THE DIGNITY OF HUMAN PROCREATION AND REPRODUCTIVE TECHNOLOGIES: ANTHROPOLOGICAL AND ETHICAL ASPECTS

PROCEEDINGS OF THE TENTH ASSEMBLY OF THE PONTIFICAL ACADEMY FOR LIFE

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Discourse of the Holy Father JOHN PAUL II

Final Communiqué

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INTRODUCTION

The formulation of the subject that was presented to the Tenth General Assembly of the Pontifical Academy for Life, both in its title and its sub-title, indicates the specific slant of the reflection that the Pontifical Academy for Life wished to pursue in relation to artificial procreation. Almost always the ‘scientific’ literature, namely popularising literature, present in this field directs attention to the effects and the results of these forms of technology. The effects themselves or the results are often considered in a partial way through mere observation of the clinical and epidemiological data: only rarely are the psychological aspects also taken into account. Ethics, which in these subjects should receive the most attention, is ‘reduced’ to utilitarian ethics and percentage terms.

The aspect that the Pontifical Academy for Life wanted to consider is the anthropological aspect in its deepest sense, its spiritual and moral sense, in order to see what conceptions of man, of mankind, of parenthood, and of the relationship between parents and children, emerge when in a technological sense the procreative moment is separated from the conjugal act in order to place the beginning of the life of an individual human in the hands of a technologist and his exploitation of it. Such an examination should take place beyond the arguments of the laboratory, which, nonetheless, can have an influence that is in itself alarming.

Many of the papers printed in this volume engage in a detailed analysis of these aspects, which refer to the being of the individuals involved, quite beyond the aspects of feasibility and technological creation. This may constitute an evaluative and cultural contribution to this field of study.

Another characteristic that provoked interest during the proceedings of the assembly and which can act as a stimulus for researchers and workers in this area is the fact that broad attention is paid to the subjects of prevention, infertility, the possibility of real and authentic therapies for some situations of infertility and some ‘aids’ towards the success of the procreative process implemented in a natural way. Adoption was also taken into consideration as a prospect for spiritual and emotional fertility of a social character.

Lastly, we should not forget the interest provoked by the papers of a juridical character on the responsibility of lawmakers in relation to the field of bio-law. Members of parliament favourable to respect for life are often in a minority. If a good law is not accepted, they find themselves in the uncomfortable situation of having to choose ‘damage limitation’ from the range of options presented, and they have to be careful not to fall into compromise or contradiction.

On this subject the Church has provided indications in the Encyclical Evangelium Vitae and then in 2003 in a further document entitled ‘A Doctrinal Note on some Questions Concerning the Involvement and the Behaviour of Catholics in Political Life’, an evident sign of an alive and debated subject.
JOHN PAUL II

Message
ON THE X ANNIVERSARY OF THE ESTABLISHMENT
OF THE PONTIFICAL ACADEMY FOR LIFE
17 febbraio 2004

Venerable Brothers, Distinguished Ladies and Gentlemen,
1. With pleasure I send you my Message on the occasion of the day on which you are commemorating the 10th anniversary of the foundation of the Pontifical Academy for Life. Once again I express my gratitude to each one of you for the Academy's high-quality service of spreading the "Gospel of life". I greet in particular Prof. Juan de Dios Vial Correa, President, Bishop Elio Sgreccia, Vice-President, and the entire Administrative Council.

First of all, I thank the Lord with you for your useful Institution which was added 10 years ago to the others created after the Council. The doctrinal and pastoral Bodies of the Apostolic See are the first to benefit from your collaboration with regard to the knowledge and facts that decisions in the area of moral norms regarding life require. This is the case with the Pontifical Councils for the Family and for Health Pastoral Care, as well as in response to requests from the Section for Relations with States of the Secretariat of State, from the Congregation for the Doctrine of the Faith and from other Dicasteries and Offices.

2. As the years have passed, the importance of the Pontifical Academy for Life has become more and more evident. However, while progress in the biomedical sciences gives us a glimpse of promising prospects for the good of humanity and the treatment of chronic and distressing diseases, it also frequently presents serious problems concerning the respect for human life and the dignity of the person.

The growing control of medical technology in the process of human procreation, discoveries in the fields of genetics and molecular biology, changes in the therapeutic treatment of seriously-ill patients as well as the spread of currents of thought of a utilitarian or hedonistic inspiration are factors that can lead to aberrant conduct as well as to drafting laws which are unjust with regard to the dignity of the person and the respect that the inviolability of innocent life requires.

3. Your contribution is also invaluable to intellectuals, especially Catholics, "who are called to be present and active in the leading centres where culture is formed, in schools and universities, in places of scientific and technological research..." (Encyclical Letter Evangelium Vitae, n. 98). The Pontifical Academy for Life was set up for this purpose, with the specific task "to study and to provide information and training about the principal problems of law and biomedicine pertaining to the promotion and protection of life, especially in the direct relationship they have with Christian morality and the directives of the Church's Magisterium" (Motu Proprio Vitae Mysterium, n. 4; L'Osservatore Romano English edition [ORE], 9 March 1994, p. 3).

In a word, your highly responsible role includes the complex subject known today as "bioethics". I thank you for your commitment to examining specific issues of great interest and likewise for furthering the dialogue between scientific investigation and philosophical and theological reflection, guided by the Magisterium. Researchers, especially those who work in the field of biomedicine, must be made more and more aware of the beneficial enrichment that can derive from combining scientific rigour and the claims of anthropology and Christian ethics.
4. Dear brothers and sisters, may your service now with 10 years of experience continue to be increasingly appreciated and supported and provide the desired results in the field of the humanization of biomedical science and the convergence of scientific research and faith. To this end, I invoke upon the Academy for Life continuous divine assistance through its Patroness, the Virgin Mary, and as I assure my remembrance in prayer to each one, I impart a special Apostolic Blessing to you all, which I willingly extend to your collaborators and your loved one.
JOHN PAUL II

ADDRESS TO THE MEMBERS OF THE PONTIFICAL ACADEMY FOR LIFE

Dear Brothers and Sisters,

1. I am pleased to be able to personally meet all of you, members of the Pontifical Academy for Life, on this special occasion when you are celebrating the 10th anniversary of the Academy's foundation. You are commemorating all the people who contributed to its birth, with a special thought for the distinguished and meritorious Prof. Jérôme Lejeune, your first President, whose memory I cherish with gratitude and love.

I thank Prof. Juan de Dios Vial Correa, President, for his kind words, and I also greet the Vice-President, Bishop Elio Sgreccia, and the members of the Administrative Council, expressing to one and all my appreciation for the great dedication with which you support the Academy's activity.

2. You are now taking part in two "Study Days" devoted to the topic of artificial procreation. The subject is proving full of serious problems and implications which deserve careful examination. Essential values are at stake, not only for the Christian faithful but also for human beings as such. What emerges ever more clearly in the procreation of a new creature is its indispensable bond with spousal union, by which the husband becomes a father through the conjugal union with his wife, and the wife becomes a mother through the conjugal union with her husband. The Creator's plan is engraved in the physical and spiritual nature of the man and of the woman, and as such has universal value.

The act in which the spouses become parents through the reciprocal and total gift of themselves makes them cooperators with the Creator in bringing into the world a new human being called to eternal life. An act so rich that it transcends even the life of the parents cannot be replaced by a mere technological intervention, depleted of human value and at the mercy of the determinism of technological and instrumental procedures.

3. Rather, it is the scientist's task to investigate the causes of male and female infertility, in order to prevent this situation of suffering in spouses who long to find "in their child a confirmation and completion of their reciprocal self-giving" (Donum Vitae, II, A, n. 1). Consequently, I would like to encourage scientific research that seeks a natural way to overcome the infertility of the spouses, and likewise to urge all specialists to perfect those procedures that can serve this end. I hope that the scientific community - I appeal particularly to those scientists who are believers - may advance reassuringly on the road to true prevention and authentic treatment.

4. The Pontifical Academy for Life will not fail to do everything in its power to encourage every valid initiative which aims to avoid the dangerous manipulation that is part of the processes of artificial procreation.

May the community of the faithful itself strive to support authentic research channels and, when making decisions, resist technological possibilities that replace true parenthood and is therefore harmful to the dignity of both parents and children.

In support of these wishes, I cordially impart my Blessing to you all, which I willingly extend to all your loved ones.

John Paul II

(official translation of the original Italian version published in "L'Osservatore Romano" di Domenica 22 febbraio 2004, p. 5)
Final Communiqué

1. This year, on its 10th anniversary, the Pontifical Academy for Life (PAV) has devoted the debates and deliberations of its General Assembly to a topic of very great contemporary relevance and strong social impact. This subject that was well expressed by the title of the meeting: 'The dignity of human procreation and reproductive technologies. Anthropological and ethical aspects'.

2. By now more than 25 years have passed since the birth of the first baby created by a procedure of fertilisation in vitro. It is estimated that since that time more than 1 million children have been born throughout the world employing the same procedures. Indeed, during these years the use of techniques of assisted reproduction has undergone a progressive diffusion in various countries of the world, in many cases leading national governments to develop specific legislation to govern the complex procedures connected with the use of these methods.

In this field as well, scientific research has invested increasing human and economic resources in order to make these 'artificial reproductive techniques' (ART) more 'effective', without, however, managing to obtain a substantial increase in the overall rate of births compared to the number of cycles of treatment. Indeed, this rate remains so low that if it were to occur in other kinds of medical treatment it would without doubt be interpreted as a clear sign of fundamental technical failure. Furthermore, in the case of artificial procreation such a low level of success, in addition to being a statistical fact attesting to technical failure, often has as a sad consequence very great suffering and disappointment on the part of couples who thus see their hopes of parenthood by this route frustrated.

Unfortunately, this negative statistical fact is tragically matched at an empirical level by an enormous loss of human embryos. This is because the greatest difficulties still to be found at a practical level in ART are specifically encountered at the moment of implantation and during the subsequent development of the embryo.

3. It should also be noted that the intervention of medicine upon the act of procreation was initiated under the aegis of helping the 'treatment of sterility' in many couples afflicted by this condition and in response to a sincere desire for parenthood. The data available today, moreover, demonstrate that the incidence of sterility in couples is increasing, above all in Western societies, a fact that invites science to engage in the demanding task of identifying its real causes and finding remedies for it. This original aim, however, has in part changed over time. On the one hand, it has at times been expressed in an approach which one might term 'self-congratulatory'. In the face of a large number of cases of sterility caused by unascertained factors, and without being concerned about engaging in further diagnostic and clinical investigations, this approach perceives in the hasty use of artificial reproductive techniques the only useful form of treatment there is. On the other hand, an even more worrying phenomenon is looming on the horizon. We refer here to the progressive emergence of a new mentality, according to which recourse to ART constitutes a preferential route - compared to the 'natural' route - to bring a child into this world because it is possible through these techniques to exercise a more effective 'control' over the quality of the conceived child in line with the wishes of those who ask for such a child. All this works in favour of seeing the child obtained through the use of ART as being on the same level as a 'product' whose value in reality depends in large measure on its 'good quality', which for its part is subjected to severe controls and careful selection. The dramatic consequence of this is the systematic elimination of those human embryos that lack the level of quality that is held to be sufficient, and, moreover, according to parameters and criteria that are inevitably disputable. Unfortunately, there are scientific and legislative initiatives designed to produce human embryos through ART to be 'used' exclusively for research purposes - which amounts to their destruction - and thereby transforming them into laboratory objects, sacrificial victims predestined to be immolated on the altar of scientific progress that has to be followed 'at all costs'.

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4. In the light of all of this, the Pontifical Academy for Life, in conformity with its institutional purpose, feels the need and at the same time the responsibility to offer the ecclesial community and civil society its contribution of thought on the subject in order to propose again to every person of good will the very great dignity of human procreation and its intrinsic meanings.

5. The coming into being of a new human being is always in itself a gift and a blessing: 'Lo, sons are a heritage from the Lord, the fruit of the womb a reward' (Psalm 126:3). Each person from the first moment of his life, is the tangible sign of God's faithful love for humanity; he is the living icon of the 'Yes' of the Creator to the history of men, a history of salvation that will be completed in full communion with God in the joy of eternal life. Each human being, in fact, from his conception, is a unity of body and soul, and possesses in himself the vital principle that will lead him to develop his potentialities, which are not only of a biological character but are also anthropological.

For this reason, the dignity (which is the dignity of the human person) of a child, of every child, independently of the practical circumstances in which his life begins, remains an intangible and immutable good which requires recognition and defence, both by individuals and by society as a whole. Among all the fundamental rights that every human being possesses from the moment of conception, the right to life is certainly the primary right because it is the pre-condition for the existence of all other such rights. On the basis of this right, every human being, especially if weak or not self-sufficient, must receive adequate social defence against every form of offence or substantial violation of his physical and mental integrity.

6. It is precisely this inalienable dignity of the person, which belongs to every human being from the first moment of his existence, which requires that his origins should be the direct consequence of suitable personal human action; only the reciprocal gift of the married love of a man and a woman, expressed and realised in the conjugal act, with respect for the inseparable unity of its unitive and procreative meanings, is a worthy context for the coming forth of a new human life. This truth, which has always been taught by the Church, is fully met in the heart of every person, as the recent words of John Paul II well emphasise: 'What emerges ever more clearly in the procreation of a new creature is its indispensable bond with spousal union, by which the husband becomes a father through the conjugal union with his wife, and the wife becomes a mother through the conjugal union with her husband. The Creator's plan is engraved in the physical and spiritual nature of the man and of the woman, and as such has universal value. (John Paul II, Address to the Participants in the Plenary Assembly of the Pontifical Academy for Life, 21 February 2004, n. 2).

7. We thus state again our firm conviction that artificial reproductive techniques, far from being a real treatment for the sterility of a couple, in reality constitute an unworthy method for the coming forth of a new life, whose beginning thus depends in large measure on the technical action of third parties outside the couple and takes place in a context totally separated from conjugal love. In employing ART, indeed, the spouses do not in any way take part in the conception of their child through the reciprocal corporeal and spiritual self-giving of their persons by means of the conjugal act. The Pope also wanted to call attention to this truth when he pronounced the following words: 'The act in which the spouses become parents through the reciprocal and total gift of themselves makes them co-operators with the Creator in bringing into the world a new human being called to eternal life. An act so rich that it transcends even the life of the parents cannot be replaced by a mere technological intervention, depleted of human value and at the mercy of the determinism of technological and instrumental procedures. (John Paul II, Address, n. 2).
8. Beyond these arguments at the level of principle, there are also certain practical circumstances in the application of ART - given present-day technical possibilities - that increase the negative ethical judgement to be applied to such techniques. Among these we may refer above all to the enormous number of human embryos that are lost or destroyed following these procedures - a real 'slaughter of the innocents' of our times; indeed, no war or catastrophe has ever caused so many victims. In addition to these embryos there are also those that for various reasons end up by being frozen. If rejected by those who have ordered them, these embryos 'are exposed to an absurd fate, with no possibility of being offered the safe means of survival which can be licitly pursued' (Congregation for the Doctrine of the Faith, Donum Vitae, I, 5). Every other reflection on this point, and in particular on the question of the (theoretical and real) possibility of a possible pre-natal adoption of these 'spare' embryos, would require a detailed analysis of scientific and statistical data on the subject, which in fact is still not available in the literature in the field. For this reason, the Pontifical Academy for Life thought that it was premature to address this subject directly during its recent General Assembly.

In addition, it should be emphasized that the implementation and the improvement of artificial techniques of reproduction, whose level of efficacy is objectively very low, require the investment of notable health care and economic resources, which are thus withdrawn from the need to treat other pathologies that are much more serious and widespread and on which often depends the very survival of entire human groups.

In the case of 'heterologous' methods of ART (that is in the case of recourse to the donation of gametes by a subject outside the couple), we are in the presence of a further element that increases the already negative ethical judgement that should be applied. The conjugal unity of the couple, in fact, is offended and violated by the presence of a third person (at times also by a fourth person), who will be one of the real biological parents of the child that has been requested. Furthermore, the right of the newly conceived child to have a man and a woman as his parents from whom his biological structure originate and who in a stable way concern themselves with his growth and upbringing, is fundamentally violated. We believe, in different fashion, that the implementation of possible medical interventions (when a real need exists for them) that are intended to facilitate the naturally carried out conjugal act or to help it achieve its natural objects (without substituting it), is morally licit (CDF, Donum Vitae, II, 6).

9. Sterility in the case of spouses who wish to find 'in their child a confirmation and completion of their reciprocal self-giving' (CDF, Donum Vitae, II, 1) can undoubtedly be a real reason for great suffering and also a source for them of further problems. There can be no doubt that such a real desire is in itself more than legitimate and a positive sign of a conjugal love that wants to grow and be expressed in all its forms. It should be stressed, however, that a more than understandable and licit 'desire for a child' can never be transformed into an arrogant 'right to a child' and, moreover, a 'right to a child at all costs'. No person can claim the right to the existence of another, otherwise the latter would be placed on a lower level of value than the one who claims such a right. In reality, a child can never be understood as an 'object of desire' to be obtained at any cost. Rather, child should be seen as a very valuable gift to be welcomed with love, whenever he arrives. The spouses are called through their reciprocal conjugal self-giving to create all the conditions needed for a new life to begin, but they cannot licitly go so far as to determine its coming forth by commissioning its 'production' in a laboratory through the work of technicians who have nothing to do with the couple itself.

It seems to us, rather, that all those efforts that modern medicine can make in an attempt to cure forms of conjugal sterility should be very strongly welcomed and encouraged. As the Supreme Pontiff himself has declared: 'I would like to encourage scientific research that seeks a natural way to overcome the infertility of the spouses, and likewise to urge all specialists to perfect those procedures that can serve this end. I hope that the scientific community - I appeal particularly to those scientists who are believers - may advance reassuringly on the road to true prevention and authentic treatment' (John Paul II, Address, n. 3.). By way of a confirmation of the sincerity of these hopes, we would like
to point out that during this General Assembly of the Pontifical Academy for Life, a number of practical programmes were presented of notable scientific interest for the therapy and treatment of certain forms of sterility in couples.

The gift of conjugal fecundity, however, should be understood in a much broader sense than biological fertility. Spousal love as a practical expression of God's love for mankind, is always called to love, serve, defend and promote human life (cf. John Paul II, Evangelium vitae, n. 29) in all its dimensions, even when, in actual fact, it cannot in a biological sense generate it. For this reason, feeling very near to spouses who are still unable to find a solution in medicine to their condition of sterility, we fraternally encourage them to equally express and realise their conjugal fecundity by placing themselves generously at the service of the very many human situations that need love and sharing. Among these, special reference should be made to the social institutions of adoption and the legal entrusting of children to families, in relation to which we hope that there will be juridical rules and regulations increasingly able to assure due guarantees and at the same time the speedy completion of bureaucratic procedures.

10. Lastly, we wish to make a final observation about the question of the role of Catholic members of parliament in relation to unjust laws in the field of human artificial reproduction. We declare ourselves in full harmony with the general moral norm, upheld by Catholic doctrine, according to which an intrinsically unjust law that clearly violates the dignity of human life - for example, in the case of legalisation of abortion or euthanasia - must be firmly opposed by believers through the institution of conscientious objection. It is never licit for a Catholic to 'take part in a propaganda campaign in favour of such a law, or vote for it' (John Paul II, Evangelium vitae, n. 73).

However, the same ratio of this norm raises questions about what form of action can be seen as morally licit when the vote in a parliament of one or more Catholics is decisive (totally or partially) in repealing an unjust law that is already being applied or supporting a new formulation of that law which limits its unjust aspects. In such a context, the giving of one's own vote - after publicly expressing one's own firm disapproval of the unjust aspects of the law itself - is ethically justifiable on the grounds that the greatest good possible and the greatest reduction of injury possible at that moment are obtained. A Catholic member of a parliament, in fact, in such circumstances, would only be morally responsible for the effects arising from the (total or partial) repeal of such a law, whereas the continued existence of the unjust elements in that law would be attributable solely to those who voted for them and supported them.

For that matter, it should be remembered that for each person there exists hic et nunc the specific moral duty to do all the good that is practically possible and one cannot deny that eliminating or reducing an evil is in itself a good.

11. The Pontifical Academy for Life once again wishes to appeal to every person of good will to consider the lofty and special dignity of human procreation, in which the creative love of God is expressed at its highest level and the interpersonal communion of the spouses is fully realised. The creativity of man and his technical-scientific capacities in this matter should, however, be at the service of the human person, for the good of the spouses and their children, without ever seeking to replace or to substitute human procreation itself.

SOME BIBLICAL SIGNS ON HUMAN PROCREATION

I would like to thank the Pontifical Academy for Life for inviting me to give the inaugural paper of its General Assembly and for its suggestion that I reflect on the theological biblical meaning of human procreation. Two years ago, indeed, on a similar occasion, I reflected on human life in itself, and today, as a continuation, my thought will be directed to the direct origin of life.

I will dwell on the first chapter of Genesis to begin with. I will then make references to this subject in other books of the Old Testament. And I will then conclude by alluding to the New Testament, with a mention of the mystery of marriage in St. Paul. The analytical reference point that will guide me in my interpretation of the sacred texts will be the Magisterium of John Paul II, who specifically at the beginning of his pontificate, and especially in the Wednesday catechesis, developed his thought on this subject.[1]

SOME REFLECTIONS ON GENESIS 1

Creation as a fundamental gift

As a premise we may observe that the verse that narrates the creation of the human being repeats the word created[2] three times. God reveals Himself fundamentally as the Creator but also as He who ‘is love’ (1 Jn 4:8) because "only love in fact gives rise to good and is pleased by good" (cf. 1 Cor 13).[3] Divine love is the reason for the creation and is its spring.

Faced with a pessimism that is widespread in so many sectors of our modern society, which often, in a frightened manner, sees the procreation of a new human being as a burden, it is urgently necessary to proclaim the joy of creation. The deepest meaning of our existence is that at its ‘beginning’ there is the creative act of love of God. At the beginning it was the Love of God for us that gave us the greatest of gifts – our existence.[4]

The removal of the sacredness of sexuality and procreation

However, because the creation was the fruit of divine love, it was not a pantheistic emanation of God: specifically because of creation the creature is distinguished infinitely from the Creator and in this sense is desacralised. In the ancient East, sexuality and procreation were strongly divinised. The various accounts of the creation of those civilisations provide accounts of divine weddings, which were prototypes of human marriage: a father-god and a mother-god beget gods. Human sexuality, a source of life, found its origin in divine sexuality and fertility and was a way by which to unite oneself to divinity (one may think here, for example, of sacred prostitution).

The religion of Israel is a surprising and unique case. God is not sexed and there is only one God. God does not marry to be fertile and no such thing as a mother-god exists. Divinity is confined to God. Everything that is not God (heaven and earth) is created. In stating that sexuality is good and the work of God, the sacred text desacralises sexuality, thereby bearing witness to its created reality. In Israel there are no myths about sexuality or fertility rites, and sacred prostitution would be an act of idolatry. Man and woman, love, marriage, and procreation are created and good realities, but realities that are distinct from the Creator.[5] The sacred in the creation is such only as likeness to the word and action of God the Creator, and to the extent to which it mirrors this likeness. In this sense, the revelation of God desacralises sexuality – it is not a participation in a divine act. But at the same time it sanctifies it,
making it a part and condition of the way in which man is the image of God and the subject of his blessing.

Man, male and female, the image of God

In the creation of God there is a break in the repetitive structure of the account (‘God said…and there was’), as though God was thinking prior to acting: ‘Let us make man in our image, after our likeness’ (Gen 1:26).[6] Man is a creature. However, this account attributes to him a likeness not to creatures but to God. Man is thought of from the outset as an interlocutor of God and as an administrator and steward of the creation.[7] To him, whose existence is a gift, God entrusted the universe as a gift.[8] He was the subject of a special love. Only after creating him, ‘God saw everything that he had made, and behold, it was very good’ (Gen 1:31).

It is in this context of the creation – of the human person and of the universe – as a gift, that Holy Scripture explains to us that this image of God, man, is a dual image: ‘male and female he created them’ (Gen 1:27). Man is a gift and an image of God in his masculinity and in his femininity. God is not sexed; however, his image is. This sexual difference means that no human being contains in himself everything that is human. It means, rather, that his complete image is formed both by man and woman. In order to discover to the full the image of God, they must so do together, co-operating with, and looking after, each other. The meaning of the sexual difference must be very important if God wanted it to be the subject of His revelation.

The image of God in procreation

Because of the fact that the human being exists as man and woman, the image does not involve only the person, but also procreation, being fertile.[9] The fertility of the sexual union of a man and a woman is a part of being in the image of God. It is a sign of the fertility of the infinite love of God the Creator. Indeed, it is directly linked to His special blessing. Offspring are a sign of this blessing and of the faithfulness of God to His original plan. In this field as well, and in a radical way, man and woman are complementary.

In the context of creation as a fundamental gift, ‘pro-creation’ becomes the multiplying of this gift through a man and a woman. In their masculinity and femininity they become tangible signs of the infinite love of God for every new human person. Implicitly, the sacred text presents man and woman as co-operators of God in bringing forth new human lives.

God formed man from the earth; man is His ‘vase’. Man was not born from a divine matrix. He already belonged to the creation. He was a creature. He was Adamah, ‘the earthy one’. But the Creator breathed into him the breath of life and this made him alive, and also a person.

The human being was not only a gift of God but also a gift for others. He was a gift to give himself. For this reason, ‘It is not good that man should be alone’ (Gen 2:18). He needed another person who was a ‘helper fit for him’ (Gen 2:18). Without his fellow he was incomplete because he could not live out his being as a gift. He needed another who was equal in dignity, ‘flesh of his flesh, bone of his bones’ (cf. Gen 2:20), who could help him.

The primordial loneliness of man in his humanity, in the experience of not finding ‘a helper fit for him’[10] (Gen 2:20), is "openness to and waiting for a 'communion of persons'.[11] The human being shows that he is a being for communion, who can be a person to the full only ‘existing “with someone” – and even more profoundly and more completely, existing “for someone”’. Indeed, "the communion of persons means existing reciprocally for, in a relationship of mutual self-giving'.[12] In fact, Adam did not create Eve and Eve did not create Adam. The Lord created them for each other. "They were given by the Creator, in a particular way, for each other"[13]
This second account reveals that the creation of the human being was a creation at the same time of "that communio personarum that man and woman form". In other words, "man became the image and likeness of God not only through his own humanity but also through the communion of persons that man and woman form from the outset", thereby becoming the "image of an inscrutable divine communion of Persons".[14]

It is no accident that the help of a fellow is for the man ('ish), woman ('ishshah), and for the woman, man. This is not help limited to work or to reproduction, but reciprocal help in all fields of existence.[15] It is a reciprocal complementariness that specifically arises from different male and female sexuality. Through masculinity and femininity they become a gift for each other.[16] In the sacred text it seems that this loneliness thus has two meanings: the first refers to his being man, to his humanity, and the second derives from him being male and female.[17]"Therefore a man leaves his father and his mother and cleaves to his wife, and they become one flesh" (Gen 2:24). The human being is not created for himself: He is created to live in communion, and in particular in that special communion of life and love that form man and woman, and which makes them fertile in procreation. The relationship man-woman is not first of all and only a sexual relationship. "Man and woman, before becoming husband and wife…emerge from the mystery of creation above all as brother and sister in the same humanity".[18] Each of them experiences that the other ‘is flesh of my flesh and bone of my bones’ (Gen 1:23).

Procreation as gift within a gift

Marriage, procreation and the birth of children are thus to be placed within this context of reciprocal complementariness and giving. Procreation is a gift within a gift. It is giving life to a new person in the giving to each other of a man and a woman with all their person, with their own masculinity and femininity.

The consequences for the ethos of man are relevant and almost self-evident. Sexuality is experienced well only when it bears witness to the spousal meaning of the body and the whole of the person, "that is to say the capacity to express love: that love in which the person-man becomes a gift and, through this gift, actuates the sense itself of his being and existing".[19] Only in this way does sexuality become a privileged space for communion, as the biblical term know expresses very well when it means having sexual relations.[20] Only "conserving the interior characteristic (that is to say innocence) of self-giving and accepting the other as a gift", [21] does becoming one flesh (cf. Gen 2:24) really involve knowledge of the other as a person and "mutual self-realisation".[22] In the context of self-giving "procreation means that man and woman (his wife) know each other reciprocally in the third, created by both"; they recognise "their humanity, their living image".[23]

Procreation is truly human procreation when it is the fruit of spousal love. Marriage, as a communion of persons, further strengthens being in the image of the Trinity, where the Holy Spirit proceeds from the Father and the Son, as divine personification of their reciprocal love. In procreating a new life the spouses experience the initial amazement of an encounter with a fellow: "She is flesh of my flesh and bone of my bones" (Gen 1:23). In procreation, God calls the spouses "to a special sharing in His love and His power as Creator and Father" "to actualise in history the original blessing of the Creator – that of transmitting by procreation the divine image from person to person."[24] Children are a gift of God, as is borne out by the words of Eve on the birth of her first child: “I have brought a man into being with the help of the Lord” (Gen 4:1). "This exclamation of Eve, the mother of all the living, is repeated every time a new human being comes into the world. It expresses the woman's joy and awareness that she is sharing in the great mystery of eternal generation. The spouses share in the creative power of God!"[25] These words express "full awareness of the mystery of the creation, which is renewed in human generation…and the creative participation of God in human generation".[26] In becoming one
flesh through the act that originates it, "each time both of them, man and woman, take up again, so to speak, this image of the mystery of creation and transmit it “with the help of Jehovah-God”.[27]

SOME REFERENCES TO PROCREATION IN OTHER TEXTS OF THE OLD TESTAMENT

My analysis of the first two chapters of the Book of Genesis has been broad because in them we find privileged testimony by which to know the original plan of God concerning man and marriage, and thus, as has been observed, procreation as well. Indeed, thanks to these accounts of the creation we can turn to the beginning, to the state of innocence of man before original sin.[28] In the rest of Scripture as well we can find this testimony to the plan of God concerning procreation, although at times it is obscured "by the hardness of the human heart".

The sacred story is rich in tales about couples, couples such as Abraham and Sarah, Isaac and Rebecca, Jacob and Rachel and Leah. Sexuality is always linked to fertility, which is at the centre of concerns, and to the point that a sterile wife can legitimately give to her husband a concubine so that he can have children through her.[29] In the Bible fertility is never seen in a negative way, as a danger to be avoided, except during periods of great catastrophes, when a mother has to undergo the trials of the suffering and death of her children. The law of the levirate strengthens the link between sexuality and offspring.[30]

Sterility is a dramatic reality for a woman.[31] It is, in fact, the worst misfortune that can befall her. The procreation of children was linked to the blessing of God, but sterility was seen as a curse.[32] The Lord blesses Abraham by promising him abundant offspring (cf. Gen 22:15-18),[33] Isaac (cf. Gen 26:4:24) and Jacob (cf. Gen 28:13-14).[34] A large number of children is the reward of the just.

This concern about procreation and offspring, however, leaves space to spousal love. On fertility could also depend the love of the husband for his wife,[35] but we also find that the love of the husband is altruistic, freely-given, and not only a matter of having offspring.[36] In a significant way, a man was exempt from military service during the first year of his marriage – "to be happy with his wife whom he has taken" (Deut 24: 5). In presenting a husband and wife as equal in dignity and shared humanity, the Book of Tobias is one of the highest points of Old Testament morality. The spouses are often called brother and sister.[37]

In the traditions of the Prophets, the relationship of God with Israel is described through the employment of the metaphor of marriage and the wedding feast to express the relationship of the Covenant, which is a relationship of love and faithfulness. The infidelity of Israel, and in a special way idolatry, and the breaking of the Covenant, are compared to the infidelity of a wife, to prostitution.[38] This indicates the importance of love and conjugal intimacy, at least as an ideal, but an ideal to be taken on and experienced as a revelation of God, even though the historical reality must have been very often different, above all during an epoch of marriages arranged by parents and marked by the subordination of women to men. The relationship of God with Israel becomes an exemplary model of the relationships between a man and a woman in marriage, the sacred prototype of human history.[39]

The Song of Songs is the book of love par excellence,[40] and is almost a development of the hymn of the first man in paradise in the presence of his woman. But it rises above this because here it is not only the man who expresses himself but also the woman. Amongst the various readings that this book allows, one is that of a song to the goodness and beauty of human love, which would be the symbol of the love of Jehovah for his people.
"The time is fulfilled, and the kingdom of God is at hand; repent and believe in the Gospel" (Mk 1: 15). The Kingdom of God is already present in the person of Jesus, who fulfils the prophecies. His healings and in a special way his forgiveness of sins show that the Kingdom of God is an event of salvation. Jesus is ‘the God with us’ who saves man, who heals him totally and restores him in his dignity, the dignity of the beginning.

Such salvation, healing and restoration are also applied to sexuality, to marriage, and to procreation. We do not find long speeches on these subjects, only the reference of Jesus to the requirements of the Ten Commandments (cf. Mt 5:27; 19:18) and the original plan of God for man from the beginning (cf. Mt 19:3-9). But it is above all in his encounter with men and women who are wounded in their sexuality that Jesus shows that human love and sexuality are healed by him, by the advent of the Kingdom. Thus is inaugurated a new life where the relationship of a man and a woman – and thus procreation as well – is fulfilled in its original beauty and truth. Christ is the Spouse who reveals to us the truth of love and shows us the path to take. From this arrival of grace come two new realities: indissoluble sacramental marriage – whose indissolubility as natural marriage was obscured by the hardness of the human heart – and celibacy for the Kingdom of Heaven (cf. Mt 19: 11.12) – realities called to be fertile but having different fertilities.[41]

In the New Testament as well the relationship of God with men and with the Church is narrated with the metaphor of marriage, of the wedding feast.[42]

The fifth chapter of the Letter to the Ephesians

All of this emerges clearly in the fifth chapter of the Letter to the Ephesians. This chapter, whose subject is the practice of the Christian life, begins with St. Paul’s exhortation to the effect that life should be an imitation of God, and finishes by speaking about the family and in concrete terms of marriage as participation in the mystery of God.

In the framework of marriage conceived as such, procreation appears as an imitation of the mysterious fertility of God. The mystery is the mystery of God, the mystery of the Trinity, and the mystery of the redemptive Incarnation of the Son of God. Thus one comes to the summit of Revelation on the subject of Procreation.

As an imitation of divine fertility, procreation must share in the real life full of love, which is the Triune God: God the Father, the spring of life, in the truth of his Son, full of Love, who is the Spirit. Procreation thus enters into participation in the Trinitarian Mystery, which throws definitive light on the biblical presentation where procreation was conceived as the openness of a person to another person in a third received as a gift, that is to say in the child. The gift of human procreation has its authenticity in participation in the gift of the Trinitarian fertility: the Father in his infiniteness, totally, gives Himself in His Son, His Word, who is thus created for the whole of eternity; and the Father and the Son encounter each other in that total loving giving – the Holy Spirit. The fertility of the Trinity lies in infinite mutual giving. Thus the mystery of human procreation is seen in its most intimate reality – total and absolute giving.

But this wonder, the absolute origin of all life, comes to spouses only through participation in the marriage of God to humanity, that is to say in the Incarnation of the Word of God. Thus the fertile Mystery of God becomes history. But in this Wedding, as we well know, the spousal gift of God to humanity is only made through the cross. Thus, for human procreation to be really fertile, it must pass through the cross. So that human procreation can reach Trinitarian happiness, it must have the sign of resurrection, and this sign is impossible if it does not first pass through the death of Christ.
Specifically within this mystery of paschal fertile union, of which the Kingdom of Heaven is made up, one can understand why celibacy and virginity as union directed to the dead and risen Christ can be even more fertile and worthy that the already sublime procreation of Christian spouses. To understand and experience, in particular, this New Testament dimension of fertility is above our capacities, and a man and a woman cannot attain it unless it is conceded to them as a very special gift.[43] This special gift of Christ "is his spirit, whose first fruit (cf. Gal 5:22) is charity".[44]

In my modest contribution of two years ago I concluded that life was nothing else but giving. I then tried to present some ideas deduced from the logical difference between contradiction and opposition applied to the unfathomable Mystery of God. Today, casting a glance over the Biblical texts, I have come to the same conclusion: ‘life is giving and receiving, although as the Lord says: "It is more blessed to give than to receive."[45]

[1] Going through Holy Scripture I have found only four instances when procreation is referred to: Gen 30:1; 44:27; Deut 21:15; 32:18. There are many similar headings: to beget, begetting:221; cleave to/know a wife: 10; to give birth, birth: 193; with child: 18; to be born: 48; womb: 36, etc.

[2] As is known, the first account, of the Heloistic tradition, chronologically preceded the second account and goes back to the sixth century BC, during the exile in Babylonia.

[3] ‘So God created man in his own image; in the image of God he created him; male and female he created them’ (Gen 1:27).

[4] Giovanni Paolo II, Uomo e donna lo creò. Catechesi sull’amore umano (Città Nuova Editrice/Libereria Editrice Vaticana, Roma, Vatican City, 1985, 4th. edn. 1995), p. 73 (catechesi n. 13, 2 gennaio 1980); cf. ibid. p. 81 (catechesi n. 16, 6 febbraio 1980). In this paper the italics in the original text have been removed. ‘And God saw everything that he had made, and behold, it was very good’ (Gen 1:31).

[5] ‘Thus the creation, as an action of God, does not only mean the calling into existence, and the establishing in existence, of the world and man in the world, it also means, according to the first account, “beresit bara”, a gift, a fundamental and ‘radical’ gift, that is to say a gift where the giving arises specifically from nothing’ (Ibidem).

[6] ‘It should be observed, however, that the power to create is not understood here as a reflection and an expression of man’s likeness to God. Pagan mythology expressed in various forms the mystery of procreation…In this way it seemed to man that he had acquired access to, and participation in, the world of the gods…It is thus significant that the capacity to procreate is carefully distinguished from the likeness to God and is expressed as a special form of blessing’: G. von Rad, Genesi. Traduzione e commento (Paideia Editrice, Brescia, 1978, 2nd. edn.) pp. 71-72.

[7] There are a large number of interpretations of this likeness of man to God: his existence, his rationality, his being capable of love, his dominion over the creation, his being an interlocutor of God, etc. I think that they do not mutually exclude each other but rather that they should be seen as being complementary, although one should emphasise man’s capacity to form a relationship, above all else with God. A great deal has been written on the term ‘likeness’. The Holy Fathers have tended to see an ontological value in man’s being in the image of God and the ethical level and divine filiality in man’s being in the likeness of God.

[8] ‘…fill the earth and subdue it; and have dominion over the fish of the sea and the birds of the air and over every other living thing that moves upon the earth’ (Gen 1, 28).

[9] ‘…in the whole of the work of the creation, only of him can one say that he was rewarded with a gift: the visible world was created ‘for him’…: the creation is a gift, because in it appears man who, as the ‘image of God’, is able to understand the meaning itself of the gift in the call to existence from nothing’: Giovanni Paolo II, Uomo e donna lo creò, p. 73, (catechesi n. 13, 2 gennaio 1980).
And God blessed them, and God said to them, “Be fruitful and multiple, and fill the earth” (Gen 1, 28). The image of God also exists in the union of a man and a woman in marriage, the ‘primordial sacrament’. John Paul II develops this point in his comment on Ephesians 5:21-23: cf. Giovanni Paolo II, Uomo e donna lo creò, pp. 343-388 (catechesi nn. 87-100, dal 28 luglio al 24 novembre 1982). The subject of marriage is implied in Genesis 1 but appears explicitly in Genesis 2: ‘Therefore a man leaves his father and his mother and cleaves to his wife, and they become one flesh’ (Gen 2: 24).

Cf. Giovanni Paolo II, Uomo e donna lo creò, pp. 44-47 (catechesi n. 5, 10 ottobre 1979).


[14] Ibid., p. 59 (catechesi n. 9, 14 novembre 1979).


[17] Cf. C. Westermann, Genesi, Commentario (Piemme, Casale Monferrato, AL, 1999), p. 34.


[19] Ibid., p. 89 (catechesi n. 18, 13 febbraio 1980). Perhaps, therefore, the analogy of sleep indicates here not so much passing from the conscious to the subconscious but a specific return to non-being (sleep has in itself a component involving the elimination of the conscious existence of man), or to the moment prior to the creation, so that from it, through the creative initiative of God, the solitary ‘man’ can re-emerge in his dual unity of male and female…In this way, the circle of the loneliness of the person-man is broken because the first ‘man’ awakens from his sleep as ‘male and female’: cf. pp. 55-56 (catechesi n. 8, 7 novembre 1979).

[20] Giovanni Paolo II, Uomo e donna lo creò, p. 77 (catechesi n. 15, 16 gennaio 1980). The spousal meaning of the body is one of the cardinal points of the catechesis of the Holy Father on human love. See especially Ibid., pp. 74-89 (catechesi nn. 14-17, 9 gennaio – 6 febbraio 1980).

[21] ‘Adamo si unì a Eva sua moglie’ (‘Adam knew Eve his wife’)…If we connect to ‘knowledge’ that first fact of the birth of a man on earth, we do so on the basis of a literal translation of the text, according to which the conjugal ‘union’ is defined as ‘knowledge’. In fact, the translation referred to reads as ‘Adamo si unì a Eva sua moglie’, whereas this should be translated more specifically as ‘conobbe sua moglie’ (‘Adam knew eve his wife’), which seems to correspond more adequately to the Semitic term ‘jada’: Ibid., pp. 93-94 (catechesi n. 20, 5 marzo 1980).

[22] Ibid., p. 85 (catechesi n. 17, 6 febbraio 1980).

[23] Ibid., p. 98 (catechesi n. 21, 12 marzo 1980).

[27] Giovanni Paolo II, Uomo e donna lo creò, p. 99 (catechesi n. 21, 12 marzo 1980).
[29] ‘And it is also significant that when referring to Genesis 2:24 Christ not only connects the ‘beginning’ to the mystery of creation but also leads us, so to speak, to the boundary of the primitive innocence of man and original sin’: Ibid., p. 37 (catechesi n. 3, 19 settembre 1979).
[30] As is the case with Sarah and Abraham (cf. Gen 16:1-4) and Rachel and Leah with Jacob (cf. Gen 30:1-13). The desire to have offspring leads Lot’s daughters to lie with their father ‘that we may preserve offspring through our father’ (Gen 19:32), and the Israelites to find virgins for the Benjaminites (cf. Judges 21:8-14) and the Benjamites later to kidnap other women (cf. 21:15-23).
[31] The death of Onan is emblematic (cf. Gen 38:8-10), as is the case of Tamar who dresses as a prostitute to ensure offspring for her dead husband (cf. Gen 38:12-30).
[32] As was the case with Rachel, the wife of Jacob, in Genesis 30:1 (“‘Give me children, or I shall die!’”), and Hannah, the wife of Elkanah, in 1 Sam 1:5-16.
[33] In this sense the ceremony for a jealous husband is instructive: ‘then let the priest make the woman take the oath of the curse, and say to the woman, ‘the Lord make you an execration and an oath among your people, when the Lord makes your thigh fall away and your body swell; may this water that brings the curse pass into your bowels and make your body swell and your thighs fall away’…But if the woman ha not defiled herself and is clean, then she shall be free and shall conceive children’ (Num 5, 21-22, 28).
[34] See also Gen 13:16; 15:5; 17:3-8, 15-16, 20; Sir 44:21.
[36] As is the case with Leah’s assumption about Jacob: ‘Because the Lord has looked upon my affliction; surely now my husband will love me…Now this time my husband will be joined to me, because I have borne him three sons’ (Gen 29:32, 34; cf. 30:20).
[37] As in the case of Abraham and Sarah, and Elkanah and Hannah: ‘And, although he loved Hannah, he would give Hannah only one portion, because the Lord had closed her womb…Therefore Hannah wept and would not eat. And Elkanah, her husband, said to her, “Hannah, why do you weep? And why do you not eat? And why is your heart sad? Am I not more to you than ten sons? (1 Sam 1:5-10). ‘So Jacob served seven years for Rachel, and they seemed to him but a few days because of the love he had for her…So Jacob went in to Rachel also, and he loved Rachel more than Leah’ (Gen 29, 20.30). See also Genesis 24:67 on Isaac and Rebecca. Given the mentality of the time, we find expressions of the love of a husband for his wife but never vice versa.
[38] ‘Take her right now, in accordance with the law. You are her relative and she is yours. The merciful God will guide you both for the best’ (Tob 7, 12). Cf. Tob 5:22; 7:15; 8:4-5, 21; 10:6:13.
[41] Karl Barth connected this to the text of Genesis 2, the Jehovah account of the creation of man and woman.
[42] ‘And every one who has left houses or brothers or sisters or father or mother or children or land, for my name’s sake, will receive a hundredfold, and inherit eternal life’ (Mt 19:29). ‘By this my Father is glorified, that you bear much fruit…You did not chose me, but I chose you and appointed you that you should go and bear fruit and that your fruit should abide’ ((Jn 15:8, 16).
John Paul II, Encyclical Letter The Splendour of Truth Shines (6 August 1993): ‘To imitate and live out the love of Christ is not possible for man by his own strength alone. He becomes capable of this love only by virtue of a gift received’ (n. 22). ‘Love and life according to the Gospel cannot be thought of first and foremost as a kind of precept, because what they demand is beyond man’s abilities. They are possible only as the result of a gift of God who heals, restores and transforms the human heart by his grace’ (Ibid., n. 23). Cf. Ibid., nn. 102-105.

Ibid., n. 22.

‘Beatius est dare quam accipere’ (Makavriovnejstinma'llondidovnaih^ lambavnein), (Acts20:35)
HELEN WATT

PARENTHOOD AND NEW REPRODUCTIVE TECHNOLOGIES: ANTHROPOLOGICAL CONSIDERATIONS

PARENTHOOD AND THE SEXUAL ACT

Sexual conception in marriage is designed to give the parents an experience of real, though partial, causal involvement in the child’s creation. The child should be experienced as partially caused by the act of self-giving between husband and wife, and partly received as a gift from God completing the process they began. As Mgr Livio Melina has rightly observed,[1] the fact that the couple do not directly bring about a child, but rather receive a child as something in addition to their own act of bodily giving and receiving protects the parents from feeling an excessive, God-like responsibility for the child. In contrast, non-sexual conception[2] encourages the exercise of excessive power and control over the child, even if this power and control is in practice exercised by doctors on the parents’ behalf. Paradoxically, non-sexual conception can also give the parents a feeling of causal disempowerment, as they rightly perceive conception taking place in a way which excludes them as a couple. This is perhaps especially so with the father, who is not, as the mother is or may be,[3] involved in the child’s gestation. Even in the case of sexual conception, men are at somewhat greater risk than women of feeling disassociated from the child resulting from their necessarily externalized genetic contribution. This risk is very much increased where the man’s contribution does not result from an interpersonal act with its own intrinsic dignity, but results from a solitary, depersonalized act of providing sperm for a process of production. This act has the goal of conception, but has no meaning relating to the marriage independent of that current goal. The act of obtaining sperm, and subsequent acts, simply express an intention to participate in the production of a child. The necessary separation referred to by Mgr Melina between the act of love of the parents, and the child received as the crowning of that act, is here replaced by a utilitarian sequence of events totally geared towards the child projected as the outcome of a technical procedure.

GIFT after sexual intercourse
So much is accepted by Catholic ethicists who acknowledge the wrongness of IVF and GIFT as practised in a secular context. I will now say a few words about a more difficult and disputed question among Catholic ethicists: the question whether the child can be said to be the fruit of married love when intercourse is combined with a practice such as GIFT or artificial insemination, where sperm is removed after intercourse and then placed inside the woman’s body. I am thinking, in particular, of cases where the sperm is collected via intercourse using a perforated condom. In this case, does the father still retain the experience of causal responsibility for the child, who is received as a direct result of intercourse between him and his wife? Alternatively, do we have a case of child production following two parallel effects of intercourse: the partial union of the couple and the wholly non-unitive production of the sperm which is intentionally withheld?

What does it mean to say that a child should be the ‘fruit of the conjugal act’?[4] To quote Donum Vitae again,[5] what is the ‘proper end’ of the conjugal act which a doctor should promote? The end is surely that the gametes be brought together by means of the act. It is not sufficient that the act make sperm available for some later reproductive project. Rather, the sperm should be received directly by the woman, and that receiving should itself contribute to the sperm’s eventual union with the ovum. Intercourse should unite the couple completely, and that uniting should unite the gametes, or at least bring them closer together, even if technology must complete the process. The child should be the fruit of the sexual act ‘normally performed’,[6] not the fruit of a withholding from the union of the
wouple,[7] followed by the withdrawal and reinsertion of the sperm. It is not respectful of the sexual act to treat it as a means for making sperm available which is not involved in sexual union, even if the same sexual act independently achieves a partial uniting. The woman should receive her husband in a total sense; to use a sexual act as a means for collecting sperm which is deliberately divided from the woman’s body respects neither her role nor her husband’s. A uniting should cause a uniting: the child should be the fruit of married love.

Even in a case where no condom was used, so that marital self-giving was in no way compromised by the intentional withholding of sperm, the withdrawal of sperm from the woman’s body would nullify the effect of intercourse in bringing sperm and ovum closer together. The father in this case would be justified in thinking that he did not cause – even partly – the uniting of the gametes: he merely made sperm available which was later brought towards the ovum by a technical procedure. In contrast, if the sperm were merely assisted in its journey towards the ovum, the man would know that he contributed to causing that journey, and thus to causing conception. It is not necessary that the entire journey be caused by the husband and wife: after all, no sexual act could cause conception were it not for the final act of God in creating a new soul. Providing intercourse unites the couple, where that very uniting brings sperm and ovum closer together in a way that is not then cancelled by the sperm’s subsequent removal,[8] the child owes its origin to an act with the kind of human dignity that his or her own dignity requires. It is the child, not just the sperm, who must come from the union of the parents. To protect the role of the father, who is, even more than the mother, the ‘giver’ in relation to the marital act,[9] the link between his gift of himself to his wife – including the gift of his sperm – and the causing of conception needs to be protected[10]. To fail in this is to risk the very disassociation from a proper sense of responsibility for the child which we see elsewhere in assisted reproduction. For the man, fatherhood is self-donation in a very rich sense, relating not merely to his providing sperm which results in conception, but to his providing sperm as an immediate part of his gift of himself to his wife[11]. His role in giving, and his wife’s role in receiving, and the role of both in causing the bodily conditions for the gift of life, may not be replaced, though they may be supplemented, by a technical procedure.

PARENTHOOD AND THE SUBSTITUTION OF MATERIAL

What are some other problem cases in relation to parenthood and new reproductive technologies? We should begin by noting the need for respect for fatherhood and motherhood even in relation to techniques which will not result in children. The fertilization of animal ovum by human sperm is disrespectful of human fatherhood, even if there is no risk in practice of generating humans – or, perhaps, non-human animals. In the same way, even if we could guarantee that ‘parthenogenesis’ would not produce a genuine human embryo, the stimulation of an ovum to produce embryo-like development seems to be too close to human conception for it to be morally acceptable. People should see their reproductive powers as special, reserved for the context of marriage. Respect is required for the most important goal of one’s reproductive powers: the conception, birth and rearing of a child. This goal must be honoured, even in relation to activities where no part of that goal can be achieved. For a human being to make a substantial contribution to what resembles – but is not – a human or animal embryo is for that person to fail to acknowledge the dignity of children and of parenthood. Indeed, even if the scientist is not using human reproductive powers as such, but is using a human nucleus, not a sperm, to activate an animal ovum, it is morally relevant that the human nucleus is substituting for the reproductive powers of two animals, or two human beings. We fail to respect human parenthood when we engage in an activity which is both too close to, and too remote from, marital conception.

However, it is sometimes difficult to tell when there has been a significant intrusion on marital conception, as opposed to a legitimate, health-promoting intervention. Where the aim is to bring about
conception, it is important for a child’s sense of identity, and for the parents’ sense of causal and moral responsibility for the child, that there should be no ambiguity as to who the parents are. However, some forms of genetic contribution to conception, apart from the contribution of two ‘full’ genetic parents, seem morally permissible in principle, even if not in practice, due to safety concerns. If germ-line therapy is morally wrong, it is because of the use of IVF and the risks posed to future generations, not because the scientist is contributing perhaps as little as one gene to the formation of future generations. Admittedly, there is some sense in which the scientist could be said to be replacing what the parents do in forming the body of their child. However, even somatic gene therapy in a sense replaces what the parents do: i.e., contribute genetically to the makeup of a certain part of their child’s body. No-one would say that somatic gene therapy is an immoral replacement of the parents’ contribution to their child’s genetic makeup. For that matter, other medical techniques contribute in non-genetic ways to a person’s makeup at a certain time.

Fertilisation of ‘combination’ ova
However, it remains the case that contributing material to a child’s immediate formation is par excellence a parental function. What should we say about the proposal to treat mitochondrial disease by creating a ‘combination’ ovum for use in IVF? In this technique, the nucleus would be taken from the ovum of a woman with mitochondrial disease, and placed inside a donor ovum, from which the nucleus had been removed. The combination ovum would then be fertilized in vitro, and a child would (or might) result. Leaving aside the fact that IVF is not, in any case, morally acceptable, is not this procedure even more disordered than standard IVF in creating two ‘partial mothers’ for the child? Despite the fact that very few genes are contained in the mitochondria, this seems a different sort of intervention from germ-line therapy as normally envisaged – i.e., germ-line therapy involving one gene only, which is not derived from a gamete. In the case of ovum nuclear transfer, the woman providing the mitochondrial genes, together with the rest of the ovum, is doing part, though only part, of what a mother does in conceiving a child. In the same way, the woman providing the nucleus from her ovum is acting as a mother in a partial and fragmented way. There is more to an ovum than its nucleus, and to make a combination ovum from two women is to introduce a real ambiguity into the parentage of any child conceived from that ovum.

It is interesting to compare this technique with a fertility technique whereby the ooplasm of an infertile woman’s ovum is supplemented by the injection of ooplasm from a donor ovum prior to fertilization. When this technique was first carried out, it was found that the donor mitochondria were supplanted by the native mitochondria during gestation. However, tests on two one-year-old children conceived in this way have shown a genetic contribution from the donor, as well as from the birth mother and father. The donor contributed both to the child’s conception, and to his or her later composition, part of what a mother contributes when she conceives – i.e., mitochondria from her ovum. It is doubtful whether such a contribution is morally permissible, even apart from concerns raised by IVF, and by effects on the germ-line. However, it is interesting to speculate on whether the situation would be improved if the donor ooplasm did not come from another woman’s ovum, but was synthetically produced. It is at least arguable that this would be morally preferable, since it would not introduce a rival candidate for the role of mother of the child. This is not, however, to say that there are no limits to the amount of synthetic material which could be introduced without damage to the parents’ role.

Ovum nuclear transfer seems harder to defend than injection of donor ooplasm into the birth mother’s ovum, since it involves subtracting from, and not merely adding to, the birth mother’s ovum, and since the donor’s contribution is not merely a supplement of ooplasm - albeit containing some mitochondria - but large portions of the ovum, which will become the body of the zygote. If a child conceived after such a process were to conclude that he or she had two mothers, this conclusion would not be unreasonable. In the same way, if the woman providing the donor ovum were to feel that she had
maternal responsibilities to the child, it would be difficult to argue that she was altogether wrong in this belief. For example, if the child wanted to meet the donor in later life, the donor might have a duty to agree – and perhaps even to care for the child should he or she be orphaned or abandoned.[18]

EMBRYO ADOPTION

Another area of perplexity lies in determining under what circumstances a new mother may be provided for a child already in existence. Ideally, genetic, gestational and social motherhood should all go together: one should not plan in advance of conception to separate these aspects of motherhood[19]. However, adoption after birth is morally acceptable, at least in some circumstances, although it is wrong to conceive a child deliberately with the aim of giving it up for adoption. More doubtful is the question of ‘adoption’ or ‘rescue’ of an in vitro embryo. Granted that it is wrong deliberately to conceive a child intending for him or her to be gestated and/or brought up by another woman, are there any circumstances in which an abandoned frozen embryo, or an embryo the genetic mother was incapable of gestating, might be transferred to the body of a woman who plans to raise the child as her own?

This is a difficult question, on which there is much to be said on both sides. We should begin by stressing the special significance of pregnancy with regard to parenthood. Pregnancy is not just another form of nurture, like (for example) breastfeeding. Care for a child after birth is normally shared with other people, at least to some extent, and even breastfeeding may be readily shared if there is some good reason for doing so. In contrast, pregnancy is a more private and exclusive relationship, establishing a bond between parents and child before the child’s more public life. However, it should be remembered that embryo adoption would not involve surrogacy, in the normal sense of the term, since the woman adopting the embryo would plan to act as a mother after birth. Pregnancy would therefore retain its significance as a sign of the uniqueness of the parent-child relationship, and the parents’ later commitment to the child, though it would lose its normal significance in regard to the child’s origin. While in postnatal adoption pregnancy retains its significance in regard to origin, but loses its significance in regard to the child’s later care, in embryo adoption, pregnancy would signify a permanent commitment to the child, while losing its significance – in this case, before the pregnancy begins - in regard to the child’s origin.

It might be objected that the division of genetic from gestational motherhood in embryo adoption is more serious than the division of gestational from social motherhood in adoption after birth. Embryo adoption, it might be said, falsifies what has always been a uniquely reliable sign of a child’s origin: pregnancy and childbirth. Moreover, to encourage maternal commitment may be more important early in the mother-child relationship than after the woman has bonded with the child, such that any suggestion that this commitment might be transferred to another woman may militate against the genetic mother’s feelings of responsibility for her child.

Alternatively (or in addition) one might argue that pregnancy should always be the result of marital intercourse (leaving aside the accident of twinning, and the special case of the Incarnation)[20]. However, this argument should, I think, be rejected, since it leads to counter-intuitive results. If it is immoral to become pregnant in a non-sexual way, then not even a genetic IVF mother may have her embryos transferred to her womb. Moreover, it will also be immoral for the mother of an ectopic embryo to have that embryo transferred to her womb – for example, after the fallopian tube has been removed with the embryo inside. Any attempt to reimplant the ectopic embryo after its removal will necessarily involve initiating a pregnancy in a non-sexual way. The woman is no longer pregnant once her embryo has been removed, whatever her subsequent intentions: she could theoretically have the embryo frozen for many years, and even give birth to other children, before the embryo was reimplanted. At least in cases where a maternal relationship – genetic and/or gestational – already exists with the child, it does not seem to be wrong in principle to establish a pregnancy via a technical
procedure. Of course, if a genetic relationship already exists to the child, the significance of birth in relation to the child’s genetic origin will not be falsified by the transfer of that embryo. However, even a woman who has been gestating a child who is genetically not her own would surely be entitled – perhaps even obliged – to allow her ectopic embryo to be reimplanted. Indeed, if we see a value to the fulfillment of ongoing care commitments, then such a woman has a right and duty which is now prior to any right or duty of the genetic mother of that embryo. Motherhood should not be ‘re-fragmented’ by transferring the child who has been gestated by one woman - and could again be gestated by that woman - to the body of another. Although the gestational mother is not pregnant unless and until the embryo is reimplanted, she has nonetheless been interrupted in the task of nurturing her child to birth, such that to recognize an ongoing duty of care does not seem far-fetched.

Among those who have argued strongly against the legitimacy of embryo adoption/ rescue is the philosopher Mary Geach. Dr Geach bases her argument on the fact that, as she sees it, the woman’s part in normal marital intercourse is that of allowing an intromission of a kind to make her pregnant. On this understanding, for a woman to allow embryo transfer is a choice at once too close to, and too far removed from, the marital act. Dr Geach is, however, uncertain whether to allow embryo transfer of one’s own genetic child after IVF, or after ectopic pregnancy, rightly noting that in such cases the woman already has a relationship with the child to be transferred. However, if having one’s own genetic embryo transferred is allowable - as Dr Geach thinks it may be – then an impregnating intromission need not express a marital relationship. Not only is the intromission in embryo transfer not in any way sexual, but the woman may not even be married to the father of her child. Dr Geach’s argument would be greatly strengthened by seeing the wrong-making intention as that of becoming a mother by an intromission or by any similar procedure[21] apart from marital intercourse, rather than that of becoming pregnant by such a procedure. The wrong-making intention in IVF is, on this theory, that of becoming a mother (i.e., through conception itself) by a technical procedure, rather than that of allowing the child so created to be transferred to one’s body. And given that a woman also becomes a mother by having a child transferred with whom she has no prior relationship, perhaps embryo adoption is also too close to, and too far removed from, the marital act for it to be morally permissible.

[2] We can imagine a case in which deliberate sexual conception – say, by means of rape – has a similar effect, because the other person, though not in fact a tool or object, is treated as if he or she were. Here there is no act of relating, in a bodily way, to the other human being as a person, and thus no human focus to stand between the agent (in this case the rapist) and the causing of conception. However, in most cases sexual conception, even outside marriage, is superior to IVF in focusing on persons, rather than on parts or tools (or human beings as parts or tools).
[3] I am speaking here of the genetic mother, who may be replaced by a ‘surrogate’ mother - herself with maternal rights and duties - in the gestation of the child.
[7] It may be objected that the sperm is not withheld in this case with a contraceptive motive. However, this is not sufficient to safeguard the structure of the sexual act, which should be one of unreserved self-giving. Openness to life means openness to the life-causing aspect of intercourse at fertile times; not
the mere intention that intercourse be somehow followed by life. Were the latter intention sufficient, intercourse with a standard condom followed by IVF or GIFT would be morally permissible.

[8] An analogy might be with someone who goes on a journey— for example, from Rome to Milan. If I were to begin walking up to Milan, and was given a lift by car at some point in my journey, the person who gave me the lift would have ‘helped me’ to get to Milan. In contrast, if I got a lift back to Rome, and was then taken to Milan by car, I would not have been ‘helped’ to get to Milan; I would have been ‘taken’ to Milan.

[9] Theologically, the more active role of the man mirrors the role of Christ in relation to the Church, who is receptive and fruitful in responding to the grace Christ provides.

[10] It is important for the integrity of fatherhood that the very same act which ‘produced the gift’— in the sense that sperm left the man’s body as a part of marital self-giving— is also responsible, or partly responsible, for causing conception. Thus it would be wrong if sperm obtained from one sexual act (say, before the man had cancer treatment which would leave him infertile) were separately conveyed to the body of the woman by means of another sexual act. I am grateful to Anthony McCarthy for this point, and for other helpful comments on this paper.

[11] In contrast, the presence of the ovum in a suitable place for conception to occur is not caused by intercourse, and may therefore be wholly brought about by a technical procedure.

[12] I am assuming here that the scientist is contributing to, not replacing, the child’s formation via fertilization. In contrast, if a child were produced by adding genes to a non-human entity resulting from a faulty fertilization, this would not be morally acceptable. Here we would not be assisting the mother and father in causing fertilization as an end-result of their sexual act. Rather, we would be producing a child by other, non-sexual means— albeit from material which could, in theory, be sexually created.


[14] Even if ovum nuclear transfer were combined with sexual conception, it would still be unacceptable, as the child would not result from the integral self-giving of husband and wife— their giving of their fertile selves without reservation. The woman would not, after all, give her ovum in giving the nucleus of her ovum: her contribution would be restricted to the nucleus alone. Despite the fact that the couple want a child, and are trying to conceive by sexual intercourse, their sexual union is not, in fact, open to life, in the sense of being fully open to the woman’s own fertility. The woman is giving only part of what she should give, together with something she has no right to give— a large part of another woman’s ovum.


[17] An analogy might be with the use of incubators or artificial wombs for babies born premature: this does not raise the same moral problems as the transfer of a premature baby to the body of a woman not its mother.

[18] Similarly, if the woman who provided the nucleus were to refuse to gestate the child created, the woman who provided the rest of the ovum might have a duty to gestate the child herself.

[19] I am assuming here that the intention is to conceive and then relinquish/abandon a child whom one is able to care for oneself. A separate question is whether it is permissible to conceive a child deliberately - as opposed to taking the chance of conception - whom one will not be physically able to gestate and/or raise (for example, due to a terminal condition). It might be argued that a woman has a responsibility not to conceive a child deliberately unless she is able to nurture him or her in early
childhood – a stage entrusted to the mother in particular – and unless the father is able at a later stage to care for the child if she cannot.

[20] Mary Geach sees the case of the Incarnation as consistent with what she regards as morally required for a woman to allow herself to be made pregnant, in that Mary by her fiat expresses a ‘permanent, sexually-exclusive relation to the father of her child’ (GEACH M.C., Rescuing frozen embryos, in FURTON E.J. and MITCHELL L.A. (Eds), What is man, O Lord?, Boston: The National Catholic Bioethics Center, 2002:217-230). Dr Geach observes that Mary ‘… is not performing an act of admission allowing a spatial intromission, so she is not performing a version of the marriage act, though in her relation to God the same reason for sexual exclusiveness exists (par excellence) as in the case of the marriage relationship’ (p.222). Embryo adoption/rescue was originally discussed by Dr Geach and myself in GEACH M., WATT H., Are there any circumstances in which it would be morally admirable for a woman to seek to have an orphan embryo implanted in her womb?, in GORMALLY L. (Ed.), Issues for a Catholic bioethic, London: The Linacre Centre, 1999:341-352. See also WATT H., A brief defense of frozen embryo adoption, National Catholic Bioethics Quarterly 2001, 1:151-154.

ADRIANO BOMPIANI

THE HISTORICAL DEVELOPMENT OF TECHNOLOGIES AND THEIR IMPACT ON THE PROCESSES OF HUMAN PROCREATION

PRELIMINARY CONSIDERATIONS

Document's subject

This report intends to explain “technical-operational” aspects of the in vitro procreation’s technologies, as an introduction to the whole anthropological, ethical and juridical considerations other speakers will deal with.

The opinions expressed in this text derive from the analysis of literature and not from a direct personal experience. The author does not put into practice any of the techniques included in the generic denomination of ART (Artificial Reproductive Technologies). This can be considered from some a “weakness”, from others an “advantage” for the reliability of the same text.

Since these techniques have been introduced in the clinic of human fertility and sterility, it cannot be denied that there have been continuous researches to improve their results in laboratories and schools with suitable biological preparation. Nevertheless it was also in pursuit of priorities, “sensational” results and there were improvisations by some adventurers as well.

During the exposition, we will try to emphasize the “historical” evolution of the deepening of various problems and the reasons of the selected solutions. The field of analysis is, obviously, very wide and it cannot be reported here but with short indications to the essential lines and, as far as possible, with a “not specialistic language”.

As everybody knows, there are three principal methodologies in the development of the technology denominated “assisted procreation” in proper sense (ART):

a) the IVF-ET (In Vitro Fertilisation-Embryo Transfer), or FIVET (IVF);
b) the Gamete Intrafallopian Transfer (or GIFT);
c) the direct injection of the sperm inside the cytoplasm of the oocyte (or ICSI, Intra Cytosplasmic Sperm Injection):

A short notice must be made, moreover, also to the Intrauterine Artificial Insemination that - for many years - has preceded the advent of the ART and that is still used in clinical practice.

Of course, as years go by, several variations to the above mentioned ART “basic” techniques have been realized, even if they maintain still now a notable experimental component despite their wide use in the past and in the present as well.

One more note: in order to well understand the reasons that have brought to the different attempts of solution of the problems set by the ART, it is necessary to know the fundamental events of the mammal reproduction’s biology and in particular the human’s one: from the gamete preparation in the two organisms that will be reproduced - male and female -, to the events under the control of the ART that will develop mostly during the first 48 - 72 hours of life of the embryo (maximum to the 5th day). This time is very short per se, but so important for the future development. To this purpose the reading of the whole report presented here by Professors A. Serra and R. Colombo, “Identity and statute of the human embryo: the contribution of biology”, will be very useful.

A general look at the diffusion of the ART techniques

These techniques, in fact, spread quickly in many countries, in the west and in the extreme east, where favourable economic and sanitary conditions exist.
The outcome of several treatments were notified in many publications, by groups or single operational departments, and also in far-reaching statistics: for Australia-New Zealand by Hurst et al. (1997); for Latin America by Zegers-Hochshild and Galdames (1997), for USA and Canada by the Society for Assisted Reproductive Technology SART (1999). Finally five world reports were written by the World Collaborative Report (1997).

In Europe, after the constitution of the Gruppo Consortile ESHRE (European Society for the Human Reproduction), that gathered data of 22 European countries in 1999 (Nygren and Andersen, 2002), over 200,000 cycles of treatment IVF/ICSI/GIFT are reported, that is equivalent to 500-1500 cycles per million of inhabitants. In 1998, according to the ESHRE report quoted by Land and Evers (2003), the rate of clinical pregnancies for transfer is 27%, the total one of multiple pregnancies 26% (with 24% of twins). Children born with assisted reproduction (ART) are from 1 to 3% of all born alive in European Countries (Nygren and Andersen, 2001): this shows the amplitude of the phenomenon.

The situation of the treatments started in 1999, showed in the third ESHRE report by Nygren and Andersen (2002), can be reassumed as follows: 22 countries with 258,460 cycles of treatment, allotted in this way: IVF=125,370, ICSI=95,221; transfer of frozen embryos (FER) = 34,002; oocyte donations (OD)=3867.

About the number of the embryos transferred after IVF and ICSI (summation) we have the following: 1 embryo transfer=11.9%; 2 embryo transfer=39.2%; 3 embryo transfer=39.6%; 4 embryo transfer (and over) =9.3%.

Results in “clinical pregnancies” IVF (compared to the number of oocytes sucked up and subjected to direct IVF) = 24.2%; per number of transfer (embryos cryopreserved included) = 27.7%; ICSI = from suction and direct ICSI = 26.1; from transfer = 27.9.

The number of born is 36,135, allotted in single, twin and multi-twinning as follows (from IVF and ICSI added together): single = 73.7%; twin = 24.0%; trigeminous = 2.2%; quadruplet (and over) = 0.1%. The increase of the activity of ART is 11% in the period between 1998 and 1999 and 25% if assessed from 1997 to 1999.

In comparison with the data of 1998, it can be noted an increase in 1999, from 27.0 to 27.7% of the “clinical pregnancies” after IVF, and from 26.8 at 27.9% after ICSI. In 1999, in order to have a pregnancy, it was necessary to move, on average, 7.8 embryos (from 5.6 to 13.5 in the 22 considered European countries): in fact, on a total of 343,162 transferred embryos, 44,026 pregnancies were obtained. Therefore several attempts: the matter of the number of the embryos that nowadays is thought to be necessary to transfer, will be examined later.

Some “historical” aspects of the in vitro reproduction

The modern techniques of assisted reproduction come from experiences that date back, for the mammals, to 1878, when Shenk tried to fertilize in vitro oocytes directly withdrawn from the ovary with no success. As did not have success Pincus and Enzman (1934, 1935) and Pincus (1939), probably for the immaturity of the same oocytes or the brief time of in vitro maturation. Rock and Menkin (1944) and Menkin and Rock (1948) tried with human oocytes cultivated short time before the insemination based on the studies by Pincus and Sauder on the in vitro maturation speed of the oocyte (1939). Edwards finally judged this time inadequate only in 1965, and he brought it at 24-36 hours.

While these attempts were also developed in the human kind, the phenomenon of the spontaneous in vitro activation of the oocyte were specified for several stimuli, with parthenogenesis in rabbit that could simulate the happened spermatic penetration (Pincus 1936; Thibault 1949; Chang 1954; Dauzier and Thibault 1956; Austin 1956). Today also the results reported by Shettl in 1953 regarding the happened in vitro fertilisation of 5 human oocytes due to the presence of sperm in the pre-yolk space are considered photographic artifice (due to the defective microscopic technologies of that period).
In the same years, the phenomenon of the “capacitation” was defined. Austin (1951, 1952 and Chang, 1951) disclosed that the result of the in vivo insemination of the rabbit, as to fertilized oocytes, was dependent from the length of the contact between the sperm [just ejaculated (or withdrawn) and put in the fallopian duct] and the genital tissues.

It was quickly revealed that this phenomenon is spread to a lot of kinds of mammals, man included. In the latter, nevertheless, also the contact with the serum of blood, or the washing and recovery for centrifugation of the spermatogenic phase produces the same effect.

After the discovery of the capacitation and its artificial induction, the goal of the in vitro fertilization of the rabbit oocyte (Chang, 1959) was quickly achieved and the normal embryo development before and after his transfer in uterus, was proved. Since then, a period that Bavister (2002) calls the gold epoch of the IVF began; in this period the research was spread in nearly all kinds of mammals. This led to the collection of a surprisingly numerous information on the biological phases of the fertilization - from the acrosomal sperm reaction to the kinetics of the penetration, to the mechanisms of the spermatogenic motility, to the oocytary reaction against the polyspermy, etc. -, on the early embryonic development and on technical conditions for the success of the in vitro experiments.

Recently Edwards (2001) described his attempts, in the 60s, to get the in vitro fertilization of the human oocyte. The first failed with too short time incubations (18 hours), then succeeded with incubations of 24 hours: in the Glasgow laboratory he gets the first human oocyte matured in vitro to the metaphase 2 with polar globule at 37 hours. In the following months he sets the cultivation conditions, the control of the pH etc., on the few oocytes which he was furnished with by the gynaecologist Molly Rose after surgical interventions.

The collaboration with Dr. Patrick Steptoe, one of the first that used the diagnostic-operative laparoscopy, allowed him, in 1968, to have an experience of in vitro fertilization on a notably greater number of oocytes. They were obtained from ovarian stimulation with human menopausal and chorionic gonadotropin (Hmg) and from urine of pregnant woman (Hcg). So in 1972 he tried the transfer of the embryo (reached the 4-5th day development) in the female uterus. At first the attempts failed, due to ignorance of the “corpus luteum failure” that occurs in the production cycle of oocytes. It was treated - Edwards points out – during 2 years with a “progestinic” preparation that subsequently it has been shown to have opposite effects to the support of luteal activity. The attempts lead anyway to get 4-5 clinical pregnancies that are precociously stopped, as long as – changing the conditions of support of the ground of implantation (the endometrium) – the first well-known positive result occurs with Louise Brown birth on 26 July 1978. But at the end of the description of this unusual, personal experience, Edwards recognizes that the achievement of 4-5 pregnancies on 32 embryo transfers using techniques of in vitro fertilization in natural cycles, made him aware of “weakness” (precariousness) of the implantation ability of the embryo in the human kind in comparison with other species. This experience showed him practical difficulties that the application of IVF would have met in the future.

ACTUAL DEVELOPMENT AND PROBLEMS OF THE ART TECHNIQUES: GOALS, METHODOLOGIES, RESULTS CONCERNING THE GAMETES

We think necessary to distinguish, to the goals of the present work, two sectors: research and interventions on the gametes. Research and interventions on the embryo.

RESEARCH AND INTERVENTIONS ON THE FEMALE GAMETE

The induction of ovulation and the superovulation
As it is often recalled, history of the assisted procreation began with a letter to the editor published in the Lancet, August 12th 1978, where Steptoe and Edwards announced the birth of Louise from an
oocyte withdrawn by a spontaneous cycle and fertilized in vitro (FIV). Their precedent attempts yielded two abortions and an extrauterine pregnancy. They mourned, however, the excessively long time and the precariousness of the collection of the oocyte from each menstrual cycle.

In those years a therapy for the ipogonadotrop ipogonadism, condition combined with amenorrhea, anovulation and sterility was being searched for. Furthermore it seemed necessary to favour a more frequent and abundant follicular maturation and multiple ovulation in a still greater number of women with spaced out cycles, but ovulatory, who were trying to become pregnant.

It was thought, finally, that the multiple ovulation would have favoured the results of the intrauterine insemination (IUI) (see chapter 2.3, The intrauterine insemination). Australian researchers got - in those years - the induction of the multiple ovulation with Clomifene Citrate (CC), 100-150 mg/dies for five days from about the 3rd day of the cycle. But they came to the conclusion that the increase of oocyte production with this drug (2.5 oocytes on average) was inadequate to the demands of the FIV. They obtained best results with extractive hypophysarian Gonadotropin(HPG), finding a most elevated number of matured follicles and collected oocytes, but also an insufficiency of the following luteal phase.

In 1981 a drug produced by Serono (Italy) was made available, the Pergonal, that allowed the group of Lopata and that of Trounson (University of Monash) to get encouraging results with the combination of clomifene and human menopausal gonadotropin (HMG) (exactly the Pergonal). Analogous results were obtained by several teams of researchers in the following years with combinations of Gn (gonadotropin) either hypophysial or menopausal, or pulled out from urine of pregnant woman (HCG) (Garcea et al., 1983; Navot et al., 1988). The ovarian reaction to pharmacological stimulus with gonadotropines is known in the woman but also in many other species (rabbit, cow, etc.). There can be a lot of ovulatory follicles (till 20 per woman), but at present it cannot be exactly foretold the number of the follicles that will mature and of the oocytes that can be collected.

This is important especially for the remarkable number of women with ovarian polycystosis, that are part of the case history of oligomenorrhea and infertility with unbalanced rates of LH, FSH, estrogens and androgens - and with polyendocrine syndromes even more complex. Our school pointed out the importance of these syndromes (Lanzone et al., 1990; 1992; 1999; Fulghesu et al., 1999) susceptible to the treatment stimulating the ovulation (Lanzone et al., 1987; Caruso et al. 1989; Fulghesu et al., 1992; 2001), also with the risk of the ovarian hyperstimulation syndrome (see below).

The attitude of the gynaecologist is ambivalent. On one hand he/she tries to induce the ovulation in several follicles (to avoid to repeat more times the induction), on the other hand he/she should avoid serious risks of superovulation connected with the wellbeing and sometimes the life of the woman. In the past hormones either from human hypophysis or urine (women in menopause and pregnant women) or from pregnant cow blood, were largely used. Now, instead, hormones purified from in vitro cellular systems (recombinant hormones) are available and they have the advantage to not expose to the risks of contamination. Furthermore they have greater action specificity.

By now the techniques of ovarian stimulation are a lot and diversified, also in relation with the specific indications required by the therapy of different pathologies. The recent review by Homburg R. and Insler V. (2002) can be useful to a complete information. Restricting our analysis to the induction of multiple ovulation - that it is one of the purposes of the healthcare plan in order to face the ART safely and with available oocytes - it is necessary to admit that, even using the system of the subject’s hypophysis rest, a greater homogeneity in the ovarian response has been now obtained, even if the risk of dangerous syndromes characterized by diffuse dropsy from superovulation is not avoided.
The use of the GnRH Analogouses (GnRH-A)

Due to the difficulties of the direct use of drugs from human gonadotropins, namely the high and acute estrogenic increase, another way of ovarian stimulation has been devised, in order to obtain, as far as possible, a linear oophorogenous response proportional to the stimulus with Gn (gonadotropins). This can be realized desensitizing hypophysis with GnRH-A (A means Analogous) by resetting that share of endogenous gonadotropins, which is not easily defined. After the first uncertain attempts of some pioneers in the years 1986-1987, this practice has gradually grown to around 80% of the cycles of assisted procreation carried out in the USA and 92% of the Italian ones. Currently almost all ART's cycles (Assisted Reproductive Technology) are conducted in this way (Garcea, 1999).

Using the analogous, any type, it is necessary to sustain the luteal phase to avoid possible lacks of the luteal body (administration of progesterone, chorionic gonadotropin HCG, etc.). As far as it concerns the depot form of the analogous and the Hgn, there are doubts about the harmlessness for the embryo transferred after in vitro fertilization. This is because today a formulation with daily doses of antagonists is preferred that allow the sharp interruption of the drug’s biological effectiveness when HCG is administered.

A recent review of an experienced author as Frydman points out that in the international statistics from 1995 to now no meaningful increases in the “output” of the ovarian stimulation techniques were found that combine Gn-RH antagonists and gonadotropin to increase probabilities to get pregnancies after the transfer of several embryos with ART procedures. The number of transferred embryos is still high to offset the low number of implantation’s per each attempt (cycle), that however has been slowly increased during these years. Its consequences are, on one side, multiple pregnancies; on the other side the overstimulation syndrome that is still reported in the literature even if more seldom. The possibilities of minimal ovariun stimulation should be better make clear, eventually repeated, up to get normal ovulation of single and mature oocyte, as it happens in physiological conditions. This is also the very wise conclusion reached by Homburg and Insler (2002).

The matter of the oocyte maturation

It appeared evident that to obtain in vitro fertilization, the oocyte must have reached a suitable maturation degree, as it happens in vivo. The oocyte maturation, parallel to the follicle growth and to its eventual “enlistment” for single monthly ovulation (in general), is a very complex process – from different point of view clarified, by now, at the level of molecular biology - that cannot be described here: on this subject it would be useful to read the work by Salha et al. (1998).

To our purpose it is sufficient to recall that in normal in vivo situation a follicle named “dominant” (Hodgen, 1982) is identified (through complex hormonal balance and local metabolites) that is destined to the ovulation. The oocyte of that follicle, with its nucleus stopped at the stage of diplotene since the beginning of the meiosis occurred in foetal period, has progressively increased its volume (from 35 \(\mu\)ms of the original follicle, to 120 \(\mu\)ms of the mature oocyte: phase defined as germinative vesicle (Gosden and Bonnes 1995; Gougeon and Chainy 1987) and has synthesized large amounts of mRNA and r RNA, with accumulation of proteins essential in the last phases of maturation, fertilization and of the early embryo development. The mature oocytes are called “competent” (to the purpose of fertilization).

When a woman undergoes hyperstimulation, the growth/maturation of several follicles is accelerated and not all the sucked up oocytes have reached a suitable maturation. The “yield” of these immature oocytes, as to fertilizability and embryonic development, is very reduced if not absent.


**The in vitro oocyte maturation**

In order to avoid to repeat several times a controlled “stimulation” till the optimum conditions of the mature oocyte suction from the follicle (that is an heavy procedure for a woman) considering the subsequent fertilization, it has been attempted to let mature in vitro the oocytes. Consider that many immature follicles with their oocytes are lost in each stimulation cycle due to the follicular atresia. These “no competent” oocytes were cultivated in some laboratories in the last 30 years, and led to about 70% of maturation in some kinds of mammals: for example in the cattle, where there are commercial interests to obtain prized stock, this kind of research is fairly developed. In the human kind the culture conditions are not still perfect (see Sutton et al. 2003), and the rate of development of oocytes matured in vitro - after fertilization - doesn't reach the 50% of that obtainable from oocytes matured in vivo.

Nevertheless, notably modifying the usual conditions of culture of the mature oocyte to the purpose of fertilization, maturation and then implantation were obtained also with immature oocytes. When implanted, they showed to be viable by Cha et al. (1991), Thomson et al. (1994), Barnes et al. (1995), Nagy et al. (1996), etc. These results have paved the way for cryopreservation attempts of mature and immature oocytes and of sections (fragments) of ovarium to be stored in “tissue banks” for a following use by the owners or – after donation – by others. We will discuss this subject later (see chapter 4).

Now the results are uncertain: only a few pregnancies have been reported after insemination and transfer of embryos coming from frozen oocytes. It concerns the Chen report (1986); Al-Hasani and collaborators (1987) and, in Italy, Porcu and collaborators (1997); but researches go on (see Coticchio et al. 2001; Fabbri et al. 2001, etc.).

It is necessary to make clear that the collection and the cryopreservation of oocytes either mature (rather sensitive to the damages of the actual cryopreservatives) or immature is different from the cryopreservation of fertilized oocytes that at the 20th hour are at two pronucleuses stage. In this stage the damage from cryopreservation of the meiotic fusus is very small and such fertilized oocytes (already embryos) have more chance for development and implantation.

**Use of other’s oocyte (oocyte donation)**

This procedure began in 1986 with Navot, picking oocytes from donors undergone gonadotropic stimulation. These oocytes produced embryos that were implanted in women with precocious menopause, surgical castration, gonadic dysgenesia, Turner syndrome or natural menopause. The “technical” difficulty of such decision, is the optimal preparation of the genital ducts of the receiver through oestroprogestinic therapy in order to have optimal conditions of the so-called “implant-window” (see below, chapter 3.4).

**The micromanipulation of not fertilized oocyte**

In 1988 Gordon used in human a technique that he had previously set up in rat in order to favour the “spermatic penetration” in the mature oocyte within the processes of in vitro fertilization: the chemical dissociation of the zona pellucida with dripping of Tyrode with acid pH or other substances that digest this glucoproteinic layer such as trypsin, pronase, etc. The goal was to do some holes on the zona pellucida to make the passage of the sperm of individuals with seminal motorial pathology easier. This technique is called “drilling zone”.

Nevertheless the results were not encouraging so that, with the advent of ICSI (Intracytoplasmic Sperm Injection), other methodologies have overcome this one.
The verification of the “oocyte quality” to the goals of the fertilization

In conclusion of this section, it could be said that, from a technical point of view, it is very important in the research to identify the quality of the oocyte, either at the molecular structure (cytoskeleton and chromosomes) and metabolic capability level (Sutton et al. 2003), to the goals of the yield, in terms of fertilization, and of the following development of the embryo, without damaging the oocyte itself and without resorting to the judgement “ex-post” of the occurred fertilization and of the early embryonic development ability.

The morphology (even submicroscopic) is well known but it is not fit for a prognosis because it would cause the oocyte suppression, nevertheless possible metabolic-functional test to be carried out at the pick-up or during the maturative in vitro culture, could be helpful.

Beyond the current morphological criteria attainable with no risk observation, at present there are no tests to determine the ability of the taken oocyte to develop normally when fertilized. The oocyte contains some hundreds of “messages” that - accumulated during the maturation process that slowly develops during many weeks or perhaps months, as it has been estimated (Gosden and Bownes, 1995, Gougeon, 1996) – as already recalled – are necessary to the beginning of embryonic development.

Despite the work is on several species (rabbit, mouse, cattle, etc.), many of these messages are not yet identified. In order to determine the action of each of them, it would be necessary to deprive the oocyte of the identified substance and verify if it is still able to produce embryos. Besides, in the last years they discovered that some of these “message-substances” - elaborated by active genes in the oocyte – act during the time, not only immediately after the fertilization, in the cleavage phase, but even after the implantation of the blastocyst. In so doing their absence would provoke the interruption of embryonic development at different following stages (see Tong et al. 2000).

The knowledge of the dynamics of this phenomenon, however, would be important to the understanding of the clinical syndrome of the “empty oocyte”.

Some conditions of risk

Even if shortly, it seems rightful to expose some “conditions of risk” connected with the discussed subject, namely the production and recovery of numerous oocytes in the woman through induced stimulation.

Putting aside in this context the matter of the twinship and especially of the multitwinship (that is a maternal and embryo-fetal risk factor and that will be discussed in chapter IV, par. 7), the following are identified:

- the syndrome of the ovarian hyperstimulation;
- the matter of the neoplastic risk for the breast and the ovarium due to the repeated gonadotropic hyperstimolation;

Since it was mentioned the prevailing strategy to obtain an high number of oocytes per every therapeutic cycle, it is right to refer to the risk of the transmission of genetic defects with the oocyte donation.

The syndrome of the ovarian hyperstimulation

It represents, when it is at an advanced stage, the most serious complication of the ovulation, that rises up when the simultaneous development of numerous follicles produces excessive quantity of peptides that regulate growth and the permeability of the blood vessels (Insler and Lunenfeld, 1997). This involves a massive escape of fluids from intravascular compartment towards intercellular spaces, with hydrotorax, hydrocardia and tissue oedema, ascites, hypovolaemia and thrombotic phenomenon, that
The incidence of the syndrome is esteemed, in literature, from 0.25 to 6% of the inductions practiced in the early times of the massive use of human extractive gonadotropins; now it is established at around 0.5-2% (Grudzinskas and Egbase, 1998). Currently, having the clinicians reached the conclusion that forced superovulations do not correspond to a “good quality” neither of the oocytes, nor of the embryos, one is more careful in the stimulation. The fact remains that - especially in patients with oophorogenous micro-polycystosis - the risk is always present during the stimulation (Delvigne and Rozenberg, 2003).

Some proposed preventive measures are:
deferring the administration of HCG (generally used as trigger for the ovulation) if following the stimulation, the growth run-up of the estrogens is too quick (Sher et al., 1993, Waldenstrom et al., 1999); checking, during the time, the echographic and hormonal parameters (Levinsomn et al., 2003). In such way that stimulation cycle could be counterbalanced without serious risks.

Leaving that stimulation cycle and repeating the procedure with bigger cautions after a waiting period. Combining to the administration of HCG also the administration of human albumin, to prevent the hypovolaemia (Asch et al., 1993)

An even more effective prophylaxis is done replacing the HCG with recombinant LH (European Rlh study group, 2001).

However, in many recent publications is stated that during last years too much superstimulation was carried out. This is a very frequent cause of multiple pregnancies even where no in vitro fertilization (FIV) or ICSI techniques were used, but especially in the second ones due to the high number of transferred embryos (Jones, 2003).

At the moment it is not enough evident that the cryopreservation of all the embryos (in order to be transferred in uterus in following cycles) or the albumin administration offer real advantages in comparison with the transfer of fresh embryos in the management of the treatment of the syndrome (D’Angelo and Amso, 2002).

The ideal goal to prevent every risk should be to pick the single mature oocyte normally ovulated during the month or – at least – to make milder stimulation (as already stated: see for example Homburg and Insel, 2002).

Obviously no all the authors accept this proposal.

As we will better clarify below (see chapter 4), in USA the indication to transfer no more than three embryos is in force (what is also true in other Countries, with the trend to the reduction to two embryos: see the opinion of the ESHRE European Group at p.79, as well) to decrease the remarkable risks both fetal and maternal correlated to the multiple pregnancies, that currently are too often faced with the inauspicious practice of the “embryonic reduction” in the case of superovulation followed by multiple pregnancy. This practice is ethically unacceptable (see discussion in Bompiani et al., 1995; Bompiani, 1997).

The matter of the risk of mammary and ovarian neoplasms

By now the question about the possibility that repeated administration of hypophysarian stimulants of the ovaric activity could be a risk factor in breast (Collaborative Group etc., 1997; Burkman et al. 2003; Healy and Venn, 2003, etc.) and ovaric cancer onset, is under discussion. The conclusions are uncertain, considering the scanty surveys available at the moment. This risk in the breast cancer would increase by 2-3 times due to the use of HMG for more than 6 month (or, at least, 6 administrations) (Burkman et al. 2003) and it would not be revealed with the use of clomifene or of chorionic gonadotropin. The elevated estrogens and ovaric progesterone production
would mediate the effect. Nevertheless Healy and Venn (2003) - commenting the results - assume a casual effect in the selection of small survey undergone such prolonged and repeated treatments. For any conclusion, cases in which familiarity with the tumour of the breast exists are to be considered with the greatest care.

As concerns the ovary it has been assumed (not without reasonableness) that the repeated stimulation with the repeated trauma provoked on the ovarian surface can cause an increased incidence of epithelial ovarian tumours (linking to the so-called theory of the “never-ending ovulation” by Fathalla, 1971). Certainly the epithelium of the ovary surface play a definite role in the ovulation process, through proteolitic substances processing that reduce the albuginea tunic and the theca below weakening the consistence of the follicular apical wall (Biersjing and Cajander, 1975). Such phenomenon are subject to a complex hormonal regulation (see Murdoch and McDonnel, 2002). The stigma restoration from the surrounding epithelium – locally controlled by the progesterone action - can lead to epithelial invagination with forming of small harmless cysts. Nevertheless defects in the epithelial DNA restoration mechanism could happen with mutagenesis phenomenon, especially in subjects that show familiarity with the ovarian tumour (Aunoble et al. 2000).

Some epidemiological studies would have confirmed the risk increase (between 2.5 and 2.8) in some survey of several times stimulated patients (with clomifene c/o gonadotropins) (for example Whittemore et al. 1992; Rossing et al., 1994, etc.). Nevertheless that risk is not reported by others (Potashnik et al., 1999; Venn et al, 1995; Modan, 1988; Parazzini et al, 1998) etc. Great variability of therapies does not allow to draw certain conclusions, requiring long duration perspective studies. Patients that undergo such repeated stimulation should be periodically and systematically monitored in their interest (Franceschi et al., 1994, Franco et al., 2000; Walkeley and Grendys, 2000).

**The genetic screening of the oocyte donor**

Apart from the moral judgement (the genetic screening of the oocyte donor in some countries developed a lot, due to the fact that it is remunerated), we want to insist on the heavy responsibility that the donors assume for the transmission of hereditary diseases and/or of genetic orders that can favour the illness also at a late stage.

The matter is not different from that of the sperm donors; physicians that did not make needed checks before the donors enrolment assume an even heavier responsibility. The guidelines of the American Society for Fertility (1990; 1993) fix, as a minimal condition for the donation of masculine gametes, the check of the absence of any remarkable mendelian defect in the donor or well-known organic malformations. They also suggest the check for recessive genetic disorders (a-thalassemia; b-thalassemia; sickle cell disease; Tay-Sachs disease) and recently of the most frequent mutations for the cystic fibrosis.

Only 14% of the oocyte donors underwent genetic test (Mechanik Braveman et al, 1993). We do not know the result of these practices in born from these donations; yet a different following study by Wallerstein et al. (1998), showed that in 11% of the oocytes donor candidates, there are genetic conditions that advise against the withdrawal enlistment.

We will examine below (see chapter 4, paragraph 5-6), the so-called “indications” to the ooplasm portions donation and the “de novo” “oocytes hybrids” structuring, absolutely experimental techniques now rising.
THE FERTILIZING ABILITY OF THE MASCULINE SEED

Especially in the last decades of the XX century, the clinical and biological research paid an increasing attention to the spermatozoons fertilizing ability with remarkable advancement progress that have also had consequences in the in vitro fertilization techniques, at least till the ICSI (1992). Since it is not possible to expose here this wide subject - that is the specific object of disciplines like andrology and spermiology - it seems yet to be worthy of a brief reference examining just what concerns the artificial procreation techniques.

The capability phenomenon

Adding further information to what expressed in chapter 1, paragraph 4, it is convenient to underline that the just ejaculated mammals spermatozoon is not able to fertilize the oocyte: it must undergo a series of biochemical and biophysic transformations of the plasmatic membrane, of the ionic concentration, of the oxidative metabolism, etc. that are called capability. As a result the spermatozoon develops (for phosphorilation of the proteins tyrosinic residual, and particularly of the protein AKA - 82 located in the scourge) a hypercynetic motility - that not only bring it near the oocyte but makes it adherent to the oocyte itself - and it is able to express the acrosomal exocytosis reaction that is necessary in order to clear a way through the pellucid membrane thickness (or zone). These modifications are temperature dependent, nearly negligible to temperatures of 20° (room temperature) but important to bodily temperature (37°) (Marin - Briggiler et al., 2002). The modifications of the plasmatic membrane - that covers the head of the spermatozoon - are the diminution of density for changes of the equilibrium of the lipidic components. This leads to permeability, tackiness and then fusibility variations (the latter will verify in the following time of the acrosomal reaction). They are important phenomenon of this phase. These processes are altered in some masculine infertilities and/or severe oligospermia (Ambrosini et al., 2001). To the goals of the employment of the IVFs, GIFT and ICSI techniques, the capability is obtained with the in vitro seed “preparation” phase itself, that is an integral part of the ART procedure (see description in GARCEA, 1999).

The total ejaculated quantity and the spermatic motility

In the literature remarkable divergences about the best formalities to measure the (alive) spermatozoon quantity present in the ejaculated hold on still now, in spite of the carried out work to exactly esteem the in vitro motility and, above all, about the relationship between degree and characteristics of mobility and fertilizing ability’s favourable or unfavourable “prognosis”. Different methodologies (special calculation rooms) (see, for example, Tomlinson et al., 2001) and WHO guidelines (1999) to reduce several variability and bias factors of these estimates, have been elaborated. The trend is towards the standard use of graduated and known depth (20 µms) rooms that allow simultaneous calculation and measurement of the spermatic motility that is however affected by the characteristics of the material itself (Kraemer 1998). Methods have been described of automatized spermatic analysis, assisted by computer (for example Farrel et al., 1996; Menchini Fabris et al., 1988, etc.) or by flow citometry (Evenson et al., 1993), but because of the cost of the equipment they had a small diffusion in the laboratories. Obviously, these researches have not only interest in the definition of the normality parameters of the masculine population in a determined territorial-ecological area and in defined life conditions. They have interest also in the clinical context, to express the judgement about the masculine origin of the infertility and to quantify - as far as possible – the probability to obtain, with the use of that hypofertile
seed, the in vitro oocyte fertilization (Coetsee et al. 1998; Gunalp et al., 2000) or in vivo programs of endouterine insemination (Lindheim et al., 1996; Ombelet et al., 1997; Mountain Gauci et al., 2000). A best knowledge of the probability to spontaneously obtain pregnancy with hypofertile seed or through IVF, would have an evident impact on the decision, often “automatic”, to have immediately recourse to ICSI in case of masculine subfertility - as nowadays laboratories and ambulatory recommend. It would increase prudence in sight of the current debate on the still unknown long-term effects on the children born with ICSI technique (Devroey et al., 1998; Repping et al., 2002 etc.). We will broadly discuss these effects below (see chapter 4, par.3). However it is not possible to neglect the fact that big part of the literature has esteemed that to get the in vitro fertilization in an oocyte, 10,000 mobile spermatozoon are needed, while (at least in theory) one is enough (and no mobile) to ICSI! This broadly influences the researchers and clinicians choices. The Total Motile Sperm Count (TMC), that combines the volume of ejaculated, the spermatic concentration and the motility (expressing the total mobile sperms number in the ejaculated) would have predictable value for the IVF results, accepting a threshold value between the 500,000 mobile sperms (Devroey et al., 1998) and a minimum of 200,000 (Repping et al., 2002).

The acrosomial reaction

The penetration of the sperm in the oocyte occurs in several phases: the interaction of the sperm with the radiated crown, the adhesion to the zona pellucida of the oocyte (ZP), the exocytosis with emission of the acrosomial enzymatic content, the fusion of the oocyte plasmatic membrane and the spermatic membrane. The techniques of IVF in the animals - but also in man - have clarified many aspects of the complex molecular biology of this phenomenon (Evans, 2002). Many categories of cellular adhesion molecules are involved like integrines, proteins of the extracellular matrix, cadesines and specific immunoglobulins; multi-enzymatic proteases called “proteasoma complex” with spermatic acrosomic origin, participate (Morales et al. 2003); protein substances of testicular, other epididymal,(Laserre et al. 2003); still others - like the protein ZP3 deriving from the zona pellucida itself (Wassarman et al. 1999).

The importance of genetic mutations that preventing the synthesis of some of these proteins, cause the sterility for fusion lack of the sperm – oocyte membranes can be glimpsed: it is the case of the female mice CD 9 Knockhouts (Kaji et al., 2000). In the IVF procedure the acrosomial reaction is important. To make it happens it is necessary that the adhesion of the sperm to the oocyte membrane occur with spermatozoon with any mobility, even if reduced (Yanagimachi, 1988).

As soon as the sperm-oocyte fusion has happened, the movements of the spermatic tail (Wolf and Armstrong, 1978) stop as well.

In other words, an appropriate interaction gamete/zona pellucida is necessary to put in the oocyte, in a right way, the physiological one, the father DNA, the spermatic centriole and prospective factors of oocyte activation, what does not occur with the ICSI (Evans, 2002) (see also chapter 4, paragraph 3).

The morphology exploitation

According to the classical WHO criteria (1999), men are fertile if at least 15% of ejaculated sperms shows a normal morphology (Kruger et al. 1998), but if the percentage of normalcy goes down to less than 5%, there is teratospermia that can be associated with oligospermatism or asthenospermia: all of these are subfertility conditions (Baker, 2001).

The efficacy of IVF, in such cases, is low because of the sperm difficulty to develop an appropriate reaction with the zona pellucida and to penetrate it (Liu and Baker, 2000) or because of anomalies of
the acrosomic (Cross et al. 1988), or because of functional mechanisms of scarce answer to the induction by the zone of acrosomial reaction (Liu and Baker, 2003). It is considered important - in the future - to develop these studies to better graduate teratospermia condition also to the goals of the choice between IVF and ICSI.

The spermatic penetration test
This test (SPA) analyses the ability of the sperm to directly penetrate the oocyte of the hamster deprived of the zona pellucida and it gives a global evaluation of the four functions of this ability: capability, acrosomal reaction, fusion of the spermatic membrane with the oolemma, decondensation of the spermatic head inside the oocyte, namely in the cytoplasm (Yanagimachi, 1984). It has been found a meaningful correlation between the normal morphology of the sperm, according to the Kruger’s parameters, and the test results, that – without false negatives - can express the probability that the spermatic pattern determines the in vitro fertilization (FIV) of the human oocyte (Soffer et al., 1992).

According to Zahalski et al. (2003) the correlation with morphology is not proven, but rather the correlation with the sperm’s number of the specimen counts.

The test of the hamster is currently small practiced and tends to be replaced by the analysis of the bond, in vitro, between sperm and solubilized specimens of human zona pellucida seeking the percentage of acrosomial induced reactions (number of tied sperms).

There would be a positive correlation with the result of the IVF (Bastiaan et al., 2003). The described tests, that represent - however - the “second level” of the diagnostic deepening, are considered useful and to be further developed - in a next future - to help the clinician choosing IVF or ICSI.

Concluding this main chapter it seems to be possible to point out that - while the standards of the first level spermatic examinations don't seem to have suffered substantial modifications, but only “revaluations” of their reliability in order to better foretell the ART techniques results – the so-called second level sector has been developed for the search of more sophisticated techniques, specific of particular aspects of the biology of the sperm with clinical interest.

We will shortly deal with matters of genetics when discussing ICSI; here we just recall - besides the already quoted test - the possibility to define spermatic viability with the migrosin test (Björndahl et al. 2003); the test of crossed reactivity with antibodies against a peptidic marker, the ubiquitina (Sutovsky et al. 2001); the determination of the a6b1 spermaticintegrine for the quality measure (ability to bond with the zona pellucida) (Ramik et al. 2003); the bond with the jaluronic acid as indicator of the complete spermatic maturation of the spermigenetic processes of the membrane (Huszar coll., 2003); the relationships between clinical conditions (as varicocele, results of spermatic ricanalization, idiopathic infertility etc.) and degree of cromatine condensation (Molina et al., 2001); rapid determination of the antisperm antibodies (Kipersztock et al., 2003).

According to the literature, these and other parameters could technically direct the choice between IVF and ICSI, by now it represents one of the most important problems for the centres of artificial insemination.

IN UTERUS MASCULINE SEED TRANSFER: THE INTRAUTERINE ARTIFICIAL INSEMINATION

This technique, characterized by sperm introduction (opportunely prepared) in uterine cavity through the cervical duct (I.U.I.), it is not considered - in a narrow sense from the current classification - as ART (artificial reproductive technology), but like a distinct technique, or like a “minor ART”.

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Obviously it also implies ethical problems (that will be examined by others), more or less remarkable depending on the way of the seed collection: from a direct conjugal act or not.

From the clinical point of view, the I.U.I. represented the only treatment, for many years, of that condition defined as inexplicable infertility, known as incapability of the couple to conceive despite the verified normalcy of the explorable biological and clinical parameters (Moghissi and Wallack, 1983) and persistent after three years of free sexual intercourses (Hull, 1985). Other indications for the IUI were the reduced spermatic motility, moderate oligospermia, and the presence of antibodies antisperm in cervical mucus, etc. (see also Garcea, 1999).

These indications have found some documentation of effectiveness in the verifications carried out with the criterion of Cochrane (Cohlen et al, 2003; Johnson et al., 2003).

When the ovarian stimulation was introduced in order to obtain more ovulations in the same cycle (see chapter 2.1 “induction of the ovulation”), the technique of the administration of gonadotropin FSH and then of the injection of LH (HCG) spread, followed by just one place of masculine seed (opportunely prepared) in uterus 34-36 hours after the injection (Hughes, 1997; Nulsen et al., 1993, etc.).

The blandest and less risky stimulation in terms of ovarian over exposition, can be obtained – as clarified elsewhere - also with the clomiphene although the results are less evident.

The double insemination after stimulation (between 12-18 and 34-42 hours) (Ragni et al., 1999; Huang et al., 2000) was tested as well, but this variant would not offer sensitively different results (superior) to the only introduction of the seed (Alborzi et al., 2003; Catineau and Heineman, 2003). It should be thought that success (in terms of induction of pregnancy) is above all proportional to the number of the matured ovulated follicles, although at the cost of a remarkable number of multiple pregnancies, with all the inherent complications elsewhere discussed (see chapter IV, paragraph 1) (Stewart, 2003).

Countercheck was given: a careful revision of the literature concerning ovarian stimulation followed by sexual intercourses at controlled time (without I.U.I) shows that cyclical fertility is 0.11 against 0.02 that is the spontaneous fertility of intercourses at controlled time in the natural cycles (not stimulated) (Zikopoulos et al., 1993).

In the most recent years, many authors have considered the ovarian stimulation followed by I.U.I. like a first employment technique of “low technology” - to go then to the IVFET or to the ICSI; but it must be remembered that in the ESHRE Group trial two cycles of gonadotropin/I.U.I and the treatment IVF offer the same results approximately: 24.5% and 22.9% respectively of “baby in arm” rates (Crosignani et al., 1992)

The transfer of the gametes in the tube

As it is known the GIFT (and some of its variants) provides for the transfer of the gametes in the Falloppio's duct, leaving to the nature its time for fertilization, for embryo development in his natural environment and for spontaneous migration towards the uterus.

Certainly, the GIFT technique – elaborated by ASH and coll. (1984) – seemed very useful in the first times of its experimentation, also because used in relatively young women (or, in the elderly, with oocyte donation from young women) it resulted effective in the types of sterility of unknown origin. Nevertheless, on one hands, it presupposes tubal integrity and, on the other hand, the execution of a laparoscopy for the transfer of the gametes, with the woman's hospitalization, even if during a short period. With ICSI a lot of interest to this technique was lost, although it was tried to eliminate laparoscopy and hospitalization placing gametes in the tubas through the vagina and the uterus, obviously after having effected the aspiration of the oocytes (transvaginal via), with ultrasound scan. The first ones to try the transvaginal GIFT with ultrasound scan were Bustillo and his collaborators who have gotten a pregnancy in a 42 year-old woman in 1988, unfortunately ended in abortion.
In the same year, in Germany, Wurfel obtained a pregnancy realizing the transfer with hysteroscopic guide in a 33 year-old woman.

In the following years, yet, the results have been very scarce (see for example Ranieri et al., 1995), although some good Italian schools have gotten encouraging successes adopting the hysteroscopic technique or operating relatively rashly (Ferraiolo et al., 1991; Possati et al., 1991; Seracchioli et al., 1995). Besides there was a certain difficulty to achieve repeatable and constant results, so that the transvaginal GIFT had not followers (Garcea, 1999), and the GIFT in its complex from 35% of its employment in 1985 passed - in USA - to less than 3% of the ART procedures (Toner, 2002).

It should be said, however, that the interest for GIFT techniques remains unchanged in some ethical aspects, because - operating with homologous and rigorously separated gametes till the transfer in the duct - there is not the human direct interference in the fertilization and in the embryo development. However it is necessary to distinguish it from the ZIFT (this confusion is often made) that works with the replacement in the salpinx of in vitro produced embryos.

**ACTUAL DEVELOPMENT AND PROBLEMS OF THE ART TECHNIQUES: GOALS, METHODOLOGIES AND RESULTS REGARDING EMBRYO**

Apart from the discussion about researches on human embryo that have been performed, or that are in progress, for theoretical knowledge of the processes of differentiation and development, as well as for the matter of the nucleuses “reprogrammation”, the “therapeutic cloning” etc. - researches that have their own physiognomy and that will be discussed, as such, by other speakers – for the analysis completeness it is necessary to illustrate the results of the researches on the embryo to the goals of the ART improvement.

In this field, different researches continue: in some (those on cattle, ovine, species in extinction, etc.) for productive reasons; in the human kind for clinical interest: knowledge of the technical factors that intervene in different ART procedures allows the correction or the very substitution of whole operational phases, with improvement of the final results (“baby in arm”).

Techniques of oocyte surgical micromanipulation: the microsurgical fertilization with direct injection of the sperm in the citoplasma (ICSI)

In this paragraph some information will be provided about some techniques used to overcoming particular obstacles to fertilization: these techniques use microsurgical procedures (made possible by the precision of the cellular in vitro micromanipulation tools available today).

They are the “subzonal injection” (SUZI) by Metka (1985), Laws-King (1987) and Fishel et al. (1990) and especially the ICSI (intracytoplasmic sperm injection). The latter superseded the former since the microsurgical sperm injection in the perivitelline space was not so good due to the persistent difficulty of many sperms to penetrate into the oocyte membrane (oolemma).

The ICSI is a micro manipulative technique that leads more directly, in comparison with the others, to the embryo creation. Also for this reason it found many followers in some laboratories, for shortening times (with the trend to reduce costs connected to this factor), even if with expenses of great operational complexity under other aspects. Furthermore ICSI has specific indications in some kinds of masculine sterility (asthenospermia etc.: see chapter 2); but there are also other indications, for instance for the treatment of oocyte membrane factors (because of a presumed abnormal thickness or rigidity of the membrane for ageing oocyte, etc.) that would hinder the spontaneous fertilization, even with a normal spermatic acrosomic functionality (Shilom and Dinfeld, 2000).

At the beginning the ICSI technique was experimented, among others, by Lanzedorf and coll. (1988) in the eighties, getting seven embryos to the stage of two pronucleuses, directly injecting a sperm in 20 oocytes, held back with a pipette with bland suction.
The clinical application by Palermo et al. (1992) and then the rapid world diffusion followed. As we will better clarify later (see chapter 4), this technique sets the problem of the eventual chromosomal anomalies in the transferred sperm, either heterochromosomes or sexual chromosomes that are directly transmitted to the progeny. There is still not a method to previously appreciate if the selected sperm is a vector of such anomalies without damaging the sperm itself. It can be affirmed that a scarce attention has been paid to this source of danger in choosing such technique, at least till now. All the more reason, it seems that further and more frequent anomalies occur when spermatids are moved in absence of mature sperms. In this decade of often-rash employment of ICSI, such data were collected that are more and more utilized by international literature, raising controversies (see below). Further information about ICSI technique can be found in the good description by Garcea (1999). In the “technical” general matter of surgical formality, in case of azoospermia the sperms collecting procedures should also be considered for aspiration from the epididymis (indicated with the acronym MESA) in case of obstructive malformation of the vas deferens (associated to the mutation of the cystic fibrosis gene), and procedures used for not obstructive azoospermia, often associated with chromosomal anomalies (Reijo et al., 1996; Girardi et al., 1997, etc.), that involve direct extraction of spermatic germinal cells (to different degrees of development) from the testicle, through biopsy. Positive outcome in these conditions are reported by many authors (for instance Palermo et al. (1999); Shulman et al. (1999); Baraky et al. (1998); Tournaye et al. (1999); Vernavee et al. (2003); Olivius (2002); De Vos (2003), etc. Meseguer et al. (2003) put in evidence the possibility to withdraw germinal elements with testicular collecting (TESE), also in patient with permanent azoospermia after chemotherapy. The problem of the risk connected with the growth of children born with ICSI technique will be examined later (see chapter 4, paragraph 3).

Analysis of the development conditions of the early embryo in the in vitro cultures

By now, the research carried out in this phase of the embryonic development is very ample. Its importance (we have already recalled it) was stressed by the researchers that, since the beginnings, worked on the problem of the in vitro reproduction. At least in theory, the research can be conducted whether with the observation of the events that spontaneously occur to the embryo in the fertilized oocyte culture, or with the observation of the development, of the implant capacity and of the following evolution of the embryo after induced modifications in a determined cultural mean. The more and more deepened knowledge reached during the years about these embryonic reactions to the development environment, allowed to recognize “epigenetic factors” that, operating on the progressive genic activation - deactivation, can be invoked in the origin of following structural anomalies (see below, chapter 4, paragraph 2). Here, setting a limit to the examination of the matters that more directly concern the knowledge of the phenomenon that are involved in the application of ART techniques, we will consider: 1) The “field of culture”. It has been rightly observed that at the beginnings it was considered more important the general knowledge of the in vitro cellular culture fields to choose the culture field of the oocyte before and the embryo then, rather than the precise knowledge of the respective metabolic needs. The improvement of the outcome (in terms of fertilized oocytes in the first case, and of embryos of normal early development in the second) was slow, but showed concrete results when it was thought to seek the tubal fluid chemical composition (that, as it is known, is the first environment in which the segmentation and the morulation occur). It led to more suitable culture means (see Menezo and the
SOFT), the fertilized oocyte culture in presence of tubal cells (so-called co-cultures); and above all the limitation to 48-72 hours of the time of in vitro embryo maintenance (between fertilization and transfer in uterus) because it is considered that the oxygenated radicals that form and tend to accumulate in vitro (not being drained, like it happens in vivo, outside from the blood circulation and from the presence of erythrocyte that absorb them) damages the embryo in case of prolongation of the in vitro phase. Currently, many laboratories (see Wiemer, 1989; Bongso, 1989; Menezo, 1990) adopted this technique of the brief co-culture, either for the in vitro fertilizations (FIV) or after the embryonic micromanipulation of the zona pellucida, especially in cases of sterility of the couple with evident masculine pathology (for the blastocyst culture, see below, par. 4).

2) Individuation of the morphological characteristics of embryo maturation (in relation with development capacity). The observation at the microscope of the initial embryo development process (segmentation) today is the standard method used to determine the “normalcy” of such process and to draw a prognosis on the embryo growth ability (Puissant et al., 1987; Sulman et al., 1993, Roseboom and Vermeiden, 1995, Giorgetti et al., 1995). In general, embryos are classified in 4 groups, as follows:

- **Group I**: normal aspect, with regular and equal dimensions blastomeres, cytoplasmic fragments absent. They correspond to an average of the 70% of incidence of the fertilized oocytes.
- **Group II**: normal aspect, regular blastomeres, but the presence of cytoplasmic fragments begins. Incidence: 15% of the total.
- **Group III**: not normal aspect, with blastomeres partly irregular and numerous cytoplasmic fragments. The 10% of the total.
- **Group IV**: very irregular aspect, cytoplasmic fragments in more than 50% of the blastomeres, possible polynucleate blastomeres. The 15% of the total.

The embryos of the group IV are not able to continue the development; others are able to, but they can have cardiologic anomalies proven by polynuclearity during the development. Many of them, therefore, are stopped in the development, others continue (giving place however to malformations). Some authors insist on pointing out that morphologically optimal embryos at the second day of culture do not develop to blastocyst and have many chromosomic anomalies (Plachot et al., 1987; Munné e Cohen, 1998), whereas embryos that seem to be unsuitable to be transferred, develop and catch on. (Rijnders e Jansen, 1998). In order to have a more reliable preimplantation prognostic evaluation to the goals of the following development, it would be necessary to continue the in vitro culture at least to the stage of blastocyst (this provokes other problems for the prolongation of the culture and for possible effects of the development manipulation: see below). As a matter of fact, a positive connection between blastocyst quality and success of the in uterus transfer is proved easier (Gardner et al. 2000). Moreover, since now caution is recommended in the accelerated ovulation induction - that would be responsible of the incomplete oocyte maturation and consequently of the irregular fertilization and of the correct embryonic development (see below, chapter IV/2) - and however it is required not to transfer multinucleated embryos.

The speed of development is also considered as a further prognostic factor to the mere morphologic inspection, to facilitate the embryonic selection. Some authors have put in evidence that the transfer of only embryos that show faster development ability is positively associated to more elevated pregnancies rates (Shoukir et al., 1997 Sakkas et al., 1998; Lundin et al., 2001; Salumets et al., 2003); it more easily allows the “politics” of the transfer of an only embryo and reduction of twin pregnancies, wished by many (see below, chapter 4, paragraph 7).

But this strongly set the ethical problem of “eugenic” selection of the embryos.

3) Eliminations of masculine pronucleuses surplus. Some techniques of in vitro procreation can give the polysperma (5%): this occur particularly following the zona pellucida micromanipulations where polysperma is higher and practically inevitable, producing the intracytoplasmic transfer of a lot of
sperms because of the suppression of the barrier effect (not only mechanic, but also biochemical) produced by such protective shell.

To avoid the interruption of embryo development that is consequential to the polyspermy, it would be necessary to destroy the surplus of masculine pronucleuses. The technique has been set and improved in the years 1988 and 1989 and it consists in thinning the zona pellucida with Tyrode in acid solution and then with a micro needle to intake the surplus of masculine pronucleuses. This is because, unlike some animal species in which the dimensions of the masculine pronucleus are bigger than the female one, in the human kind it is practically impossible to distinguish them, because they have the same dimensions, and the nearest one to the polar globule is considered the female pronucleus (Garcea, 1999). As a matter of fact, the polyspermic embryo is not used.

4) Search of the best transfer time: morula or blastocyst transfer? As we have mentioned, the laboratories in general have adopted the transfer between 48 and 76 hours from the fertilization. Besides, at the stage of 4-8 cells which is reached by at 48 hours of life (morula), the transfer of the so early embryo does not guarantee its survival. Furthermore it is proven that numerous embryos to the preimplant stage are mosaics, that is composed by cells with and without chromosomal anomalies, and this phenomenon sometimes tends to persist up to the stage of blastocyst: the embryos that show a more elevated balance between normal and abnormal cells (Bialanska et al., 2000), that are gradually eliminated, continue to develop. The aneuploids lead to a strong embryonic “selection” even before the implant.

Finally it is worth recalling that an analytical work by Spanos et al. (2002) put in evidence phenomenon of apoptosis that occurs in the blastocyst culture, after the conclusion of embryonic compacting and differentiation stages, in which the genes that regulate the family of BCL-2 proteins, responsible of caspase activities are inhibited.

This phenomenon, in their selves physiological in every cellular cycle, in sub optimal culture conditions can become important and jeopardize the embryonic development. For that reason it has been hypothesized that the embryo transfer in the fifth day, at the stage of blastocyst, because it allows to verify worsening stages of embryonic development, it could improve the obtainable results with the transfer at the stage of morula.

Recall that Steptoe and Edwards obtained the first pregnancy with blastocyst transfer in 1976, but it ended up in a tubal pregnancy. Only more recently it has been possible to get an evolutionary pregnancy from blastocyst (Cohen et al., 1985; Menezo et al., 1990; Bolton et al., 1991). May be in the next years this problem will be better examined, also because it is correlated to that of the practicability at large of the “preimplant diagnosis”, previous to the blastocyst transfer in uterus. Till now, however, it is still doubtful if the blastocyst implant offers substantial advantages regarding the “yield” of FIVET practices, except the important minor risk of trigeminer pregnancies. With blastocyst transfer high rates of implants and pregnancies have been reported by Gardner et al., 1998; Marek et al., 1999; Langley et al., 2001, but not confirmed by other authors (Sholtes and Zeilmaker, 1996; Coskun et al., 2000; Huisman et al., 2000; Lundqvist et al., 2002). The first studies on bigger survey would point out yet for the blastocyst an implantation rate higher than 40-60% in comparison to the morula. If confirmed - this would have an applicative meaning to settle the matter.

From the experiences done till now, it should be deduced that some of the advantages of cultivating the embryo up to the blastocyst stage, before moving it to uterus, would consist in a higher synchronization of the embryonic development with the cycle of the endometrial mucous and in the diminution of the number of the embryos to transfer (Simon and Pellicer, 2000); besides, as it has been showed that the simple morphological investigation is not able to select with certainty the 2 days embryos endowed of the greatest development capacity to the goals of the preferential transfer - this could be obtained instead with a rigorous verification of development speed (beyond the normalcy) between the third and the fifth day and also with the search of particular metabolic activities of the blastocyst that attests its vitality (Bavister, 2000).
Indeed it seems that already prolonging the in vitro culture up to the third day, equivalent prognostic
evaluations to those extending the culture to the stage of blastocyst (Rienzi et al., 2002) could be
obtained.
However, the problem is strongly still tied up to safety (quality) of the employed means of culture. The
lines of actual approach try several mean modifications, but also the co-culture with other tissues.
The blastocyst can be still implanted if transferred at 6th day of development but without further
advantages, while there are scarce or no results with the transfer of blastocyst of 7 days and over. There
is therefore a transfer “optimal time” tied up to the blastocyst biology (the so-called “implant window”)
(see the paragraph on the embryo transfer, chapter 3, paragraph 4). There is a last consideration to do:
the blastocyst development seems to be better in co-cultures, but in these it is not always possible to
exclude the transfer of viral diseases from the donor of the co-cultivated cells to the embryo.
Finally, some reports would point out that the frequency of the monozygotic twin is great in the transfer
of the embryo at the stage of blastocyst rather than at the stage of morula in the 2nd day (48 hours)
(Scheiner et al., 2001; From Coast et al., 2001; Miki et al., 2003).

Embryo cryopreservation

Due to its importance from the juridical and ethical operational point of view, this strategy requires an
appropriate illustration, also under the historical profile.
The embryos cryopreservation (at the stage of morula or blastocyst) is a criterion – as known – broadly
followed on a rational basis that goes back to the first experiences of the methods of active assistance to
the procreation (ART).
At the beginning of the eighties the Australian school of Trounston (see Trounston and Mohr, 1983)
tried to realize the cryopreservation of the embryos with the purpose to increase the yield of
pregnancies of the IVF-ET globally considered. In fact with the same cycle of induction of the multiple
ovulation it was possible to carry out two or more transfers, one immediately (embryo of 48-72 hours)
and one later, during a physiological ovulatory cycle following the stimulated one and therefore with
great probabilities of success, using the cryopreserved embryos. The birth of the first child “coming
from the cold” was announced in 1984 (Zeilmaker et al., 1984). On the basis of the above-mentioned
indications for the embryo freezing, embryo banks have also been founded, likewise to the banks of the
seed. In the same period, in 1985, the freezing of human blastocyst has been realized and subsequently
survey of many pregnancies obtained with such method were presented.
Going into details, the reasons alleged for the embryo cryopreservation are the followings (see Fauser
et al., 2002):
the ovarian stimulation provides an elevated number of fertilizable oocytes. In order to reduce the rate
of multiple births, in most cases it is convenient to transfer no more than 2-3 embryos of “good
quality”. If the exceeding embryos are preserved through cryopreservation, they can be used later -if
the implant or the development of the “fresh” embryos installed directly at the end of the stimulation
cycle is not possible - without need of further ovarian stimulation.
If there are conditions for an evolution toward the hyperstimulation syndrome, so that the embryo
transfer in uterus is not convenient, the produced embryos can be used later, when the crisis is
overcome, only if they have been cryopreserved.
The synchronization with the “implant window” (especially in the case of embryo donation) can be
facilitated and, in the case of donation, one can wait for the confirmation by the laboratory that there
are no risks of viral transmission between the oocyte donor and the embryo receiver.
As it appears evident, it concerns “pragmatic” and “technical” elements (which the possibility of the
“preimplant diagnosis” has been recently added to) that put aside moral considerations of more
elevated and ontological value concerning the embryo.
Two are the models of strategies adopted for the embryo in the very early stages:

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to select, before being able to have morphological evaluations on the embryonic development (48–76 hours), the embryos to transfer and those to cryopreserve. It is an operation to do at the stage of 2PN (two pronucleuses), that coincides with the mitotic division interphase because this procedure would not damage further embryonic evolution. The disadvantage of such criterion would be -according to Fauser et al. (2002) - that it is not possible to select with reliability the embryos that could be the best ones for the immediate transfer (neither it is possible to have the certainty that the other ones develop correctly), to verify - leaving in culture all the produced embryos - the two or three embryos that present the best evolutions (dynamics and morphological), transferring these ones, cryopreservate the others (generally reached different stages, between 2 and 8 blastomeres). The “advantage” of the selection of the fresh embryos is counterbalanced by the great difficulty to effectively preserve the others through cryopreservation.

This second hypothesis is the most followed one.

A very important issue is the exact determination of the embryo damage provoked by freeze when embryo is thawed and put in culture again in order to be transferred. As regards embryos that – after thawing – show 50% of damaged blastomeres, there are conflicting information; in any case the damage is frequent. El-Toukhy T. et al. (2003) proved that even freezing classified “fresh” embryos in the I and II groups, after thawing 50% of the embryos shows the damage of 1 blastomere at least. But the normal ones had the same development ability than that of the fresh embryos. Therefore it is known that the success (pregnancy) percentage with cryopreserved embryos is of course lower than that with “fresh” embryos. Cryopreservation of the blastocyst is also under discussion. This last strategy, besides to be connected to the possibility of widening the goals of the “preimplant diagnosis”, would be connected to the better synchronization of the embryonic development with the receptive endometrial stage, when the embryo transfer had to be postponed to a following cycle.

In fact, at the 5th day from fertilization the blastocyst is physiologically placed in uterine cavity. In this period the uterine susceptibility is at maximum level and the mesometrium contractions have reduced frequency and ampleness because of the high rate of progesterone (Leasny et al., 1999; Franchin et al., 1998, etc.). Nevertheless perplexities about this solution still remain. This is due to the fact that different blastocyst culture systems would provide different results (Menezo et al., 1992; 2000); furthermore reliable criteria on the development of children born from cryopreserved blastocyst do not exist.

The blastocyst to be frozen have often been obtained in co-culture (Fehilly et al., 1985; Cohen et al., 1985; Troup et al., 1990, etc.)

In these last years, however, a remarkable increase of the searches about cryopreservation of embryo at the third day of life and also of the blastocyst (4-5 day) in function of the preimplant diagnosis is reported. At such stage of development it could have greater extension.

**The embryo transfer**

It represents the final part of the ART procedures examined here, particularly of the FIV and ICSI. In fact, in the intrauterine insemination (I.U.I.) it concerns the transfer in uterus of the masculine gametes only; in the GIFT it concerns the transfer of both types of gamete and not of embryos (see chapter 2, paragraphs 3 and 4).

**The standard transcervical embryo transfer**

The purpose of the transfer is to position the embryo (the embryos) in the uterine cavity. It is a delicate operation, practically remained unchanged from the first applications by Edwards and its group that in 1984 analyzed its characteristics, difficulties and yields.
It is necessary to add to the genetic factors that govern (epigenetically) the first embryonic development and to the factors correlated to the “uterine receptivity” (that allow or prevent the blastocyst implant), those connected to the transfer (that is an eminently operational procedure by the gynaecologist and that can influence the final result of the ART).

A recent review by Schoolcraft et al. (2001) – following the analysis by Meldrun et al. (1987), Englert et al. (1986); Mansour et al. (1990), Wood et al. (2000) etc. - has enumerated the factors that (from an accurate literature review) seemed to be important in favouring or in hindering the transfer technique.

*The transmesometrium embryo transfer*

In cases of strong stenosis of the cervical duct, with acutangular bending of the body on the uterine neck (eventually not corrected by a precedent instrumental expansion of the cervical duct with temporary application of a tutor) the transmesometrium introduction of the embryos has been proposed (the so-called Towako method: Kato and coll. 1993). It is a rarely suitable procedure.

*The transvaginal embryo tubal replacement*

In the 1988 Jansen and Anderson have published their first transvaginal transfers of an embryo in the tuba, with correct premise that the tubal fluid constitutes the first environment of embryo development. This technique performed under ultrasound guide was used after many experiences, by the same authors, with intratubal insemination with cryopreserved donor seed. In the following years, some researchers followed their example and suggestions, but - according to Garcea (1999) - it seems that there was not yet a real and constant interest for these transfers of embryos by transvaginal via in the salpinx (that obviously require anatomical and functional normalcy of the salpinx itself).

*Methods of implant facilitation: assisted hatching*

In 1989 Malter and Cohen proposed to do some “holes” on the gelatinous wall that still wraps at this stage the 4-8 cells embryo (called zona pellucida or membrane) with acid solution of Tyrode (like already seen in the oocyte for the zona pellucida drilling technique to favour the spermatic penetration), to favour - in this second case - the (enzymatic) dissolution of the zone and the implant. The cold laser can replace the acid. This technique seems to be useful in conditions of difficult development of the in vitro embryos and when - for instance for elderly woman (that is oocyte age) - difficulties are suspected in the enzymatic phenomenon of the zona pellucida opening. A great aid to the increase of the plant in uterus also seems to be given by the use of immunodepressive substances, like methylprednisolone administered to the woman beginning from the evening of the oocyte collecting (together with tetracyclines) (16 or 40 or 60 mg/die for 4 days).

These techniques of assisted implant, that some years ago seemed to be very useful when there were difficulties in the FIVET (or – as we recalled for the oocyte fertilization – in case of pathology of the seed) have been supplanted by the ICSI, that destabilizes the membrane itself before the spermatic penetration (and it also allows the maintenance of a certain brittleness of the zona pellucida even during the phase of the in vitro development of the embryo).

*Mentions of the factors involved in the implant*

If the above-mentioned researches try to facilitate the implant, acting on the gelatinous capsule that winds the embryo in a mechanical sense, others are addressed to better establish the biochemical and receptorial phenomenon that occur either at embryonic or at the uterine mucous level. The need of a suitable hormonal preparation of the mucous is long time known, but recently the interest of the
research is rather addressed to the “active abilities” of the primitive trophoblast to create - in the interaction with local chemical and receptorial factors – the way of penetration in the endometrium synchronized to positive reactivity of this tissue (see the synthesis in Tabibzadeh, 1998; Beier, 1998, Giorlandino, 2000, Loverro and coll., 2000, Taylor, 2000, Lindhart et al., 2002, Daftary and Taylor, 2001, etc.). Although the matter - in its extension and complexity – is the subject of autonomous discussions (and such opinion is to be accepted, in narrow sense, even in this discussion), it seems to be convenient to do at least a mention in the following terms: 1. Since long time the hormonal and morphological variations of the uterine epithelium in correspondence with the phases of the menstrual cycle and the characteristics that these two balanced parameters must have at the moment of the implant, are known. 2. The embryo transfer techniques provided new experimental and statistical occasions to study the relations between the degree of the transferred embryo maturation and the morphology and biochemistry of the uterine mucous at the moment of the transfer. 3. Above all the dynamics of the process have been better clarified with the embryo transfer (ET) and with the demonstration of a regulated and subsequent intervention of many tissutal proteins and cytokines that would be produced in the implant phenomenon. The phases are described as mirror-like: the endometrium receptive ability, that last only for a limited period of time (so-called “receptivity window”) must coincide with the ability of: apposition of the blastocyst to the place of implant; adhesion of the cellular external wall of the blastocyst with the place of implant. It is necessary the intervention of specific proteins, among which the integrin, whose action is modulated by the cytokines and by growth factors probably of trophoblastic origin. The integrin is a protein that belongs to a class of adhesion molecules that is found in every cell, and its secretion would be excited at level of the decidual cells of the stroma of the uterine mucous and of the glands of the impending uterine epithelium. In such way tightened junctions between mucous and trophoblast develop; invasion or penetration of the basal lamina, by the primitive trophoblastic cells adhered to the mucous that - following the previously established narrow junctions - penetrate in the endometrium for the action of proteolytic enzymes of the metalloproteins family, being modulated, in their action, by systems of cytokines and enzymes of the collagenase IV type, which act on the collagen that constitutes the basal lamina of the uterine epithelium; interaction with the stroma; overcome the basal lamina, the blastocyst, that “sinks” actively creating its place in the stroma with the trophoblast typed expansions, searches the stroma blood vessels (besides strongly imbibed and rich in glycogen) and the trophoblast demolishes the perivascular structures, develop many gaps in which maternal blood comes into contact with those that are by now the villuses. In this way the particular immunologic relation, conflicting but balanced, between mother and embryo, begins. From the practical point of view, and for the direct application of the transfer after FIV of the embryos, two are the criteria to consider: “concordance” between endometrium progestagen maturation and transfer results as number of pregnancies; the previous evaluation of the “endometrial thickness” as index of the uterine receptivity (Noyes et al., 1995; Friedler et al., 1996, Rinaldi et al., 1996; etc.) through echography. The former criterion is founded on the existence of an optimal stadium of endometrium preparation, even if within the “implant window”. At the moment of ovulation, during secretory transformation (due to the small quantities of progesterone produced by follicle), it stabilizes itself in a clearer secretory phase, (even if sometimes zonal) between the 16th and the 17th day of the cycle (when the ovulation is at the 14th-15th day), when a morular embryo at the 2nd day of fertilization is transferred. A secretory or a mixed endometrium is suitable for implant (Chetckowski et al. 1997); but if the secretory transformation is excessive (after the 19th day) the results of ET, as implants and pregnancies, are reduced (Schoolcraft et al.1991; Silverberg et al. 1991, Navot et al. 1991, etc.); Franchin (1993). In order to have an estimate case by case an endometrial biopsy in the day of the
transfer would be necessary, but this could have negative consequences on the results. The latter criterion (ecographical evaluation) is not invading, but rather summary. The evaluation of the subendometrial arterial flow (spiral arterioles) has also been taken into consideration, but data provided by Schild et al. (2001) don't convince on the concrete utility of the test. Research on circulating “markers” - that certainly will be developed in the next years - more specific of the uterine receptivity, provides better prospects.

“FORECASTS OF THE ART RESEARCH DEVELOPMENT”

The review that we have done about “times” and procedures of the artificial procreation techniques in the true sense of the word (ART) has aroused a lot of questions, which the research activities are attempting to find an answer to.

The most important seems to be the followings: Which is the “safety” degree that each of these techniques offers to the children? Can the in vitro culture of the early embryo (in general 48-72 hours) that unites FIVET and ICSI and above all the manipulations of ICSI have an “epigenetic effect” on the embryonic development?

Obviously the two questions are complementary; but the analysis of the problems that they set is generally done separately, with “epidemiological” methodology in the first question, of molecular biology methodology for the second one. A third question pertains to the perspectives of the oocyte cryopreservation (especially with the technique of the “vitrification”).

A fourth question concerns the effect and the risks of the so-called “ooplasm donation” (or mitochondrial transfer) from an oocyte to the other and the possibilities of the so-called “semicloning”.

A fifth question concerns the real possibility to avoid multiple pregnancies, through the transfer of one only embryo, even maintaining high the percentages of success of the ART techniques.

Of course, other questions could be asked, but these listed here seem to be susceptible of greater development in the research on the ART techniques in the next years and are the specific subject of our discussion.

Do those born with assisted procreation techniques run a more important risk for their health in comparison with those born with natural procreation?

The question doesn't have an univocal answer yet, but starting from 2002 data pro a higher risk is being gathered (Lambert, 2003).

In the 80s some first limited retrospective researches gave encouraging results for children born with FIV (Lancaster, 1987; Cohen, 1988; Beral and Doyle, 1990; Olivennes et al., 1993). Nevertheless it has been noted that these observational studies, don't overcome the difficulties of all the epidemiological longitudinal retrospective studies connected with the survey selection, the control groups, the monitoring biases and the observation period (in this case, the time since the birth, that has been in general very short) and the difficulty connected with the small size of each survey considered and sometimes with the lack of a control group (Kovalevsky et al., 2003).

Neither can be excluded - in the global judgment that has been provided – factors connected to the maternal conditions at the moment of the conception, as the age (generally high), the causes of the infertility, the possible effect of the “fetal reduction” (if any), and above all - as we have remembered - the culture conditions of the early embryo and finally the selective effect eventually coming from prenatal diagnosis (usually carried out in these circumstances), or from the very early or early spontaneous abortivity. The effect of such factors have been rarely reported in the first survey. Sure further and more recent studies would have questioned the so encouraging initial results, deepening
several “components” that can interfere with the global judgment also in relation with used methodology (FIV or ICSI), and that can be reassumed as follows: many authors, Friedler et al., 1992; Balen, 1993; Gissiler, 1995; Berg, 1999; Buitendik, 1999; Koivurova et al., 2002 and others, have proven that between those born by FIV there are an higher rate of “low weight at the birth”, longer hospitalization and around the double rates of perinatal mortality and morbidity in comparison with general population, with the same maternal age, number of sons and social status conditions. These effects would be especially correlated to the multitwinship, but “organic” factors connected to the first phases of the development cannot be excluded. According to some authors it would not seem that among those born by FIV there is substantial differences in the rate of malformations in comparison with the rate of the general population (MCR Working Party, 1990; Ritz, 1991; Friedler, 1992; FIVNAT, 1995; Palermo et al., 1996; Addor, 1998; Westergaard, 1999). Other Authors - however - have reported small differences in the cardiac malformations frequency in children born by FIV, that yet they attribute to the maternal characteristics (in general, advanced reproductive age) rather than to the FIV procedure (St. Antony et al., 2002). In order to settle these doubts, connected with the multitwinship, children born “single” from the transfer either of an only embryo (still very rare) or from the implant/development of one only embryo after a multiple transfer, were studied. The available survey, still small, show, however, that the frequency of the children with low or very low birth weight for the gestational age would be higher - in comparison with that observed in the general population – both in the FIV and ICSI conceptions (Doyle et al., 1992; Buitendijk, 1999; Sutcliffe et al., 2001; Bonduelle et al., 2002; Schieve et al. 2002). Nevertheless, Olivennes et al. (1993) and Schieve et al. (2003) attribute the phenomenon to different factors from the IVF technique (i.e. maternal age, factors of masculin infertility, etc.). According to Wennerholm (2000), the embryonic cryopreservation processes would not affect, by their selves, in a negative way the conditions of the newborn in comparison with those born from directly transferred embryos (but it is not clear how many embryos are implanted): the 50% of the cryopreserved embryos is lost after thawing, El-Toukhya et al. (2003). In the weight at the birth, differences would not be shown between those born from IVF embryos transferred at 48-72 hours and those born from blastocyst transfer, although also in this case the weight at the birth is lower in comparison with the general population (Menezo et al., 1999; Krauscke et al., 2001). These evaluations - still relatively reassuring for the IVF - could be different for the use of the ICSI technique. When ICSI technique started to be used, either with ejaculated sperm or with sperm surgically withdrawn from male individuals with sub fertility problems, further potential sources of variability and genetic error were added like, for instance, possible fatherly genetic anomalies directly transmitted by the sperm or by the immature spermatic elements withdrawn from the epididymis or testicle. Some initial researches would have not put in evidence the lot differences in those born from ICSI in comparison with those born from FIV (for instance, Bonduelle et al., 1994-1998); but more recent analyses call the attention to possible higher frequency, in those born by ICSI, of conditions like the low weight at the birth (Schieve et al., 2002), the higher rate of congenital anomalies (Handen, 2002); possible anomalies of the sexual chromosomes (Bonduelle et al., 2002); disorders in the imprinting (Olivennes, 2001) and also cases of cerebral paralysis (Stromberg, 2002). Such differences could derive, according to some, from the minor genetic homogeneity of the unfertile couples that resort to the ICSI in comparison with those that resort to the FIV. The chromosomal anomalies would be distributed without preference between autosomes and sexual chromosome according to some (Van Steirteghem et al., 2002; Aboulgar et al., 2001; Macas et al., 2001) but according to others, instead, the frequency of anomalies in the sexual chromosomes would be higher and it would reflect the frequency of the same problem in the fatherly seed (Bonduelle et al., 2002).
Since one of the most frequent causes of masculine infertility (for the overcoming of which ICSI is used) is the Y deletions (Silber J. and Repping, 2002), it is developing, in the literature, the idea that it is necessary to carry out a preventive analysis, genetic as well, of the seed to use in the ICSI to verify the presence of Y anomalies transmissible to the child, in order to inform the couple of that risk. In every case the prenatal diagnosis is strongly recommended. In conclusion it is still necessary to maintain a lot of reservations about the harmlessness of these techniques for the conceived (and above all about the harmlessness of the ICSI) (Barlow P., 2002). The role of the three most important and possible sources of “risk” for the unborn child is to be further specified: the in vitro procedures; the drugs used for ovaric stimulation; the infertility as a maternal or paternal anomalies index. Some of these aspects will be closely examined in the following paragraphs. The reduction of the number of embryos to be transferred today is surely the better available preventive provision for the user of these techniques to reduce the risk of multitwinship. It has been proven partially effective – at least to control phenomenon of prematurity and of low weight at the birth (that represent, already in their selves, an high risk for the newborn) - comparing recent statistics with the relatively older ones by the same Centre (Klemetti et al., 2002). However, the long-term newborn health result, as concerns eventual light development retardation and behaviour difficulty, remains undetermined (also because hardly explorable).

Are there “epigenetic effects” on the early embryo, correlated to the in vitro culture?

This second question, originated in the fact that also those born “single” from FIV or ICSI have a lower birth weight in comparison with general population, has been answered, in a way, according to what is nowadays known as “genetic reprogramming” phenomenon that embryo suffers in those very early phases that coincide in the development with those that the embryo from FIV or ICSI lives in vitro culture. The working hypothesis (that we are going to discuss in this paragraph) bears in mind the fact that the oocyte and “early embryo” (no matter how produced, with FIV or ICSI) go through an in vitro culture phase, and it foresees that the used culture mean interferes with the epigenetic modifications that occur in the embryo preimplant stage (Deryke et al., 2001). It seems therefore convenient to clarify that, as epigenetic modifications several effects are meant: the DNA methylation; the phenomenon of the genetic imprinting; the suspension of new production of RNA of the oocyte (RNA silencing) immediately after the fertilization, the co-valent histones modifications and the remodelling, by other complexes associated to chromatin, in the oocyte just fertilized. All these effects involve regulation mechanisms of genic expression, prearranged in the genoma during differentiation, through specific genetic programs: the result implies that the cell - with these epigenetic behaviours - can adapt to the environmental factors modifying the gene expression level without having to modify the DNA genetic code. The critical moments in which the epigenetic reprogrammation occurs are the gametogenesis and the preimplant period of the embryonic development that - physiologically - the embryo spends especially in the oviduct, in transit toward the uterine cavity. An in vitro culture liquid has been then predisposed (as we have already mentioned above) as similar as possible to the composition of the tubal fluid, but has also risen the doubt that some of the epigenetic effects, that usually occur in this development period, are not efficaciously checked in the in vitro culture (for instance, for lacking of some not yet specified tubal factor, etc.). That being stated, it seems convenient to deepen this phenomenon with further observations: the gametogenesis reprogramming is essential for the imprinting phenomenon that regulates the differential expression of the genes of maternal and paternal derivation, being otherwise established at
level of sperm and oocyte. It is considered that in the embryo, the epigenetic reprogramming, that occurs in the preimplant period, is important for a regular and correct development, because it regulates times like the initial expression of the embryonic genes, the embryonic segmentation (cleavage) and the cellular determination.

In the adult tissues, the genes that start operating during the early embryogenesis phase are repressed, while genes tissue-specific are activated. The genes regulated by imprinting maintain their acquired methylation marking since their gamete stadium and don't suffer the general demethylation process that occurs in the preimplant stage.

Disorders of the epigenetic reprogrammation can affect the phenotype genic expression; besides the epigenetic modifications that occur after the fertilization - and before the germinal line is settled - can concern either the somatic cells or the germinal ones, and can lead to the hereditariness of the epigenetic lines in the phenotypes of the future generations.

On the basis of these considerations it has been hypothesized that - within the techniques of assisted reproduction - three are the “risk factors”: the use of immature spermatic cells in which the reprogrammation is not completed.

The in vitro maturation of oocytes taken in a too early phase (anteale) – it is still to be considered as an experimental technique whose safety is not proven (Sinclair et al., 2000), because it could cause abnormal fetal development (Young et al., 2001).

The procedures of the in vitro embryonic culture (that are performed during the period of epigenetic reprogrammation) if unsuitable to favour the phenomenon.

By now, as concerns these factors, we have only indirect indications of the “risk” reliability, based on the existence of clinical syndromes correlated to the methylation defects, present in the general population with very low frequency. They are the immunodeficiency syndrome from centromeric instability and facial anomalies (Robertson and Wolfe, 2000; the Rett syndrome (Amir and Zoghbi, 2000) and some forms of mental retardation, among which the X fragile syndrome (Oberlé et al., 1991; Verkerk et al., 1991).

A common factor of these phenotypic anomalies is the mental retardation, so it is deduced the DNA promoter methylation is an important mechanism of the transcriptional regulation in the neural cells. Other methylation disorders may come from the epigenetic deregulation of the methyltransferase, occurred during the in vitro culture (Robertson et al., 2000), and of the proteins that regulate the cromatina (Legrouy et al., 1998; Voncken et al., 1999). These proteins act correlating themselves to the cellular cycle and they show the greatest alterations of their expression during the preimplant development (Khosla et., 2001).

Finally, Leese et al. (1998) maintain that ART techniques (with culture and/or manipulation phases) are sufficient conditions to induce the ubiquitous cellular answer to the stress, that in its turn change the expression of the first acting genes. In this reaction it should not be considered only the modifications induced on the methylation equilibrium, but also the effects on the transcriptional regulation induced by cellular apoptosis or abnormal methabolic local conditions. In fact it is known that changes of the Redox state inside the cell provoke alterations of the genic expression (Harvey et al., 2002).

From all these reflections it is argued the convenience to pay more attention – after birth – to the result especially of cerebral development of children born from IVF and ICSI.

It is true that survey at two years would not show noticeable differences in comparison with “spontaneous” population (Bonduelle et al., 1998; Sutcliffe et al. 2001), but it would be interesting to know, also at more prolonged development time, the evolution, especially mental, of two years-old children.

The authors begin to ask why the long-term epidemiological studies are so few. J.Thompson et al. (2002) answer: "Why? There is no doubt that such studies are expensive and logistically difficult.
Patient identity and confidentiality also pose significant ethical challenges. However, an additional reason may be lack of commitment to provide an evidence-based analysis. This position is becoming increasingly untenable” (pag.2.783).

3) Does ICSI technique in particular alter the phases of the early embryonic development?
In this paragraph, it seems convenient to pay attention to specific problems set by ICSI technique, on which C.Williams (2002) has also recalled the attention in a review on the “signals mechanisms” of the oocytes activation.
As we have already remembered (see chapter 3, paragraph 1), the ICSI technique (intracytoplasmic sperm injection), used the first time in hamster (Uehara and Yanagimachi, 1976), has been introduced in human by Palermo et al. (1992) and since then it has spread broadly.
This technique overcomes the normal interactions between sperm and oocyte at the level of plasmatic membrane and it suggests that the deriving oocyte activation is connected with a factor directly transferred from the injected sperm (Fissore et al., 2002).
There are, however, differences in the development of oocyte activation events that may have importance in the “quality” of the process. I list the followings for the ICSI: differences in the calcium oscillations timing (delayed of around 30 minutes in comparison with what occur physiologically: Tesarik et al. 1994, Nakano, 1997, Yanigida et al., 2001). Delay and great variability in the emission time of the polar globule and in the formation of the pronucleuses (Nagy et al., 1994). This phenomenon is may be due to the time necessary for the digestion of the spermatich plasmatic membrane and the acrosome by the cytoplasm of the oocyte. Normally the oocyte cortical cytoskeleton participates in the active removal of the spermatich plasmatic membrane and it is not known the influence that such digestion can have on the future evolution, since spermatic proteins -that normally do not transit and do not come into contact with the oocyte protoplasm- can leave in loco residual whose effects are not known.
These processes stopping “time”, in comparison with the ovulation period, can make the oocyte “older” before the oscillations of calcium start.
Besides, a delay has been observed in the decondensation of the spermatich chromatin, particularly in the anterior zone of the spermatich head where sexual chromosomes are preferably located (Luetjens et al., 1999; Sbracia et al., 2002, Ramalmo-Santos et al., 2002). This could explain the greatest frequency of sexual chromosomes anomalies in those born from ICSI (Bonduelle, 1998).
Consequent delay in the DNA decondensation and synthesis required before the first syngamy and the first cleavage (Ramalmo-Santos et al., 2000)
Finally, Rienzi et al. (2003) proved that ICSI conducted in oocytes that - during the manipulation necessary to the removal of the oophorus cumulus and radiated crown have suffered a polar globule placing out higher than 90 degrees - is associated to a reduced development ability and to higher anomalies frequencies due to formation irregularity of the meiotic fusus.
Currently it is possible to verify the presence and the position of the meiotic fusus with suitable tools and to choose the oocytes that are more suitable to the goals of the ICSI.
From all these elements, the question, that is more and more debated in the literature on the “specific” effect of risk provoked by ICSI technique for the embryonic development that could then become a “risk” for the health of the child, is justified.

The oocytes cryopreservation
The embryonic cryopreservation raises so troubling ethical and legal questions as to make the proposal, by some - also by those who accept the embryonic freezing as “provisional solution” waiting for a different one – of the oocytes freezing.
This can be studied and realized in two conditions: mature enough oocyte, isolated from the context of the radiated crown cells and of the granulose (hypothetically, spontaneously ovulated as well, but especially produced in many examples by the ovarian stimulation); oocytes at different degree of maturity, contained in ovarian tissue (cortical) thin sections (fragments) containing primary follicles, primordial and secondary at different degree of development.

The indications in the literature are not always so “angelic” as indicated: everyone agrees the at least partial maintenance of the oocyte inheritance of a young woman, that has to undergo, for instance, to chemotherapy because of a carcinoma, is useful at least for her prospective future maternity. But it is also stated that having an oocyte bank will make more easy (at least on the juridical plan) every donation or different transaction as concerns gametes donation; it will allow the quarantine of the risk assessment toward the possible transmission of viral diseases without imposing embryo production; it can provide, to the countries that forbid the embryonic cryopreservation, oocyte materials necessary to the research and to the in vitro procreation itself deferred in time (Boldi et al., 2003).

The mature oocytes cryopreservation, after the pioneering experiences carried out in oocytes at different maturity degree by Chen(1988), Van Uem et al. (1987), Tucker et al. (1988), has been recently (Gook and Edgar, 1999, Paynter, 2000; Coticchio et al., 2001, Fabbri et al., 2001) more seriously evaluated in terms of results (proportional rate of pregnancies per 100 oocytes) documenting outcome that don't have, by now, allowed a “routinization” of the procedure (from 1 to 2 % of pregnancies) but that can be encouraging for the future.

It appeared clear that the congealment/freezing mechanism in the two versions normally used (either very slow or very rapid) could cause formation of intracellular snowflakes that provoke notable alterations of the oocyte thin structure (like, for instance, irregularity of the mitotic fusus, or early release of the cortical granules at the level of the zonal membrane, etc.) (Al-Hasani et al., 1987; Sathananthan et al., 1987, 1988; Pickering et al., 1990; Van Bierkom and Davis, 1994).

From further studies appeared evident that either regulation (independent) of the congealment and thaw speed or the use of different cryoprotectors and the concentrations which they are used with and other factors, are critical in determining great or small protections of the oocyte thin structure in presence of intracellular ice (and other alterations). It allows to observe more favourable and constant rates of fertilization and implant (Gook et al., 1999; Porcu et al., 1997, 2000, 2002; Yang et al., 1998, 1999, 2002; Winslow et al., 2001).

Even better perspectives would be provided by the method of the “vitrification”, that consists in a state transition in which the solutions characterized by a very high concentrations of cryoprotectors pass to a solid state in absence of formation of a crystalline organization because of an extremely rapid cooling (direct immersion of the patterns in liquid nitrogen).

Positive reports have come from Hong et al., 1999; Kuleshova et al., 1999; 2002; Yoon et al., 2000; Chung et al., 2000; while - in veterinary field - the method offers more substantial results in the researches by Paynter and coll. (1999); Le Gals and Massip (1999); De La Pena et al. (2001); Kuleshova et al. (1999); Hochi et al. (2001), Vieira et al. (2002). In Italy, the school of Bologna (Flamigni and coll., 2003) carries out researches with this promising methodology as well.

The ovarian tissue cryopreservation, containing several follicular apparatuses at different development degree and oocytes necessarily at different maturation degree as well, is still considered a subject of “experimental” research to be organized - if a clinical/applicative profile will be ever reached - within the tissue transplantation. Difficulties of the unhomogeneous “maturity” of oocytes in the tissue to be preserved are added to the cryopreservation ones - increased by the fragments dimension. Although the immature oocyte is regarded, from some points of view, as less sensitive to the endocellular risks of cryopreservation, after unfreezing greater difficulties would be found in “maturing” the oocyte cytoplasm in time to the goals of the fertilization capacity.

In nature, it happens slowly and several ovulatory cycles elapsed between the follicle “recruitment” and the achievement of the follicle-oocyte maturity useful to the fertilization (review by Van Bierkom and
Nevertheless recently Amorin and coll. (2003) - working with prenatal follicles isolated and cryopreserved through vitrification of mouse and sheep - have obtained, after thaw and in vitro culture, oocyte maturation and “ovulation”; and comparable results are reported for the bovine oophoron by Paynter et al. (1999). Also in this sector future developments are predictable, above all for the maintenance of ovarian “potentiality” in very early age in the case of anti-neoplastic treatments. (Poirot et al., 2002).

The enrichment of the oocyte cytoplasmic potential with “mitochondrial donation”

A new technique being recently evaluated, that will be probably subjected to in-depth researches during the next years, is that known as “cytoplasmic transfer” or “mitochondrial donation” from an oocyte to another.

This technique has been planned to respond to particular demands like those that occur when the oocytes of a patient in many occasions have shown not to activate during the IVF, especially after the fertilization. Cohen et al. (1997) have proposed to transfer cytoplasm from oocytes of young and fertile women to such oocytes, which show to be deficient in ATP (Van Blerkom et al., 1995.).

The rationale of this proposal derives from the fact that a positive correlation has been proved between mtDNA content and FIV result (Reynier et al., 2001). And since a susceptibility of the mtDNA exists to the aging processes, it has been deduced that “old” oocytes have lower probabilities of correct development for that reason (St.John et al., 1997).

Besides it is known that for the synthesis of mtDNA in the mitochondrions, transcriptions factors codified by the nuclear genome are needed, that migrate from the mitochondrions nucleus (Clayton, 1998); the beginning time of this process in the new embryonic organism is critical, since it occurs at the stage of blastocyst (Piko and Taylor, 1987). So in the cleavage, the existing provision of oocytes mitochondrions is necessarily diluted being shared out in the blastomeres: because of the minimal thresholds overcoming, syndromes described in human pathology can occur (if the development is not stopped spontaneously) like the mitochondrial myopathy (Poulton et al., 1994); liver disease mtDNA associated with familiar character(Spelbrink et al., 1998); fatal infantile myopathy by Larson et al. (1994); disorders of the skeletal musculature associated to mitochondrial encefalomyopathy by Siciliano and coll. (2000).

In conclusion, an insufficient number of active mitochondrions after the fertilization can jeopardize the embryonic development. Against the reasons that would lead to the enrichment of the oocytes mitochondrions through cytoplasm “extravasation” from another oocyte, there are the unknown factors of the global result, since the compatibility reactions between two mitochondrial populations and between the nucleus and the new mitochondrial population are not known.

The few cases actually available show, however, that donor mitochondrions have been confiscated in the receiver (Brenner et al., 2000; Barritt et al., 2001) violating, with this biparietal transmission, the natural rule of a narrow maternal transmission of the mtDNA that occurs in the physiology of the human procreation (Giles et al., 1980).

It must be underlined that not only “isolated” mitochondrions are transmitted, but also other cytoplasmic organelles, mRNAs and proteins. Actual clinical experience would include about 30 children after transfer of fresh ooplasm or cryopreserved in just produced zygotes (Cohen et al., 1998; Huang et al., 1999; Lazendorf et al. 1999). A slightly higher rate of chromosomal anomalies in comparison with the normal one is reported.

In conclusion it is not still possible to set which technique between those employed to get out of serious lacks of the oocyte biology, has to be developed, but the results would go however correlated to the conditions of the particular infertile population considered.

By some, more experimental research on the animal is invoked before going on in this direction; others think that suitable animal models do not exist to represent the embryonic debit developments of the
type correlated to the human pathology, and they entrust better knowledge of mitochondrial function, control of possible mutations and correlated inheritance with possible deepenings. However, the matter is part of the “reservations” about possible embryo epigenetic modification (Barritt et al., 2001; St.John, 2002)

Is it possible to rejuvenate the elderly women’s oocytes and reduce the aneuploidy risks?

The subtended problem to this question is the known oocyte “aging” phenomenon parallel to the age of the woman. It is the principal cause of the reduction of the fertility rates observed after the 40 years (Tietze, 1957), and of the parallel increase of chromosomal anomalies in the conceived fetuses (6.5% between 35 and 39 years; 50% around to 45 years and over) (Hassold and Chiu, 1985) and, probably, it is also the cause of the incidence of spontaneous abortions in the first quarter correlated to the age (of the oocyte) of the woman (Anderson et al., 2000) and slightly superior - on these basis - in the pregnancies from IVF (Ezra and Schenker, 1995; Simon et al., 1999).

It has been proved that the oocyte aging interferes with not disjunction at the meiosis of the bivalent chromosomes (Dailey et al., 1986; Battaglia et al., 1996; Volarcik et al., 1998; Pell estor et al., 2003). The causes are probably to be sought in the modified and more difficult prefollicular circulation (Gaulden, 1992; Van Blerkom et al., 1997), that interferes with the efficiency of the oocytes mitochondrions (Bergmann et al., 1998), probably due to the production of oxidizing radicals that damage the latter (Tarin et al., 1995) and the molecular mechanisms that sustain the correct disjunction. Strategy to overcome this situation - that has certainly a remarkable clinical importance in the evaluation of the “risk” of the pregnancy in ripe old age and that interests the ART techniques as well - is multiple: the transfer of only those embryos that - at the preimplant diagnosis - don't show aneuploidy (Gianaroli et al., 1997, 1999; Munné et al., 1999; Verlinski et al., 1999; etc.); the cryopreservation of mature “fresh” oocytes withdrawn from young woman (Van Uem et al., 1987; Porcu et al., 1997) or cryopreservation of cortical oocytes fragments, even if withdrawn in juvenile age (Golden et al., 1994; Oktay et al., 1998), to be used (fertilized) when woman wants to procreate. Another hypothesis was added (experimental at all): the oocyte nucleus transfer withdrawn at the stage of the germinal vesicle from elderly oocyte of the woman interested in pregnancy in the cytoplasm of young denucleate oocyte (Zhang et al., 1999; Palermo et al., 2002), obviously “donated” by a young woman.

This technique would differ - according to the authors - from the transfer for cloning of somatic nucleus in denucleated oocyte not only in the indications but also in the results and it would have documented embryonic developments, in the experimental field, (up to 72 hours in vitro) regular in 64% of the “reconstituted” oocytes and fertilized with ICSI technique (Palermo et al., 2002). It is likely that in the next years these researches will be developed to clarify the role of the oocyte protoplasm aging in the aneuploidies genesis.

Is it possible to avoid twin and multiple pregnancies? Which prospects for the transfer of one only embryo?

As the ART techniques spread and new Centres practicing them were founded, it appeared more and more evident that the high obstetric morbidity and the high fetus-neonatal morbidity/mortality, correlated to the number of the implants with following development (multiple pregnancies), constituted the main problems to be solved (Gonen et al., 1990; Friedler et al. 1992, Seoud et al., 1992; Fivnat, 1995, etc.).

The ovarian hyperstimulation in itself not followed by ART techniques had main responsibility, but also the ART techniques contributed a lot to the pluritwinship with the transfer in uterus - made necessary – of several embryos, because of the implant uncertainty(Derom et al., 1993; Doyle, 1996).
Above all the increase of the triplets and over was worrying, reported in all the surveys in 90s (SART, 1993; FIVNAT, 1995; HFEA, 1996; Italian survey of the Istituto Superiore di Sanità, and the recent authoritative contribution of the ESHRE Group, 2003).

**Relation between multiple pregnancies and ART**

In the first decade of application of the ART techniques, an analysis of the relationship between pregnancy rate and number of transferred embryos had shown the highest rate after the transfer of three embryos (Wood et al., 1985; Sharma et al., 1988; Fiunat 1995). However, it appeared difficult to use more cautious measures. In fact since the achievement of the pregnancy was, on average, not superior than 10% of the transfer cycles, psychological, technical and economical reasons made inclined not to reduce the risk of the multiwinship and correlated prematurity (the evaluation by Evans and coll. was between 9 and 22.9% of children born before the 24th week), but rather to concentrate efforts on tangible results.

While in the United Kingdom and in Spain a regulation by the law was provided to the number of transferable embryos (no more than three: Lieberman et al., 1994) and in Germany as well it was not permitted to fertilize and transfer more than three oocytes after aspiration from the follicles (Beier and Beckman et al. 1994), in other European Countries and in USA law did not fix any rule but “guidelines” and discussions among experts were promoted.

Gradually, however, with the techniques improving, the possibility to transfer no more than two embryos, made its way-like prudential measure but able to still assure good “yields” to the ART procedures; it provided that in the first 48-72 hours of the culture the embryos had shown morphological normalcy and good dynamic conditions of development.

This orientation caused the multiple pregnancies decrease (Staessen et al. 1992,1993,1995; Englert et al., 1993; Nijs et al., 1993; Waterstone et al., 1993; Devreker et al., 1999, etc.), without however lower them to the natural frequency.

However, the “guidelines” prepared in 1994 by the American Fertility Society (AFZI; then becomeASRM) were still very “liberal” up to 1999, when - also following the debate of 1997 (Bronson, 1997) - the new guidelines established that two were preferably the number of embryos to transfer in the women younger than 35 in good health, three embryos for age included between 35 and 59 and four embryos for the age of 40 and over or when there have been previous implant difficulties (ASRM, 2000).

Jones (2003) doubts that such instructions have been followed, also for the physicians reluctance to provide too precise information on the risks of the multiple pregnancies to patient that passionately desires to solve her infertility problem, and finally for the “competition” among laboratories to boast the highest number of successes.

In USA a new debate has been opened, with the “inaction” accusation by competent authorities to the goals of the prevention of the multiple pregnancies (see Dickey, 2003). Also recognizing that the “wild inductions” of the ovulation are the principal cause of multiple pregnancies (and on the educational ground little has been done for reducing the risk), Fritze Steven (2003); Dickey (2003); Rosenwarks and Park Chung (2003); Daya (2003) re-open the debate wishing, however, a more congruous use of the ART.

**The matter of the transfer of the only embryo eventually derived from the natural ovulatory cycle**

In Europe, Land and Evers (2003) have prepared a report for the ESHRE (coming from a Consensus Conference held in Maastricht in 2002) that denounces the negative consequences of the twinship under evaluation (above all the pluritwinship) still persistent in the operators, and asks for the transfer of one only embryo (elective single embryo transfer, acronym eSET).
This solution, introduced by Vilska et al. (1999), would offer the same result in selected groups of patients (pregnancy rate) than the transfer of two embryos [(Gerriset et al. 1999; Martikainen et al. (2001)] and it would be suitable in young patients (less than 36 years) and with embryos of “good quality”.

It is required to widen experience on the subject, but the importance of this perspective is so notable that it is worthy of some further analysis.

First of all, this strategy would be favoured by a common interest by operators and patients to make the ART techniques more and more patient-friendly (Edward et al. 1996; Olivennes and Friedman 1998; Olivennes 2000; Templeton 2000; Jones and Schorr 2001).

In other words they should require less commitment, trouble and interference with private/working life of the woman, as it happens today.

Even the regimen of ovarian “minimal stimulation” for the IVF, would act in this way, abolishing practically the risk of the hyperstimulation, and maintaining good “yields” in terms of success rate (pregnancy rate 17-33% for recovered oocytes), but still with 5-14% of multitwinship (Fauser et al., 1999; Branigan and Estes, 2000); De Jong et al., 2000; Macklon, Fauser, 2000; Ingerslev et al. 2001). It is necessary, however, to make a distinction at least on the moral and juridical ground among the transfer of one only embryo after the productionof several embryoin the same stimulation cycle and the transfer of that only embryo which comes from that oocyte which spontaneously “matured” in the dominant follicle in the woman ovary, in that precise menstrual cycle.

In the first case what is practiced is the selection of the embryo apparently more suitable to the procreative goals; in the second case, instead, the possibilities of the FIV or ICSI are used to get a fertilization that experience has shown not to verify in natural conditions without interfering with the natural selection of the same oocyte that is spontaneously matured.

Positive results would have been obtained in the first case, that would however require an “expert eye” in the selection of the embryo (however the criterion of the fragmentation absence, absence of multinucleated blastomeres and a rapid process of cleavage are used: for instance between 25-27 hours from the insemination: Salumets et al. (2003) (see ESHRE Course Report 2001; Tiitinen et al., 2003).

In the second case, the possibility offered by the improvement of the technique of “pickup” of the oocyte from the follicle spontaneously matured during the menstrual cycle - monitored with echography and hormonal parameters to identify the ovulation with enough approximation – has certainly offered the possibility to practice a single FIV (or a ICSI) followed by embryo transfer with endometrial more physiological implant, because not disturbed from the interference with the techniques of gonadotropic repression/ovarian stimulation common in collecting many oocytes.

Analysis of about twenty works carried out with this criterion (see Pellinck et al. 2002) would prove a fair result on the transfer of 819 embryos (deriving from 1800 cycles: 45.5% per cycle) with 120 pregnancies (7.2% per cycle and 15.8 per transfer), however (by now) lower than that obtainable with two embryos transfer.

The effectiveness of the criterion is reduced, in fact, by the “surprise” ovulation (anticipated).

However, it would require less commitment of time for woman and of work for the team, it doesn't allow to select the embryo (that is an ethically positive factor for some, but discussed by others), it is more easily to fit for the repetition of the experiment - in case of failure –and it costs less than the “standard” ART.
EPILOGUE

I concluded the “descriptive” exposition of the techniques and the criteria of their use, as it had been asked me by the Presidency. I have tried to narrate in a truthful way how the ART techniques developed during the 25 years history of the medically assisted procreation - not missing to put in evidence the “critical state” of the selected solutions also from merely biological and clinical aspects. It seems to me that such critical state is sufficiently documented for all the procedures of the assisted reproductive techniques (ART), where - despite the progressive technological refinement - very high-risk conditions for the human embryo still remain.

It appears evident that – in general - there is no intention to put off the ART techniques, but rather the opposite attitude prevails: to continue in their use to achieve great experience and more important results.

* The problem is that the experiment is carried out directly on human beings. However in some recent works, a certain sign of criticism and second thoughts start showing, especially as concerns use of artificial tecniques in the wide and not enough in-depth field of the “inexplicable sterility” where the ART techniques are widely used.

The matter of the real ART techniques efficacy in comparison with traditional methods of suitable wait and natural treatment (natural clinical conditions restoration), was dealt with by Pandian et al.(2003) through Cochrane investigation methods.

It was already well known, in the literature, that couples with inexplicable sterility have an high chance of conceiving (Lenton et al. 1997; Collins e Rowe 1989; Snick et al.1997). Cases spontaneously cleared up with a sufficient “wait” (it does not mean inactivity, but rather optimal natural conditions restoration) were pointed out by Eimers et al.(1994); Collins et al.(1995). The “wait” success iscertainly determined by several biological factors (age of the woman, precision in searching for “fertile window”, reclamation of the genital system’s local conditions, etc.).

Furthermore, quite bland treatments like the use of clomiphene and the endouterin insemination - for a long time numbered among treatment instruments – have produced remarkable results (Hughes et al., 2000, etc.).

The question is if, from the literature, in this particular record of cases on inexplicable sterility, a substancial advantage from the use of FIV-ET and ICSI is shown. Pandian et al.(2003) do not find a substancial difference between endouterin insemination (with or without ovaric stimulation) and FIVET in the born alive rates. But it is true that with FIVET there are higher twinship rates in comparison with GIFT. Finally - what surprises – there is no substancial difference between FIVET and “wait therapy” results that Soliman et al. (1993) and other authors had already pointed out. Nevertheless Pandian et al. (2003) rightly put in evidence that there is a considerable heterogeneity in the case histories that deal with this subject. This makes the conclusions still provisional. Johnson et al. (2003), with Cochrane method applied in the “subfertility” survey, find positive effect evidence - as regards the expectetions - using clomiphene and salpingography with oily mean in the inexplicable infertility. Again, positive effect in the use of clomiphene and of gonadotrophic treatments in the anovulatory infertility; they report positive results in infertility for slight spermatic defect with insemination at the ovulation time; positive results with recombinant FSH and ICSI as regards ART tecniques (but only in the case of borderline seed).

On the whole, also these authors suggest more uniform protocols in the research and larger in order to provide unexceptionable documentation about the role of ART in the modern fertility medicine, appears yet very problematic, as regards clinical aspects as well, despite the long use of ART.
THE INTRINSIC LOGIC OF INTERVENTIONS IN THE FIELD OF HUMAN ARTIFICIAL PROCREATION. ETHICAL ASPECTS

THE INTERTWINING OF BIOLOGY AND THE PERSON IN PROCREATION

In the phrase ‘artificial procreation’, which is often used and seen as neutral, the adjective, when it is used with reference to man, is in tension with the noun. In reality, when artifice is introduced into the spring of life, to the point of replacing the very personal action of the corporeal and spiritual union of the parents, there is a deformation of the dignity of procreating as human participation in the divine creative initiative, and there is also an obscuring of the presence of God in the origin of the personal subject. Thus perhaps it would be better to remove the hypocrisy and speak frankly only of artificial ‘reproduction’. When biomedical science intervenes upon the specifically human aspects of life, it cannot confine itself to considering the technical dimensions of the efficiency of the act alone: it should also consider the personal dimensions that determine the ethical substance of the act. Otherwise, it gradually becomes the vector of a logic that deforms the human, beyond the original intentions that motivated it.

‘I have gotten a man’ (Gen 4:1). With this cry of joy the first woman welcomes the first man to be generated. And in her cry we find an expression both of grateful awareness of a man received ‘from on high’ and the pride of having contributed together with Adam to the coming forth of that new life. The attribution to God of that first ‘happy event’ does not in the least seek to obscure the human action of sexual union, in which the child had its origins. Instead, it raises its significance to the level of a ‘pro-creation’: ‘Now Adam knew his wife, and she conceived and bore Cain, saying “I have gotten a man with the help of the Lord” (Gen 4:1). A man and a woman, in generating, have really collaborated with God, from whose creative initiative, as the Church believes,[1] takes its immediate origin the spiritual soul of every human person, created in His image and called in Christ to freely take part in His divine life. Specifically for this reason, rather than the mere ‘reproduction’ of an example of the species, one should speak of the ‘procreation’ of a unique and unrepeatable person who is called to a special relationship with God.[2] Within the biological phenomenon of fertilisation, and within the instinctual and physiological dynamics of sexuality from which it arrives, a factor is marked out that goes ‘beyond’, that rises above the human parents themselves. Holy Scripture does not deny the material fact: man comes from clay. But it sees in it a new coming forth: by divine breath the person is made in the likeness of God. This, which is true of Adam, is true of every man. At the origin of every human life, every time that in the intimate darkness of the maternal womb life comes forth, it is God who says, once again: ‘Let us make man in our image, after our likeness’ (Gen 1:26).

In her cry of joy Eve thus expresses her ‘full awareness of the mystery of creation, which is renewed in human generation’.[3] As John Paul II states in summarising form: ‘the genealogy of the person is inscribed in the very biology of generation.’[4] It should also be made immediately clear that when it is stated that the human marriage partners are collaborators with God in the generation of a new human being the intention is not to limit their role to the mere biological sphere. The generation of a person, ‘corpore et anima unus’, is a unitary event in which the spiritual level occurs in simultaneous unity with the corporeal level. If the image and likeness can come only from God, from His ‘breath’, as took place in the first creation of the original Adam, by this the intention is not to limit the generative function of the marriage partners to the corporeal function but rather to ‘to emphasise that God himself is present in human fatherhood and motherhood quite differently from when he is present in all other instances of begetting “on earth”.’[6] Indeed, the fruit of human procreation is a new man who ‘brings
with him into the world a particular image and likeness of God Himself,[7] which can come only from God.
The ultimate root of the dignity of the human person, his irreducible singularity which makes him incapable of being reduced and disposed of at will, is to be found precisely in this immediacy of his relationship with God the Creator who “willed” man from the very beginning, and God “wills” him in every act of conception and every human birth. God “wills” man as a being similar to himself, as a person'.[8] In this certainty of being willed is rooted the consistency of the personal dignity of each man. It has been pointed out that although in Holy Scripture it is not possible to find a term that is equivalent to the notion of person, it is through the reality of election that the uniqueness and the singularity of the individual is expressed.[9]’Can a woman forget her sucking child…? Even these may forget, yet I will not forget you’ (Is 49:15). The dramatic reality of a culture that rejects God as the Father is inevitably one of ending up by also losing sight of the plainness of the value of the human person.

Human procreation, therefore, implies a delicate and valuable intertwining of biology and the person, respect for whom in acting is the pre-condition for a suitable approach to the unborn child (in his dignity as a person willed for himself), of the parents (recognised as subjects who are responsible protagonists of generation), of the medical doctors (respected according to the value and the limits of their intervention), and ultimately of God Himself (the direct Creator of human personal life). The ethical dimension must necessarily be based upon an adequate anthropology that recognises the singular dignity of the human person from his origins and the personalistic value of human sexuality as a context in which the language of bodies is called to express the logic of love between persons. The ethical moment, in fact, is that moment when the original gift of being is entrusted to the responsibility of human freedom so that it brings it to completion. This paper will try to outline the features of two logics that are alternative at an anthropological level in the light of fundamental ethical principles and relevant norms.

AN ANTHROPOLOGICAL MUTATION

The intervention of medicine in the sphere of procreation began under the banner of a beneficial ‘treatment of sterility’. In the face of physiological defects in the sexual or reproductive apparatus, the resources of medicine strove to overcome the obstacles involved and to allow the satisfaction of the natural aspiration of the marriage partners to have a child. Technical medicine inserted itself between a desire for a child and its impeded satisfaction, and obtained surprising results. It managed not only to fill the failings in organisms that were not able to realise sexual union, conception or pregnancy, but attained the point of organising methods that in various forms replaced the biological relations of fatherhood and motherhood.

Although in many cases procreative medicine was able to achieve a cure through a retrieval of the functionality of relevant organisms, it did not want to halt in the face of situations that could not be dealt with at a purely therapeutic level. Where procreation was not possible through the conjugal act, advance was made towards homologous artificial insemination and fertilisation. Where the germinal cells were compromised, there was a movement from the married couple to practicing heterologous artificial insemination and fertilisation, or the donation of ovules, if not even the donation of embryos; and where the genital apparatus was incapable of pregnancy, the move was towards ‘the renting of wombs’. Today, with cloning, there is an attempt to apply to man, as well, the techniques of embryo production, leaving aside the union of the sexual gametes and thus even the contribution of two people of different sex. The technical brilliance of drawing up solutions to overcome every difficulty, and in any case to provide the possibility of having a child to those who wished for one, became unchecked, multiplied the methods employed, and complicated in an exaggerated form the ethical case studies
involved. The logic of a result at any cost, of the efficiency of what is produced, relegated to a secondary position a consideration not only of the personal relationships that were involved but also the value of the incipient human lives that were sacrificed. The original intention of treating sterility has by now become so distant and impracticable that recourse must be made to future therapeutic use to justify these experimentations and conceal the Promethean hubris that inspire them.

The increasingly massive and exorbitant technical intervention of the treatment of sterility has brought about an authentic anthropological mutation in this phenomenon. Here we encounter the core of the problem of artificial reproduction. Gradually the corporeal dimension of human procreation was seen as being purely accidental compared to the wish to have a child. The essence of parenthood has been made to lie in the decision to procreate, independently of the corporeal conditions through which it is implemented. As a result, these conditions, deprived of symbolic and relational meanings, have been left to the mercy of technical manipulation and of being replaced by contracts. But in this way, also, the nature desire for parenthood, associated with the power of the artificial, has changed meaning: it is no longer an imploring waiting for a child who can be given following sexual union and who should be welcomed whatever the case, but has become a choice and project of a total parenthood. There thus emerge the configurations of a radical change in the meaning of the anthropological contents of what it is to be a parent and of what it is to be a child.

THE BASIC PRINCIPLES OF CATHOLIC DOCTRINE

By the Instruction Donum vitae of the Congregation for the Doctrine of the Faith, of 22 February 1987, the Catholic Church proposed again not only ethical answers at the level of specific cases but also contemporaneously a vision of man and in particular a vision of his mysterious vocation to parenthood. The cornerstones of this vision can be summarised in certain basic principles that then govern the solution to the connected moral questions and issues: 1). Medical intervention upon human procreation requires first of all respect for unborn life from the moment of its conception: the human embryo must be treated as a person who requires to be affirmed as an absolute value in himself and not as biological matter to be used for other purposes, however noble they may appear to be (cf. Donum vitae, I, 1.). 2). Human procreation must take place within marriage between a man and a woman, respecting the right/duty of the spouses to become a father and a mother solely through each other (cf. Donum vitae, II, A., 1). 3). Human procreation is rightly engaged when it is willed as the fruit of the conjugal act, that is to say of the specific act of both the corporeal and spiritual union of the spouses (cf. Donum vitae, II, B., 4, a.). 4). The biomedical intervention is respectful of the dignity of persons when it seeks to help the conjugal act, both by facilitating its completion and by allowing it to achieve its end once it has been normally carried out. Whenever medical intervention takes the place, in a technical sense, of the conjugal act, to obtain a procreation that is neither its result nor its fruit, it unduly takes upon itself the procreative function and thereby contradicts the dignity and the inalienable rights of the spouses and the unborn child (cf. Donum vitae, II, B., 7.). It becomes more arbitrary the more it substitutes not only the conjugal act but also the corporeal-personal contribution of the marriage partners (heterologous fertilisation, surrogate motherhood, etc.) and even the presence of the sexual dimension as such (cloning). 5). The advance of ethical negativity in these interventions, which corresponds to the increasing level of replacement of the conjugal act and the personal presence of the marriage partners in procreation, involves a differentiation of the ethical judgement and also, in particular at a legislative and political level, a different assessment of their contradictory positions in relation to the common good.
THE CONNECTION BETWEEN SEXUALITY AND GENERATION, THE PRE-CONDITION OF THE PERSONAL DIGNITY OF HUMAN PROCREATION

The dignity of procreation lies in its originality of having its specific beginning in an act of love, which is both spiritual and corporeal, of a man and a woman bound together by the nuptial tie. Openness to the generation of a new life, which takes place in connection with the sexual conjunction of a male body and a female body, is not a merely biological fact or a purely accidental fact. It indicates, rather, a profound meaning of sexuality at a personal level: specifically when the marriage partners give themselves to each other in the form of their bodies, and thus express their being in the image and likeness of God the creator, who is love, can they also become collaborators of God in calling to life a new person, who is thus born as a new gift of the reciprocal spousal gift of the marriage partners. To generate a child does not therefore in any way mean causing his existence. As the philosopher Gabriel Marcel says, he, the child, is never ‘here for me’, he does not depend on me and does not belong to me, just as I myself do not belong to myself and do not have the possibility of giving existence to myself.[10] One can wish for a child only by ‘bowing one’s knee’ (cf. Eph 3:14), that is to say by recognising the previous, unforeseen and not disposable initiative of Another, from whom the child comes like a guest who has come from afar. The human will, which hopes for and pursues the procreation of a child, is right when it recognises with humility and confidence that there is a grace, a kind of ‘nuptial bond between man and life’.[11] Thus divine authority does not authorise from outside the paternal and maternal authority of the human parents but becomes the limit that is its foundation from within, and in forming its foundation it governs its exercise. Parenthood has the form of a ‘vow’, that is to say a commitment by which throughout a person’s life one corresponds a freely given gift and is thus open to transmitting it.

The connection between sexuality and generation, from this point of view, reveals itself to be evidence of the meaning to be respected for the truth of human action in this sphere.[12] The intimate unity of the unitive dimension and the procreative dimension of human sexuality, far from being an undue making sacred of the physiological processes, defends at one and the same time the personalistic dignity of human sexuality and of the child who comes from that sexuality. In this intimate connection the human will expresses itself more in the form of consent, in which one adheres in a responsible way to the plan of Another and the action of the man and the woman has the quality of responsible ‘acting’ and not a mere technical ‘doing’.

The crisis of parenthood in the contemporary mentality has its ultimate roots specifically in the obscuring of these dimensions. For the man of our developed civilisation, the decision to procreate takes increasingly the form of being merely a decision to be taken only with great reflection.[13] At one time it was taken for granted that a person who married would have children. Fatherhood and motherhood were considered a natural and inescapable task to be shouldered together with the many other responsibilities of existence. Procreation was not a choice but the obvious consequence of conjugal life, which then became extended in the responsibility of a father and a mother to bring up and educate their children.

Through the intervention of medical technology in the field of sexuality, for over fifty years we have reached the point of separating sexuality from procreation and for over twenty years of obtaining procreation independently of the practice of sexuality. As a result, sexuality has fallen into the field of irresponsibility: it is seen as a free space for the expression of instinct and feeling, for play. In contrary fashion, procreation has been burdened by an exorbitant weight of responsibility. Today, to procreate appears as a burdensome responsibility, indeed a grave responsibility: too grave for a man and a woman, who feel that they are alone, and are indecisive in addressing this task. The decision to procreate, indeed, is connected directly and exclusively with autonomous reason, which envisages and plans, which calculates and programmes, balancing advantages and disadvantages, opportunities and resources, for one’s own good and the children that may arrive.
As can be seen, to address the subject of fatherhood and motherhood first and foremost in terms of a project and a decision to be implemented is not at all neutral. When the act of procreating becomes a thought-through initiative to bring a human being into the world, the father and the mother have the very relevant feeling of assuming a direct and total responsibility in relation to their child. The child could call them to account, attributing to them the possible limitations and ill fortune that life may have in reserve for him. Such a burden of responsibility can only give rise to fear. The philosopher Robert Spaemann, during a debate on artificial procreation, observed that he could never have been able to bear being faced by the questions of a child who one day, overwhelmed by the trials of an especially difficult existence, could attribute directly and solely to him and his wife the decision to bring him into the world.[14]

The short circuit, on which depends this intolerable overload of responsibility, is a result of making fatherhood and motherhood essentially a project of reason and decision of will which can be implemented through acts that are seen solely as technical means to reach this end. This becomes dramatically evident when recourse is made to artificial procreation – the ‘procreative’ project’ is implemented by medical doctors, whilst the body acts only to provide, to the extent that this is possible, the matter for the intervention. Procreation carried out by medical intervention in a certain sense expresses the rational ideal of how responsible human reproduction should take place today.

THE CONJUGAL ACT AS A PROCREATIVE ACT

We can thus clarify further the fundamental ethical principle involved. Responsible procreation, as conceived in the Catholic vision of human love, is the right approach of the response of a man and a woman to the procreative dimension inherent in human sexuality.[15] From the point of view of Catholic doctrine, procreative responsibility is expressed at an ethical level as respect for the indissoluble unity of the two meanings inscribed in the conjugal act – the unitive meaning and the procreative meaning.[16] In order to illuminate this fundamental principle it is useful to grasp the meaning of the conjugal act in the light of the theology of the body that John Paul II outlined in his catechesis on human love in the plan of God. ‘The human body, with its sex and its masculinity and femininity, seen in the mystery itself of the creation, is not only a source of fecundity and procreation, as in the whole of the natural order, but ‘from the beginning’ contains the spousal attribute, that is to say the capacity to express love: that love in which the persona man becomes a gift and – through that gift – actuates the meaning of his being and existing’.[17] There emerges here the decisive importance of the previous observations made in this paper: in fact, the spousal character of the human body can be understood only with reference to the person, because he is willed by God for his own sake, and to God’s call to give himself in love.

This unique kind of relationship of personal intimacy, which has its distinctive aspect in the genital communion of bodies, involves a series of characteristics. One refers to ‘conjugal act’ in the full sense as the act of genital union in which the personal communion of the spouses is realised. What, therefore, are the personalistic requirements of the conjugal act? It must be first and foremost an encounter at the level of persons: the body is permeated by the person and the encounter of the bodies is called to be a ‘sacrament’ of the encounter of the persons, an expressive and effective sign of giving and of welcoming the other. The ‘primary importance of what is personal’ in the encounter implies that only when there is a definitive and public commitment at the level of persons is the action of giving in the body truthful. The mutual entrusting of one’s own corporeity expresses, in fact, a definitive personal dedication, a total welcoming of the other, and an irrevocable giving of oneself. The conjugal act, in order to be located at the level of the authentic self-giving of persons, must be free and exclusive. Only in freedom can there be giving and only in total and definitive commitment is that gift ‘sincere’, that is to say it effectively says what it objectively means. The genital expression cannot be
limited to the body, separated from the meaning of the giving of persons. In this context it finds its real meaning: neither despised as something that is merely physical and inferior nor idolised almost as though it were a value in itself.

But the complete meaning of the spousal love of a man and a woman goes beyond their physical union itself. The finality that is intrinsically connected with the corporeal expression of conjugal love indicates a new dimension of love. I am referring here to fertility, by which love always goes beyond itself and expresses itself in the generation of new life. The sexuality practiced at a genital level is intrinsically finalised to the communication of life: it is fulfilled in the child who is born from the physical and spiritual self-giving of the spouses. Generation is not only a possible consequence of a physical act – it is the intrinsic dimension of the act of conjugal love. In this way, it is also authentic responsible ‘procreation’, because it draws its origins from a human act of interpersonal love that is extended in the task of upbringing and education. The child is born as a ‘gift from a gift’. Not being a characteristic that is merely biological in character, unity in love is always fecund; the fecundity of the body, which in the sexual encounter opens itself to the possibility of transmitting life, is a sign of the spiritual fecundity of the spousal encounter.

From a personalistic outlook, which is what has been followed hitherto in this paper, we can now understand what is the specific object of the conjugal act and the ethical relevance that the procreative dimension has in it. It is clear that it would be mistaken to consider the conjugal act as a simple means to achieve procreation. The conjugal act is not an instrument to achieve a goal that is further to it on the basis of which it would be merely ‘excused’ at the moral level. The language of ‘ends’, applied to the sexual morality of marriage, has lent itself to harmful misunderstandings and errors of comprehension. [18] If human action is understood on the basis of a technical model of efficiency, the interpretative schema of a ‘means to reach an end’ sees the value of the conjugal act solely in the achievement of a procreative end that is extrinsic to it. Instead, the conjugal act, as a human act, has first of all a value that is intrinsic to, and immanent in, the subject – it is the expression and the realisation of the giving of oneself. Thus the procreative end is not at all a biological consequence that is possible at the exterior level of events, but an immanent ‘good’, an intrinsic perfection of the action itself. The procreative meaning and the unitive meaning are the two essential ‘meanings’ of the conjugal act.

The object of a human act is its intentional content, understood from the point of view of the subject that acts.[19] Now in the conjugal act the fundamental aspect and the primary object is the union of love between the spouses, which is realised according to all the emotional, corporeal and spiritual richness of the two persons who become ‘one flesh’ (‘one beloved’ cf. Gen 2:24).[20] The openness to procreation reveals itself as a constituent intentional dimension, a necessary pre-condition for the conjugal act to be really an act of love. This is the deep meaning of the teaching of Humanae vitae and Familiaris consortio: between the two ‘meanings’ of the conjugal act, the unitive and the procreative meanings that is to say, there is a mutual co-involvement – there is no real unity without openness to procreation and there is no real procreative responsibility without the integral self-giving of the spouses at a corporeal and spiritual level.

This means that procreation that does not derive from authentic spousal love, and the corporeal and spiritual act that defines it, is not real responsible procreation. To defend the dignity of the procreation of a human person there must be real self-giving at his origins, both in the spiritual dimension (free reciprocal self-giving in the conjugal context) and in the corporeal dimension.[21] On the other hand, openness to procreation is a constituent aspect of a real act of conjugal love. Detached from the context of conjugal love, a reproductive act loses the dignity of a procreation in which the spouses are collaborators with God in the bringing forth of a new human life.[22] Detached from its procreative meaning, the sexual act is no longer the same – it no longer has the dignity of the fully spousal dimension of reciprocal total self-giving.
TWO ALTERNATIVE LOGICS

There thus emerge two logics that are alternative from an anthropological point of view in relation to human procreation. They can be described through certain oppositions, in relation to the figure of the child and the parent respectively.

The child is seen as a gift to be welcomed and not as a project to be built. Indeed, when the child is the result of a technical production and not a human action of self-giving, his condition of equal dignity with the parents and the medical doctors is denied. As a ‘product’ he must meet the requests that commanded his planning. He forms a part of a plan that tests and controls his quality. The phenomena of the rejection of children that are born through forms of artificial fertilisation that have illnesses or handicaps are not somewhat unpleasant episodes but rather the consistent consequences of a logic that from the outset does not acknowledge the full dignity of the person of the child. And this is not to speak of the selection of embryos and aborted foetuses, those procreated solely for the purposes of experimentation, of whom too often we know little and in relation to whom no ethical problem is raised at all.

Human parenthood is not a decision imbued with huge and daunting responsibilities but is an agreement to a task. Indeed, the overburden of responsibility involved in taking the direct and total decision to give life to a child is taken away when at the origins of procreation there is the act of conjugal union. The corporeal mediation interrupts the direct connection between the procreative decision and the origins of the life of the child – it opens up symbolically to mystery, the mystery, that is to say, of a further presence than the parents that in a more radical way is the basis of the absolute dignity of the person because called to a singular relationship with God. When conception springs from the union of bodies, which is usually determined by sexual attraction, then the corporeal dimension to which generating is entrusted is to be traced back to a previous design. The choice of whether to have a child or not is not direct. The readiness to procreate take the form of consent to a project that proceeds that of a man and a woman – a project to which they entrust themselves and of which they form a part, responsibly, certainly, but not arbitrarily.

THE MYTH OF TOTAL PARENTHOOD

From parenthood at any cost, the logic of artificial reproduction inescapably leads to the myth of total parenthood, and this no longer respects either the personal dignity of the child or the leading role of the parents in their intimate love or the ultimate presence of God the Creator. At the end of the journey the anonymous powers of society will seek to substitute the human couple in the decision to procreate, and man will be reproduced in the image of Power, which will claim complete dominion over him. Instead, a child welcomed as a gift invokes an origin that is shared by the parents and children, that is constitutive of them both, and is the basis of fatherhood and motherhood.

Only in forgetting such origins is it possible to misunderstand parenthood by seeking to make it total and by reducing it in reality to a conditioned decision. When the artificial comes to dominate and takes the place of the symbolic mediation of the body, the origin in God is obscured and human parenthood is deformed. ‘For this reason I bow my knees before the Father, from whom every family in heaven and on earth is named’ (Eph 3:14-15). Only in bowing one’s knees in grateful and humble adoration of the origin of every kind of parenthood is human parenthood real. One can give life worthily to a child not in the way that one decides to create something that is ours but by accepting to transmit a gift, by which we are the first to be gratified and surprised.
12. See on this point M. Chiodi, Il figlio come sé e come altro. La questione dell’aborto nella storia della teologia morale e nel dibattito bioetico contemporaneo (Glossa, Milan, 2001), p. 350.
17. Giovanni Paolo II, Uomo e donna, XV, p. 77.
21. In the singular case of the Incarnation of the Son of God it is his own dignity as a divine person that excludes the possibility of being able to refer to human procreation.
ANGELO SERRA

THE EUGENIC PROSPECTS OF TECHNICALLY ASSISTED REPRODUCTION
THE PREIMPLANTATION GENETIC DIAGNOSIS

A Premise
The prospect of «eugenic selection» has emerged with full force with the growth in the advances in the field of genetics. The operational plan was launched at the Third International Conference on Human Genetics by the Nobel Prize winner Herman Muller[1] when he invited the two thousand or so participants “to engage in a strong offensive for the control of human evolution”. And he gave the reasons for this: “Modern culture by maximal saving of lives and fertility, unaccompanied by a conscious planning which takes the genetic effects of this policy in account, must protect mutations detrimental to bodily vigour, intelligence or social predisposition. […] If genetic defects and shortcomings were to be allowed to accumulate to an unlimited extent among us, as seems to be happening now, the condition would eventually be reached in which each person likewise would present an immense, yet in his case distinctive, complex of problems of diagnosis and treatment”. He himself outlined the lines of this offensive. The first – germinal selection – was to lead to the “production” of a human subject of the “desired quality”; the second – genotypic selection – was to involve, after an early diagnosis during pregnancy, the elimination, through “abortion” either on demand or imposition of a subject who ran the risk of manifesting a serious illness; the third – gene selection – was to lead to the improvement of the human species, as soon as the advances in knowledge about the human genome had opened up the pathway to its realisation.

The first objective, the “production of a human subject”, has been in part achieved with the creation of human embryos in vitro.[2] However, serious technical problems, which still today persist after twenty-five years since the birth of the first baby conceived in vitro, do not allow us to foresee an easy achievement of a given ‘desired quality’, or even if this would be possible.

The second objective, the “genotypical selection”, proceeds with dizzy exponential speed. Due to major scientific advances in the field of cytogenetics and genomics, there has been indeed a major spread of the ‘prenatal diagnosis’ (PND) of syndromes caused by alterations in the genetic information which are observable at the chromosomal level (chromosomal syndromes) or analysable at a molecular level (monogenic or polyfactorialgenetic diseases). Unfortunately, however, given that in the majority of these illnesses the impossibility or difficulty of prevention or cure remain, a strong social pressure has developed – which has by now become a cultural fact – not to accept the responsibility of keeping alive a subject with a «quality of life» that is held to be not worthy of the human person. Hence the orientation towards «selective abortion», which has by now become a legally recognised and often recommended practice, and which can be extended in some countries to the third month of pregnancy as well, and even to birth.

In 1990, the year in which A. H. Handyside[3] and his collaborators published their work on the first birth of twins whose sex had been identified through cells taken from the embryos before implantation, the new technique of «genetic selection», known as preimplantation genetic diagnosis (PGD), was introduced. This is a technique that has by now become established not only as a precautionary measure in the medical practice of fertilisation in vitro but also an effective negative eugenic measure to be applied in all families where there is a risk present of having children afflicted by serious illnesses because of chromosomal or gene alterations present in the parents. From January 1999 to the end of August 2003, Medline assessed five hundred and seventy eight scientific works in this area directed both to the improvement of this technique in itself and to the evaluation of the technique as a safe guarantee for a «healthy child» through the technique of in vitro fertilisation.

A stimulating but reductive vision of the present-day situation as regards this new technology and its future was presented in December 2002 by A. Kuliev e Y. Verlinski[4] who had been working in this
field for years at the Reproductive Genetics Institute of Chicago. They wrote as follows: ‘More than 4000 preimplantation genetic diagnosis (PGD) cycles have been performed, suggesting that PGD may no longer be considered a research activity. The important present feature of PGD is its expansion to a variety of conditions, which have never been considered as an indication for prenatal diagnosis. […] PGD has also become a useful tool for the improvement of the effectiveness of IVF, through avoiding the transfer of chromosomally abnormal embryos, representing more than half of the embryos routinely transferred in IVF patients of advanced maternal age and other poor prognosis patients. PGD is of particular hope for the carriers of balanced chromosomal translocations, as it allows accurate pre-selection of a few balanced or normal embryos. […] PGD may soon be performed for both chromosomal and single gene disorders using the same biopsied polar body or blastomere. The available clinical outcome data of more than 3000 PGD embryo transfers further suggest an acceptable pregnancy rate and safety of the procedure, as demonstrated by the follow-up information available for more than 500 children born from these PGD transfers’.

In the face of this optimism, an examination of the features and results of this new technology can allow its assessment and evaluation in terms of what it really involves.

**Pre-implantation Genetic Diagnosis (PGD)**

PGD involves the genetic analysis of one or two cells taken from the embryo in order to detect the existence or otherwise of chromosomal aberration and gene mutations that, obviously enough, would impede normal development.

The general protocol can be summarised through an identification of the following stages: 1) ovarian stimulation followed by aspiration of oocytes; their in vitro fertilization through either the ordinary process or the intra cellular spermatozoon injection (ICSI); culture setting; 2) 72 hours after fertilisation - “the best moment in humans”[5] - embryo biopsy for the removal of one or two blastomeres (out of 7-8) at cleavage-stage, either by direct puncture or partial mechanical dissection of the zona pellucida, or through acidic tyrode chemical zona drilling, or laser-assisted zona opening; 3) karyotyping or suspected gene search; 4) in uterotransfer of ‘healthy’ embryos.

Two observations require especial emphasis.

The first observation concerns the number of cells taken from the embryo in order to obtain a reliable diagnosis of its normality and thus of its capacity for in utero transfer. A careful study[6] of 188 cycles, in which only embryos from which respectively one or two or three blastomeres had been taken, and which on the basis of the examination should have been thought to be ‘normal’, led the authors to advise an analysis of two cells of embryos of seven or more cells so as to make the diagnosis more accurate and reliable. This indication was confirmed by the development of a mathematical model created to find new strategies by which to increase the accuracy of this technique.[7] From these data it also emerges that notwithstanding the manipulation that the embryos undergo during the process of PGD, the levels of pregnancy achieved appear to be comparable with those obtained in ordinary in vitro fertilisation (IVF). The results presented in the work indicate, in fact, a rate of pregnancies begun for each cycle of 29.1% (55); an implantation rate of 18.6% (35); and a birth rate of 14.2% (27).

However, A. De Vos and A. VanSteirteghem in concluding their work emphasise with absolute clarity: ‘More data are needed in order to reassure that none of the biopsy procedures applied clinically interferes with implantation rates on ongoing pregnancy rates, allowing the birth of healthy children’.[8]

The second observation relates to the methods of diagnosis. There are essentially two goals to be achieved. The first is to define the presence in the cells that have been removed of chromosomal aberrations - aneuploidies, deletions, inversions and translocations - through the application of the FISH[9] (Fluorescence In Situ Hybridisation) technique, which, with all the advances that have now been made, allows a definition in an individual cell of the numerical and structural anomalies of the chromosomes. The second is to define the presence of gene mutations through the process called PCR.
Polimerase Chain Reaction), which allows, starting with the DNA of an individual cell, an efficient and rapid amplification of the fragment affected in a given illness and an accurate definition of its alteration. Obviously enough, errors are not absent due to a notable extent to allele-specific amplification failure or allele dropout (ADO). It has been estimated that for recessive illnesses two genotyping are required, that is to say genotypes derived from two blastomeres, in order to ensure a minimum risk (< 1%) of transferring an affected embryo in utero.

Another possible technique of analysis is offered by use of the polar bodies. This technique has the major limitation that it can give information only on the genetic contribution of the mother. The possibilities of this examination are two in number: an examination only of the first polar body and an examination of the two polar bodies. In the first case, the mature oocyte can be used for fertilisation when it is demonstrated that in the polar body there is the certain presence of the expected chromosomal or gene alteration, given that the soundness of the information that remains in the oocyte is then certain. Because of the possibility of so-termed allele dropout (ADO), any doubt can be settled through an examination of one or two more of the mature oocytes. In the second case the extraction of the two polar bodies can take place only after the fusion of the gametes has occurred. In the view of S. Rechitsky and his collaborators, this appears to be absolutely necessary in the case of the diagnosis of single-gene disorders in order to avoid the notable difficulties that are encountered in the analysis of the DNA of a single cell, amongst which may be listed DNA contamination, undetected dropout allele, and preferential amplification, which can all lead to a misdiagnosis.

The results of PGD applied to man

In the face of this new advance of the biotechnologies, welcomed by medicine as a further instrument by which to reduce the number of children born with serious or grave pathologies, the question immediately arises as to what the results of the application of this new technology have been in the fourteen years or so since it was first applied.

We have little data on the use and results of PGD through the technique of sequential polar body removal (PBR). From the work of S. Rechitsky and collaborators which has just been referred to, we learn that of 529 oocytes in 48 clinical cycles of 26 patients, only 106 embryos had been transferred in 44 clinical cycles, which were followed by 17 (10%) unaffected pregnancies. And C.M. Strom and his collaborators, when presenting the results, and above all the state of health at birth and during the first six months of the first 109 children who were born following the application of the same technique for the diagnosis of Mendelian disorders and aneuploidies, concluded as follows: ‘The data presented here demonstrate that PGD by PBR is a safe and accurate technique for couples at high genetic risk to avoid having children with genetic abnormalities, without the anxiety of awaiting prenatal diagnosis and the potential of having to terminate affected fetuses’.

A broader and more complete answer emerges from the analysis of a by now notable number of data obtained using the technique of blastomeres biopsy. Table 1 presents the most representative data published since 1999.

The first observation to emerge from the analysis of all these data regards the enormous quantity of embryos - human subjects at the beginning of their lives - that are sacrificed, that is to say literally killed. Table 2 presents the sum of data of the five works in which, as is observed in Table 1, were presented respectively: 1) the total number of biopsied embryos; 2) the number of abnormal embryos because of the presence of chromosomal aberrations – which are the most frequent errors – all of which were rejected, that is to say directly ‘killed’; 3) the number of embryos that were transferred in utero; and 4) the number that were born.

The number of embryos that were born is, obviously, to be seen in respect both of the number of biopsied embryos, that is to say the total number of embryos that were produced and used, and the
number of embryos that were transferred. It is clear that given that the percentage of births was 2.9% (39:1,347), 97.1% of the embryos that were produced were lost: 761 (56.6%) were directly killed because they had a chromosomal abnormality and 544 (40.5%) were consciously exposed to foreseen and willed death.

This situation is confirmed by a comparison between the number of transferred embryos and those born in two groups as presented in Table 3: group ‘A’, which contains the data of another three works - which are also presented in Table 1 - in which only the number of transferred embryos and the number of born embryos is communicated; and group ‘B’, which presents the corresponding data of the sample examined above.

It is evident, from the value X"2", that the difference between the two groups is not significant. It follows that given the notable information that comes from the enormous European sample the frequency of born embryos - despite the very high selection obtained through PGD - is to be seen as markedly lower than that obtained in the ordinary processes of FIVET and ICSI, in which selection by PGD is not carried out. This difference could be ascribed to various causes. It remains true, however, that the embryos, even if apparently selected following PGD, are in the same situation of high precariousness - indeed they are perhaps in an even worse situation - as the embryos produced and used in the ordinary processes in which selection occurs spontaneously.

In the face of these data, collected in a serious way by those who wanted, and want, to make a contribution of human comfort to so many situations of suffering and pain, but which indicate also a lack of understanding of the true reality of the human embryo which is reduced instead to a pure technological instrument, a very recent statement of a pioneer and protagonist in this field, R. L. M. Winston[16], seems to me very correct and of great resonance. He concluded his analysis of the state of the technologies of technically assisted reproduction with the following statements: “Patient desperation, medical hubris and commercial pressures should not be allowed to be the key determining features in this generation of humans. Bringing a child into the world is the most serious human responsibility. We cannot ignore the clouds lowering over these valuable therapies. To do so could have a profound influence on the progress of medical science, not only in this high-profile field, but in others too”.

The ethical prospects of PGD in the medical field

After a reference to the techniques of preimplantation genetic diagnosis and an analysis of the effects and the results of the application of this recently new technology, it is not only useful but also incumbent to engage in a reflection on the reasons that led to this new step in medical diagnosis not only in the field of assisted reproductive technology but also in that of genetic pathology and others which are now opening up. Certain statements, gathered from the writings of researchers in this field and from people working in the sector of public health care, allow us to understand the principles that are held to justify preimplantation genetic diagnosis – principles that have by now become widely accepted both in the scientific and medical fields and within society.

J. Savulescu[17] observes: “Eugenic selection of embryos is now possible by employing in vitro fertilization (IVF) and preimplantation genetic diagnosis (PGD). […] I will defend a principle which I call Procreative Beneficence: couples (or single producers) should select the child, of the possible children they could have, who is expected to have the best life, or at least as good a life as the others”. C. Camero and R. Williamson[18] argue that “PGD and implantation of an unaffected embryo is a more acceptable choice ethically than prenatal diagnosis (PND) followed by abortion for the following reasons: Choice after PGD is seen as ethically neutral because a positive result (a healthy pregnancy) balances a negative result (the destruction of the affected embryo) simultaneously”. J. A. Robertson[19], in a detailed work on the ethical aspect of the application of PGD in different situations, states: “While recognizing the strong objections of some people to PGD […], the following discussion
assumes that the use of PGD to screen for aneuploidy and serious Mendelian disorders is ethically and legally acceptable”. And after discussing new uses of PGD for screening embryos for susceptibility to cancer, for late-onset diseases, for HLA-matching for existing children, and for gender, he concludes: “Except for sex selection of the first child, most current extensions of PGD are ethically acceptable and provides a framework for evaluating future extensions for nonmedical purposes that are still speculative”. The concerns felt by J. A. Robertson in respect of sex selection was overcome by E. Dahl[20] who argues: “After considering five potential objections, I conclude that parents should be permitted to use PGD to choose the sexual orientation of their children”. A similar openness to the justification of PGD has been ascertained in a social context by an empirical survey carried out by M. G. Katz and his collaborators[21] using suitable questionnaires given to 121 subjects after a previous accurate consultation. Of these: 41 had presented themselves for a PGD because of gene disorders; 48 for aneuploidy screening; and 32 that were about to commence their first IVF cycle as a control group. The authors concluded: “All groups found PGD to be a highly acceptable treatment. They expressed little concern about its extension to testing for non-disease states such as sex, and they were strongly in favour of a shared decision-making model in which couples have considerable autonomy over decisions about the embryo(s) to transfer”. However, these authors also emphasised that: “Whilst our society supports reproductive autonomy there is also concern about the impact of genetic manipulation and genetic enhancement of embryos. There may not be the same community support if the move was towards embryo enhancement, eugenics and even HLA matching”.

In relation to these positions, which are characteristic of a negative eugenic approach that is today prevalent and strongly sustained[22], objections and forms of resistance, however, are not absent. The first, and the strongest, relates to the grave abuse of the human embryo, which is reduced to a mere technological instrument. This objection was formulated in 1984 by three members of the Warnock Committee and their opinion was included in the final report in the form of an «expression of dissen». It reads as follows: “It is in our view wrong to create something with the potential for becoming a human person and then deliberately to destroy it. We therefore recommend that nothing should be done that would reduce the chance of successful implantation of the embryo”. This position was openly recognised and emphasised at point n. 17 of the report of the Donaldson committee[24], which had been established in 1999 by the British government for the regulation of research on embryonic stem cells, where it is stated that “A significant minority of people believe that the use of any embryo for research purposes is unethical and unacceptable”. The second objection, emphasised by J.A. Robertson himself[25], “arises from the fact of selection itself, and the risks of greatly expanded future selection of embryos and children. […] Any form of selection or manipulation turns the child into a “manufacture” and thus impairs human flourishing. […] Increasing the frequency and scope of genetic screening of prospective children will move us toward a eugenic world in which children are valued more for their genotype than for their inherent characteristics, eventually ushering in a world of ‘designer’ children in which genetic engineering of offspring becomes routine’.

From these brief notes the net contrast between the two ethical positions appears to the full: one position is fully in favour of the use of PGD not only for any kind of treatment involving in vitro fertilisation but also in any case in which a serious possibility of pre- or post-natal pathology exists for a wanted child; the other position is decidedly opposed. It is opposed not out of some whim but for the simple and clear reason that through such a procedure one seeks a ‘good’, albeit justly wanted, through an action that involves a «grave wrong» – the intentional killing, even in a single case, of one or more human subjects who have begun their lives. Whoever knows the scientific truth of the human embryo as a real human subject cannot but recognise the moral value and the correctness of this position.

J. Habermas[26], the famous philosopher of the Frankfurt School, dwells somewhat at length upon this subject in his recent work The Future of Human Nature. The Risks of Liberal Genetics’. “For years the discussion about genetic research and engineering has continued to centre uselessly round the question of the moral status of prepersonal human life. Thus I will adopt the perspective of an imaginary
present, projected into the future, beginning from which the practices presently under discussion could retrospectively appear to us as a sliding into a form of liberal genetics, that is to say genetics governed by the law of supply and demand. Research on embryos and the preimplantation diagnosis preoccupy spirits above all because they exemplify the dangers evoked by the metaphor of «selective eugenics» in relation to the human race». Later on in his analysis he makes clear his thought on the matter: “Let us suppose that the experimental use of embryos generalises a practice by which the defence of prepersonal human life is seen as being of secondary importance in relation to other possible ends (including the to be wished-for development of noble «collective goods»), for example new methods of treatment). The widespread acceptance of this practice would render our vision of human nature less sensitive and would open the door to a form of liberal genetics. In this we can now see what in the future will appear to us as a fait accompli of the past, to which the proponents of liberal genetics will appeal as a Rubicon that we have already actually crossed’.

One must admit that in reality, with this new step of preimplantation genetic diagnosis, the very heights have been reached of the overbearing arrogance of science, which has wanted not to acknowledge the true reality of the human embryo, degrading it for the first fifteen days of its existence to a «pre-embryo»[27]: a mass of cells without any law synthesizing them into an organised whole, a cumulus of disposable cells for any kind of scientific or technological use. Faced with this situation, J. Testart himself[28] the technical father of the first child conceived in vitro in France, with evident worry was already writing in 1995: “What is in the making is a veritable revolution in ethics, transcending the frontiers of any given country”. And he, with a sense of responsibility concluded: “Beyond technical performance, individual interest and naïve desire, the problems are more complex than we are led to believe. We ought to approach these problems with a concerned effort and determined humility to uphold the ethical dimensions of human life”.

One must honestly recognise that the great expectations that the progress of science and medicine seemed to have opened up in the vital field of procreation are being transformed into a serious threat to society, in which «values» and «ethical aspects» are losing their meaning. The reason appears clear: in the prevalent scientific-technological system the value of the constant «man» - which is indispensable in maintaining the equilibrium of the whole system - has been seriously altered, if not completely annulled. We urgently need to return to the recognition of his real value, and thus his dignity and his rights. However, science and technology cannot calculate or estimate the value of this constant with their own methodologies. It is necessary for scientists and technologists, who today have a notable power in directing and effecting social development, not to remain closed within their axiomatic reductive system but to become open to, albeit respecting their own prerogatives, and to welcome the stimuli of a ‘sapiential’ system that reflects thought and light that come from the deepest part of ourselves, critically explored, examined and assimilated. Only from this research can one obtain the value of the constant «man» and, as a result, rediscover a sense of limits and deduce from this what our responsibility towards him really is. It is man in his integrated reality that must dictate, from his interior being, the set of rules to apply to his action, the basis of every form of responsible behaviour. What is required is that it should be sought for and that there should be a will not to reject it.

It is necessary to transform the closed scientific-technological system, which today prevails, into an open system in which the real value of «man» is recognised, and thus his dignity and his rights but also his responsibilities and his duties. Only in this way can science and technology - and medicine in particular - find how to meet the needs of every human person, deciding when and in what forms this or that behaviour is ethically correct, and thus create real social progress.

John Paul II[29], when addressing the members of the Pontifical Academy of Sciences, laid stress upon this aspect: “We must not allow ourselves to be beguiled by the myth of progress, as though the possibility of conducting research or of applying a technique would immediately qualify them as morally good. The moral goodness of all progress is measured by its genuine benefit to man, considered in relation to his twofold corporeal and spiritual dimension; as a result, justice is done to
what man is; if the good were not linked to man, who must be its beneficiary, it might be feared that humanity were heading for its own destruction. The scientific community is ceaselessly called to keep the factors in order, situating scientific aspects within the framework of an integral humanism; in this way it will take into account the metaphysical, ethical, social and juridical questions that conscience faces and which the principles of reason can clarify” (n. 5).

MÓNICA LÓPEZ BARAHONA

HUMAN EMBRYO IN THE APPLICATIONS OF ARTIFICIAL REPRODUCTIVE TECHNIQUES

We understand by Assisted Reproductive Techniques (ART) all the biomedical methods that facilitate or replace the natural biological processes during human reproduction, such as the introduction of semen in the vagina, the progression of sperm through the genital tract, the capacitation of sperm once ejaculated and the egg fertilization by the sperm [1].

ART are not considered common therapeutic methods since they cannot cure infertility: the sterile patient who has a problem like a testicle alteration or blocked fallopian tubes will still have the same organic problem after using ART.

ART are classified depending on the place where fertilization takes place:
- Inside the body
- Outside the body

ARTinside the body are those performed inside the female reproductive system and they can be classified as follows:
  - AI: Artificial Insemination
  - DIUI: Direct Intrauterine Insemination
  - IPP: Intraperitoneal Insemination
  - ESIPT: Egg and Sperm Intraperitoneal Transfer
  - GIFT: Gamete Intrafallopian Transfer

AI consists in the introduction of the sperm through a catheter in the woman’s vagina, through the cervical canal, and into the uterus. Then the arrival of the sperm and the fertilization takes place as it would in a normal biological process.

GIFT might be considered the most interesting technique from a bioethical point of view: it has been shown as an alternative to IVF and its methodology can be summarized as follows:

Egg induction through ovarian hyperstimulation and retrieval of eggs via transvaginal. When we mention IVF we will outline this step which is crucial for the success of this technique. It consists in the retrieval of a large quantity of eggs through adequate hormone treatment. Women in a normal physiological process only produce one egg every 28 days.

Collection and capacitation of sperm in appropriate media.

Transfer. A catheter containing the egg and the sperm reaches the ampulla segment of the fallopian tubes through the vagina, the egg and the sperm are separated by a bubble to avoid fertilization inside the catheter. They are freed at the ampulla so that fertilization can occur spontaneously in the proper physiological site.

In the ART outside the body, fertilization is performed outside the female reproductive system: from a methodological point of view, ART outside the body can be classified as follows:

Techniques where gamete micromanipulation does not occur:
  - IVFET In-vitro Fertilization with Embryo Transfer

Techniques where gamete micromanipulation occurs:
  - ICSI Intra- Cytoplasmic Sperm Injection

All these techniques performed outside the body contemplate in-vitro fertilization therefore, in all of them, there is a possibility of manipulating either the beginning of a new human’s life or his first stages of development [2].

Egg retrieval through the vagina with a probe (ultrasound-guided). Ovarian hyper stimulation is aimed at obtaining as many eggs as possible and it implies a previous hormone treatment to induce multiple
ovulation. This treatment is not safe and complications may occur so the woman’s endocrine state must be taken under strict consideration. Besides, the treatment cannot be repeated indiscriminately. Laparoscopy is no longer used for egg retrieval because the procedure is invasive and upsetting; it implies an abdominal puncture to access the peritoneal cavity. In the new technique a catheter is ultrasound-guided reaching the ovarian follicle and removing some of the eggs contained in the ovary.

Maturing of the extracted eggs in cultured media. 
Collection and capazitation of sperm (similar processes to those in ART). 
Co-culture of the eggs and sperm (in-vitro fertilization). 
Verifying, under microscopy, fertilization and segmentation of the zygote. 
Selection of the most viable embryos. This embryo selection implies the application of morphological criteria therefore, the bioethical implications are obvious. 
Intra uterine transfer of the three most appropriate embryos after 2-day culture. 
Freezing and storage (cryopreservation) of the redundant embryos in case they are needed for later use if the procedure has not been successful.

IVFET brings about some ethical considerations: 
When using this technique there are situations where human embryos are eliminated or discarded invariably. 
As implantation of three embryos or more is necessary to achieve the most efficiency. (One embryo is known to be extremely unlikely to succeed) the destiny of the implanted embryos who do not progress is death. 
Several publications demonstrate that it is important for a successful implantation of the embryo in the maternal endometrium the previous recognition of adhesion molecules.
Formation of a fully differentiated, implantation-competent blastocyst requires the expression of a complex repertoire of molecules [3]. From pronucleate to blastocyst the embryo accomplishes a temporal expression pattern of cell adhesion molecules thought to play a key role in embryodevelopment. Among those molecules are b-actin, b1 and a-6 integrins, ZO-1 and E-Cadherin [3].

These cell adhesion molecules and other factors such as cytokines play an important role synchronizing the development of the embryo [4]. 
In an IVFET process during the first stages of embryo development it can not occur recognition of the molecules described above by the mother that will gestate the embryo. The lack of control of implantation remains as major obstacle to a successful pregnancy. During the implantation window the endometrium is highly receptive to the embryo [5]. However, if the embryo has been generated outside the woman´s body, the recognition process is more difficult and therefore more than one embryo should be transferred to the uterus in order to achieve at least one implantation.

In several occasions, two out of three embryos transferred die. One of the reasons of the low success of implantation in case only-one-embryo transfer is the absence of recognition by the mother of the cell adhesion molecules that the embryo expresses from the pronucleate stage. 
Finally, the freezing of the redundant embryos implies, in case they have not been implanted, a very likely situation to happen, either their destruction or their experimental use.

ICSI consists in a later development of IVFET and it is performed through the mechanical insertion of the sperm, its nucleus or immature spermatid cells (spermatids) inside the egg. Pipettes and very fine needles are needed for gamete manipulation. These devices are handled by instruments which allow movements in the micron range (micromanipulation). These tools facilitate the deepest possible penetration of the sperm into the egg.
In ICSI, fertilization is more manipulative than that in conventional IVFET since sperm is directly introduced into the egg through an intracytoplasmic microinjection; so sperm that would have never initiated fertilization, due to their deficiencies, are forced to penetrate the egg. The egg to be fertilized is floating in culture media. Through a soft aspiration it is immobilized and held still in the middle of the culture; a blunt micropipette is used to avoid cell damage. After, and under microscopy, the only spermatozoon contained in a capillary micropipette is microinjected and drilled through the zona pellucida of the egg. The male gamete is placed in the cytoplasm where the rest of the steps of fertilization (formation of male and female pronuclei, syngamy etc.) will occur spontaneously. Once micromanipulation has been performed, the fertilized eggs are cultured for some hours and the rest of the steps of IVFET are completed (verification of segmentation, selection of zygotes...), then, various embryos are transferred to the uterus and the rest are frozen and stored.
This methodology in IVFET is used in men who have a deficit in sperm production (oligospermy) and those with a sperm motility disorder. The first success was in 1988. Nowadays, microinjection is performed even on more immature cells (spermatids) when male’s reproductive pathology does not allow normal maturation of sperm. To obtain spermatids a testicle biopsy is necessary, since these cells never leave the testicle.
In ICSI, efficiency of the process is around 12-14%, that is to say, very similar to conventional IVFET.

In both types of techniques one can distinguish:
- Homologous fertilization if both gametes come from the husband and the wife or from the couple that decides to go through an IVFET process.
- Heterologous fertilization when, at least, one of the gametes comes from a donor different from the spouses or couple.

We will focus the bioethical considerations on the techniques that are performed outside the body. All the ethical considerations have to be given under a certain referential system and three significant anthropological fields [6],[7]:
- The human’s own sexual characteristics
- Family
- The ontological status of a human embryo

We will not analyse the first field but we could say that in the practice of in vitro fertilization two aspects of human sexuality (the sexual intercourse and fertilization) are separated therefore, bringing about some ethical considerations.
We will not look into the matter of the second field, however, the fact that a baby is introduced inside a family from the outside needs to be carefully considered. When the baby comes from heterologous fertilization is even worse since he is deprived from the knowledge of his origins.
When performing the latter techniques the human embryo and his anthropological status is given very little consideration [8],[9].
1.- The human embryo goes from being a gift to being treated as a product.
2.- Natural selection of the sperm which will fertilize the egg does not occur. Both eggs and sperm are selected. In some occasions, the egg is fertilized by motionless sperm, situation that never takes place in a normal physiological process. This may bring about later pathologies on the baby, such as sterility or genetic related diseases. Basically, this process involves greater aggression in the manipulation of fertilization. Using anomalous sperm to fertilize eggs is a way of manipulation of biological selection processes, and it facilitates the persistence and transmission of negative inheritable characters, among others, germinal anomalies responsible for the infertility that we are trying to overcome. Moreover, it sets the psychological bases for the loss of social and individual sensitivity to human embryo.
experimentation, and future experiments on cloning, parthenogenesis, chimerical experiments, etc. can become a reality.

3.- The embryo is not conceived as a result of a private sublime act of love and giving but of a sublime technological act [10].

4.- As the in vitro generated embryo is not in his suitable environment: his mother’s uterus, he is very likely to be unprotected and susceptible to any kind of manipulation.

5.- In different stages of the in vitro fertilization process there is, undoubtedly, harmful interference in the organic integrity of the embryo: the selection of the most viable embryos involves the destruction of the rest; the transfer of 3 or 4 embryos implies the elimination or freezing of the remaining ones. Several times in case of multiple pregnancy, all the embryos but one are strategically aborted (a process known by euphemism “embryo reduction”). One cannot forget the significant higher rate of spontaneous abortions in IVFET compared to those in normal pregnancies.

6.- Over the last 30 years, few follow-up studies and multiple case reports have evaluated the safety of ovulation induction drugs and the risks associated with their use [11],[12],[13]. These include a higher rate of congenital malformations [14],[15],[16] and potential carcinogenic effects on the women than expected [17],[18],[19]. Several cases of malignancies associated with IVFET have been reported in the literature.

Concerning the congenital disorders observed in children that have been conceived by IVFET it is interesting to take into account that three recent studies report a high incidence of Beckwith-Wiedemann Syndrome (BWS) in children conceived thorough ARTS. Six of 10 cases where reported from a British BWS registry. The same numbers were recorded in a French registry and other seven children have been reported in the USA [20]. These frequencies are extraordinarily high for such a rare congenital condition and such finding reminiscent of reports of sporadic cases of the imprinting disorder. Angel syndrome, has also been linked to ARTs. What goes next? Further follow-up studies of children conceived through ARTs are needed, including monitoring birth defects, development, and cancer. Studies will need to be prospective and multicentre, and should include molecular characterisation of epigenetic abnormalities, including the methylation state of imprinting control regions within imprinted gene clusters.

Concerning cancer incidence in children born after in vitro fertilization it is necessary to recall that there are a number of case reports of neuroblastoma in children conceived where fertility drugs were needed. A recent study in the Netherlands (where every year 3000 women are treated with IVFET) suggest that a relative risk for neuroblastoma development in children conceived by IVFET has significantly raised [21]. In the literature we may also find cases of congenital brain tumor in a child born after IVFET (congenital brain tumors are very rare) [22].

However, literature also shows publications that state that children conceived using IVFET and related procedures did not have a significantly increased incidence of cancer (ex. 4.33 cases expected and six observed) in comparison to the general population [23],[24].

Evaluation of the children’s long-term health born through IVFET will provide important information and it is very necessary to promote research in this area of medicine.

7.- A dramatic consequence of in vitro fertilization is the freezing of redundant embryos. This technology halts the embryo’s metabolism for an indeterminate period of time, condemning it to remain in a plastic vial into the freezer until it is thawed for destruction or implanted in the uterus. Nowadays, there is an increasing interest in the debate over the future of frozen embryos due to the fact that their integrating cells (pluripotent embryonic stem cells) can be used for research on their differentiation into several types of cell tissues.
d) Since 1998 we have witnessed different publications showing that by addition of different differentiation and growth factors to the pluripotent stem cells that integrate the inner mass of the blastocyst those cells could be differentiated into different tissue types [25],[26]. This fact opens the door to the possibility of thawing frozen human embryos with the aim of obtaining its embryonic stem cells for research. As the embryonic stem cells are the constitutive parts of the embryo, the procedure used to obtain them results in the embryo’s death.

The solution to the dilemma about the frozen embryos’ future is not easy, and in no case will it be ethically correct as grave moral disorder has already been done.

The freezing process is obviously harmful to the embryo: freezing and thawing can damage him and even kill him. Nevertheless, it is impossible to establish a period of time for the embryo’s survival in a freezer. It is only possible to know the embryo’s state once it has been thawed.

On the one hand, the embryo cannot live outside the uterus beyond his blastocyst stage. That is why embryo thawing without the later transfer into the woman’s uterus is a deliberate act of elimination.

On thawing an embryo, three situations can take place:
- The embryo is dead or dies in the thawing process.
- The embryo is not viable or does not have an integrated life.
- The embryo is alive and viable.

Embryos in the third case, have the possibility of development only when they are transferred into a uterus.

This reality opens a door to prenatal adoption (or embryo donation) as an alternative to ensure the development of the frozen embryos’ “suspended” life[27].

8.- The pre-implanting diagnostic, which has been established for embryos suspected of suffering a genetic pathology, implies an aggression against the embryo that can result in his death, and subsequently the eugenics of those embryos that do not pass the “quality test”.

9.- Heterologous modalities performed outside the body even have a more negative bioethical implication than the homologous ones, because in the former the son’s right to know his biological parents is not considered. The situation can even become worse when the techniques outside the body contemplate the possibility of implanting the embryo in a surrogate mother.

The psychological implications are not less important than the ethical ones: the biological parents’ anonymity and therefore the “secrecy” about the son’s origin, can undermine the whole family relationship. Children may feel betrayed by their own parents or even feel that those are not their real parents.

10.- There is a relationship between the different cloning techniques and the assisted reproductive ones outside the body. As in vitro fertilization takes place outside the mother’s body, it allows zygote manipulation in order to get his asexual multiplication.

There are several reasons why cloning could be included in some of the IVFET protocols; let’s see some of the most relevant ones:

a) A potential application of the cloning by bipartition could be the generation of multiple embryos for their later implantation after IVF. In order to improve the success of IVFET, usually 3 or 5 embryos are implanted. By cloning just the necessary number of embryos, only the precise embryos would be generated, we could avoid embryo freezing and also the repetition of ovarian hyperstimulation in case an initial stage of IVFET fails.

b) Another likely application would be the possibility of obtaining a lot of material which is genetically identical to the embryo in order to study possible genetic defects. It would be like obtaining copies of an original. These copies also have the possible defects. Therefore, the study and diagnostic would be carried out “easily” [28].

c) Satisfying the wish of those parents that want a twin baby of a previous one obtained through IVFET establishing a bank of clon babies where parents could choose their son’s desired genetic characteristics.
In conclusion, and taking into account all objective and scientific evidence, it has been shown that IVF techniques performed on the embryo bring on negative consequences; the human embryo is reduced to a product and is no longer the finality himself as it corresponds to his personal status. The human embryo is unprotected and vulnerable to abortion practices, experimentation, freezing or manipulation.

The Practice of Artificial Reproduction Technologies: Its Effects on the Goals and Duties of Medicine

Introduction
The transfer of the new artificial reproductive technologies (ARTs) from veterinary medicine to the medical practice is counted as one of the most outstanding social and scientific events of the twentieth century. In the media it is repeated once and again that ARTs have enabled countless subfertile couples to achieve their long-awaited dreams of having a child. In the medical journals, in-vitro fertilisation and the techniques and procedures associated with it (gamete and embryo freezing, pre-implantation genetic diagnosis, gamete and embryo donation, and surrogate motherhood), are presented both as the result of bold research and as the driving force for breaking fresh scientific ground.

By contrast, much less it is spoken about the unsightly aspects of ARTs. It is not easy to find in the medical literature data on the failures - biological, psychological or familial - that ARTs bring about. Only occasional reports are published on the emotional hurt and financial distress to couples that ARTs convey. Practically never it is spoken on the loss of meaning suffered by so basic institutions such as family or parenthood, or on the way human embryos have been diminished from the condition of beloved sons or daughters to that of dispensable things.

Regrettably, the disturbing effects of ARTs are not confined to the field of reproductive medicine. ARTs exert a disquieting influence on the whole of medicine, and are changing the general goals and duties of doctors. Some of the most considerable professional values and traditions of medicine are being eroded by the erratic demands of clients and the obsequious subservience of doctors. The practice of ARTs is blurring the professional limits between altruism and commercialism, healthy emulation and aggressive rivalry, due competence and arrogant virtuosity, public needs and individual fancies.

In this paper, I will try to offer a provisional and annotated inventory of the impact ARTs are making on the goals of medicine and the duties of doctors. I think it is more consonant with the introductory character of this contribution to follow a descriptive and enumerative approach, than a systematic one. The reason is simple: professional criticism on ARTs is still at an early stage of development. Some years have to pass until we can realise the extent and diversity of deviations and untoward consequences the instrumentalist use of ARTs can entail.

In conformity with its emphasis on the professional and ethical aspects of the problem, this essay will pay attention almost exclusively to the medical bibliography. The topics considered correspond to real situations, not to imagined scenarios.

The goals and duties of medicine
It is not an easy task to summarise in a few lines the standard wisdom about the goals and duties of medicine. The difficulties increase today, when almost all aspects of human life tend are medicalised, and the dividing line between health and disease seems effaced under the pressures of consumerism and the dialectics of patient’s power. Already 20 years ago, Kass[1] could affirm that “all kinds of problems now roll to the doctor’s door, from sagging anatomies to suicides, from unwanted childlessness to unwanted pregnancies, from marital difficulties to learning difficulties, from genetic counselling to drug addiction, from laziness to crime”.

Such a weird situation must be confronted, so that we try to identify the main elements of the medical calling. To that end, different paths can be followed. First, many of the goals and duties of doctors have been determined by medical law and, particularly, by the codes of medical ethics of the national medical associations. In almost every code of medical ethics a description of the main features of the doctor’s calling is offered as one devoted to cure illness, relieve pain and suffering, promote and
maintain health, and preserve life. All of these elements are cemented by the respect of the dignity of every human being, without discrimination, in time of peace as well as in time of war[2].

Second, the ends and duties of physicians have been defined as the result of the exercise of autonomy and self-regulation based on the notion of professionalism. In recent years and especially in the field of internal medicine, a decided effort is being made to restore the old and permanent values of medicine and to adapt them to the time ahead. It is impressive the effort made by a number of independent groups in their intent to recover the sense and spirit of medical professionalism[3].

Third, the goals of medicine and the duties of the doctor can be deduced from the internal morality of medicine, grounded in the clinical encounter between physician and patient[4]. From the structure of this encounter, Pellegrino thinks that it is possible to derive an understanding of the core professional obligations, free of external adhesions. Although some have criticised this approach, it is able to offer and develop an ethics to inform and fortify the duties, virtues and obligations of physicians qua physicians. In medicine, the primum principium of all ethics (do good and avoid evil) applies fully. According to Pellegrino, in due consideration to the elements present at the clinical encounter, it is found that the good of the patient consists in “a quadripartite good, a complex inter-relationship between medical, personal, human, and spiritual goods, hierarchically arranged”.

In my view, with the help of the basic elements derived from the internal morality of medicine it becomes possible to attempt a critical analysis of our problem.

The surrender of professional morality to ideologies

The normative documents on professional ethics, the classical codes of conduct or the lately composed manifestos on medical professionalism, behave very differently in the face of ARTs. Overall, they do not seem suitable objects for our analysis. Such shortcomings do not come only from the extremely differing way in which they treat the matter (from silence to discordant precepts contained in one and the same document). Their main inadequacy lies rather in their submission to the more fashionable social opinion or to the dominant political viewpoint. Substantive ethical considerations in those norms are very scant or absent. The reason of such ethical void resides, perhaps, in the circumstance that those norms are the result of the impoverishing controversy needed to reach at a consensus, where robust ethical convictions must be sacrificed to the views of the majority.

Under the imperative of scientist ideology, market demands and financial gain, permissive and loosely regulated ARTs have received a warm approval from many medical institutions. ARTs have been frequently declared an important medical service for the alleviation of the pain of infertile couples, as well as an efficient instrument for the prevention of genetic disorders. Particularly worrying, by virtue of its authoritative and wide influence, is the statement on ARTs of the World Medical Association[5]. In some countries, professional ethics regulation on ARTs has bowed as an obedient servant to the general law of the state[6]. In others, as is the case of Italy, during the many years of absence of legal regulation, the code of medical ethics represented the only moral signpost for the practice of ARTs[7]. Only a few medical organisations have expressed ethical criticisms on ARTs and limited their use to very restricted situations[8]. I did not find ethical norms congruent with the doctrine expressed by the Instruction Donum vitae of the Congregation for the Doctrine of the Faith in any of the national or supranational codes or regulations I could gather.

A disconcerting finding in many of these documents is the incoherence between the principle of respect for human life and the dignity of persons they proclaim in their introductory lines, and the biased way in which they approve, in carefully chosen and politically correct language, the entire gamut of ARTs. The timeless imperative of medicine – cure disease and relieve suffering in the respect of human life and dignity, with no discrimination – has been denatured with the purpose of putting it to the service of the strong and powerful and to the scorn of the weak.
Three factors have been responsible of such regression. First, the major role played by national law or international professional guidelines on the production of national or local rules on ARTs. Second, the influence exerted by ideological and sentimental pressures conveyed by the media, which changed the mind and the heart of society and, unfortunately, of many doctors. And third, the frequently biased membership of committees, advisory or legislative, charged with the drafting of ethical guidelines or legal proposals[9].

As a result, from the mid nineteen eighties onwards, a number of professional guidelines on ART have relinquished the ethics intrinsic to medicine, to slavishly conform themselves to utilitarian views. The crucial issues of the utmost respect due to the living human embryo and to the basic values of family and marriage have been the victims of such unprecedented ethical surrender.

Primum non nocere: the disregarded first professional mandate

It is said that the mandate “Do no harm”, included in the principle of nonmaleficence, is the most basic of the principles of bioethics when applied to medicine. It is for the physician the oldest and first deontological precept. It enforces on the doctor the duty of not inflicting deliberate harm to the patient and of preventing harm to others. In the Hippocratic oath the duty of keeping the sick from harm and injustice is closely linked to the duty of applying medical measures for their benefit, of always doing good to them. This general duty of nonmaleficence towards the ill is resolved in more specific and immediate rules, among which it is easy to identify those of not killing, not causing pain, not maiming, not injuring, not depriving others of the goods and joys of life. And, by no means the least of these mandates, not expropriate the weak and abandoned of their inherent human dignity.

In contrast with such elementary and essential injunctions for the morality of the doctor-patient relationship, we find that the relations of doctors to human embryos show in many cases an almost complete lack of respect. The esteem for the individual human embryo is so low, that practically it is rejected as non-sense the thought of considering the death of the in-vitro human embryo as an ethical disgrace. Such is a blunt unprofessional conduct.

People practising ARTs act as if they had forgotten that a strong connection exists between the basic medical principle of not doing harm and the death, loss or damage of the embryos they produce and manipulate. Therefore, behaviours such as the intentional production of surplus embryos for mere technical proficiency, the drama of abandonment of embryos by their producers or progenitors, their destruction on more or less fashionable research, or the shocking annual immolation of out-of-date embryos ordered by law, are held as trifling, everyday matters.

Let us see some examples of that loss of concern for early human embryos. In recent years, a sincere solicitude for preventing avoidable harm to patients is growing everywhere in medicine. A co-ordinated effort is made in hospitals to reduce iatrogenic harm to patients. It has become evident by now that the conditions of in-vitro culture, and specifically deficiencies in the epigenetic regulation of development, can induce important damage to the embryo. Some data show that the loss of embryos and the intensity of epigenetic damage increase with the length of the in-vitro incubation period. No serious research is being made to identify the factors responsible for those developmental alterations dependent on the length of in vitro culture of human embryos. The damage induced is either held as an unavoidable event, or explained as the effect of a Darwinian selection-like process with its ineluctable loss of the weakest embryos and survival of the fittest ones. With Olympian calm it is said the all that loss and damage is compensated for by the higher implantation rate of the higher quality blastocysts resulting from long-culture procedures.

There is a need to take with serious professionalism the harms inflicted to human embryos caused by ARTs. The devastating physical, psychological, or social harm to the resulting children should be investigated more thoroughly than at present[10]. A field of the utmost interest is that of the disorders of reprogramming of parental imprinting occurring during early embryonic development[11], when it
can be interfered by abnormal in vitro conditions or by insufficient epigenetic regulation. A beginning alarm is being sounded by the increased prevalence of cases of Beckwith-Wiedemann syndrome[12] and Angelman’s syndrome[13], observed in children conceived by in vitro fertilisation or intracytoplasmatic sperm injection.

Disdain for early human life
There is an enormous contrast between the love and joy for any new and singular human being expressed in the first page of the Encyclical Evangelium vitae, and the blasé attitude for human life so widely spread among those working in the ARTs industry. In ARTs, the formalised routines of inspecting, counting, scoring and selecting human embryos are the surrogate for unconditional love for every human being beginning her or his life. The application of quantitative standards for the measure of biological traits directed to the eventual rejection of defective early human embryos collides frontally with the idea of the incomparable worth and acceptance of every human being. The scoring according to scales of morphological or biochemical markers – more intuitive than scientifically grounded – is deemed sufficient to class human embryos in batches linked to appallingly differing fates of life or death.

The discarding of human beings is part of the daily routines of ARTs. With the pass of time, the selection and disposal of embryos became for doctors and technicians an uninteresting and predictable habit, a painless routine.

The extinction of the respect due to the human embryo.
In the soul of many doctors practising ARTs no trace appears to remain of the medical commitment, pledged at the time of being admitted as a member of the medical profession, to maintain the utmost respect for human life[14]. So says the Geneva Declaration, the modern version of the Hippocratic oath, adopted by the World Medical Association in the aftermath of the World War II. The medical profession holds the Declaration as its ethical cornerstone, to proclaim publicly that medicine is founded on the respect for human life and human patients. According to the Declaration, the human embryo is entitled to that same utmost respect from her or his very beginning.

The same affirmation that the human embryo must be respected as a person from the very beginning of his or her existence has been reiterated once and again in the documents of the Magisterium dealing with the embryo moral status and with the embryo/parents and embryo/doctor relationship[15]. But, regretfully, practically all ethical directives coming from governmental or scientific institutions have insisted in the idea that the human embryo is worth of only a relative or second-class respect.

The lessening in moral worth of the human embryo has not been the work of ARTs’ proponents. In the early nineteen sixties a number of doctors and theologians of pragmatic mind feel the need to neutralise ethically the few days old human embryo in order to free interceptive contraception of any moral responsibility. Such pretension required the redefinition of conception as different from fertilisation, and the shift of the beginning of pregnancy from fertilisation to the ending of implantation. Years later, the supporters of ARTs and human embryo research took refuge with the notion of the lesser value of the embryo during the first two weeks of her or his life to justify the loss of countless human embryos in clinical or experimental procedures linked to ARTs.

In many circles it is held as axiomatic that the human embryo acquires humaneness and entitlement to ethical respect in a gradual way. The wide acceptance of such a deviant idea was facilitated by the introduction of the neologism “pre-embryo”, a notion to be applied only the human embryo, not the embryo of any other species. This contrived term pretends to make known that during the pre-embryonic period of fourteen days the very young human embryo is entitled not to the utmost ethical respect, but to an indeterminate “profound respect”[16], or to an indistinct “measure of respect”[17].
In countries where the national law condones the unrestricted production of embryos for clinical use or the destruction of surplus embryos for experimental purposes, many medical associations have accepted the ontological splitting of mankind into two categories. One formed by those worth of the utmost respect; the other constituted by those who can be respectfully killed. Such behaviour has been considered as a paradigmatic case of profound self-deception[18], and has been rejected by other medical associations. For example, the code of ethics of the Spanish medical organisation affirms that “The human embryo-foetal individual must be treated according to the same ethical guidelines that are applied to the other patients”[19].

The abolition of the absolute respect due to the human embryo or its reduction to a vaguely profound or measurable respect constitute a severe blow discharged to the moral values of the medical profession. A great number of national medical associations, as a review of their codes of ethics shows, have abdicated their commitment to the utmost and unconditional respect for every human being. This shift, from absolute to relative, in the respect due to the embryo is playing a major, perverting role in the way human embryos are seen. The general public consider them more as objects than neighbours; the parents deem them more as things than as children. This is not a subtle, meaningless shift. It should remind us of that subtle change in the basic attitude of the physicians towards the worth of human life, that, according to Alexander, preceded the euthanasia movement in Germany[20].

The human embryo: a thing, not a child of his/her parents
The professional hard core of Medicine, what defines the character and professionalism of physician, resides in the fact that doctors deal with men and women, not with things or animals. A peculiar feature of ARTs consultations is this: the initial encounter between parents and doctors is full of human tension. Never it does begin by saying the parents: Doctor, produce us some embryos, make us a lot of embryos! Instead, it begins practically always with a parents’ plea to the physician. They say: Doctor, we want a child! Please, help us!

Such a vehement request should determine, in a true professional patient-physician relationship, the behaviour of the doctor, and mark the ethical limits to his intervention. The doctor ought not to forget that each of the embryos produced in the practice of ARTs is a child of their parents, neither his own creature nor his possession. That each human embryo is a child is an illuminating and basic concept. It helps to understand that there is, in the context of ARTs, a humane way of practising responsible parenthood if, and only if, the decision on how much embryos are created and the responsibility for the human destiny of each one of these embryos do belong to the parents, not to the physician[21].

Too frequently, parents and doctors alike forget than every human embryo is a child to be received as a beloved and accepted son or daughter. Never must they be treated as shapeless reproductive material, as a valuable but amorphous and interchangeable precursor matter, or as something disposable and provisional that can be accepted or rejected in compliance with certain legal provisos. In the root of the superfluity of hundreds of thousands of surplus embryos is the stubborn denying by people in the reproduction business of the fact that each embryo is the progeny of a man and a woman, that human embryos are essentially filial. It must be clearly affirmed that it is ethically brutal and professionally irresponsible to bring to this world people whose destiny leads nowhere, whose existence is truncated from their very origin, who are deliberately disowned of the promise of a flourishing personal life of relationship with God and men. No area of medicine is plagued with so an overwhelming failure of professional accountability as the unbridled production of excess embryos. It is a cruel mockery to proclaim human embryos as worth of profound respect and, simultaneously, profess as reconcilable with professional ethics the frivolous decision to produce them in excess.

Doctors practising ARTs never refer to in vitro embryos as sons or daughters. They look upon them as biological specimens of their property. Obstinately they conceal from the progenitors any direct parental relationship with their own embryos. Some mothers want to name the embryos as they are
being transferred to their womb, but doctors, to prevent a too strong bond between mother and in vitro embryos, discourage so human an intimation.
That human embryos are treated as things is paradigmatically shown by the comments made by a lawyer to a notorious case of switched embryos. Insensible to deeply human, professional and symbolic aspects of the case, the lawyer reduced it to a problem of merely economic nature, where negotiated solutions for childrearing were to be found, conflicts between gestational and genetic parents solved, and compensations granted[22].

An arbitrary discrimination among siblings
One of the more ethically painful practices connected to ARTs is embryo reduction. It has been the rule in some ARTs centres, to obtain social recognition of efficiency, to transfer a high number of embryos so that the implantation of at means one embryo could be achieved. Such objectionable and egotistic behaviour, condemned today by many medical organisations, is followed unfortunately by a high order twin pregnancy with its well-known risks (high rates of foetal loss, intrauterine growth retardation, premature birth, congenital malformations, neonatal low-weight and respiratory and central nervous system morbidity).
To avoid the real dangers linked to multiembryo pregnancy, the nonselective embryo reduction has been recommended. This procedure is performed before the end of the first-trimester with the purpose of terminating the life of one or more embryos in order to increase the chances of survival of the remaining embryos and to protect the health of the mother.
A Declaration made public by the Pontifical Council for the Family in July 2000 stressed a very fundamental moral fact: that since every embryo must be considered as a human person and treated with respect for his eminent dignity, embryo reduction is in fact the killing of innocent human beings.
Next to that, embryo reduction performed for the welfare of the remaining embryos implies another ethical dimension of considerable psychological import. When the physician performs a non-selective reduction, he is destroying human lives guided by such hints as the more favourable placement of embryos in the uterus for the continuation of pregnancy. Or by the fortuity of being the operator left- or right-handed, he can get more easy access to one or another of the siblings. Of two embryos, one is killed, the other spared. Based on very brittle reasons he is deciding arbitrarily who survives or who is sacrificed. That is certainly the exercise of a terrible power, a truly instance of playing God. This terrible performance is deemed irrelevant in the declarations on embryo reduction published by some professional associations[23].
Multifetal pregnancies should be declared the result of unprofessional behaviour. They are motivated by the me-too mania of high pregnancy rates per cycle, an idol to which highly esteemed professional values are sacrificed. The yearning to climb to a high place in the league table of competitors for public renown and financial gain is considered reason sufficient for so cruel a behaviour.
Recently, a movement has emerged to promote the use of the natural cycle for the practice of ARTs, a procedure which could eliminate not only the insoluble problems of surplus embryos and embryo reduction, but also lessen the high cost of stimulated cycles[24]. This procedure avoids ovarian stimulation and its inherent risks (hyperstimulation syndrome, multiple pregnancy and premature birth). It has been demonstrated by different groups that natural cycle IVF shows an acceptable cumulative pregnancy and live birth rate, to such an extent that it results in an effective and potentially cost-effective treatment option for certain groups of infertile couples. Natural cycle IVF is less expensive than conventional treatment involving stimulation. The use of natural cycles may help also the move towards replacing fewer embryos. The present trend to replace two embryos as the best practice could herald a future of replacing only one embryo, which would bring IVF closer to a more reasonable medicine
ARTS: an unprofessional commercialisation

Disedifying examples of greed and financial abuse have been constantly present in the history of medicine. But it is typical of the medical ethos to reject the idea of medicine as a lucrative activity. Many Codes of Ethics of European and Latin-American Medical Associations establish clearly that medicine is a learned profession that cannot be practised as a trade. In recent years, many directives of medical associations have sounded a cautionary advise on the perils threatening the medical profession from a shift from the traditional ethos of moderate financial relations with patients to the competitive principles of the market place. Such a change would have disgraceful effects on the traditional practices protecting since Hippocrates the members of the profession from avarice or selfishness.

Regrettably, due to the particular emotional situation of couples asking for reproductive services and desiring a child at any cost, ARTs are seen as a profitable speciality by many of its practitioners. The prevalence of financial interests in the field of ARTs is revealed in the poor development everywhere of this type of services offered free or at cost price by public or private non-profit institutions. That contrasts with the thriving expansion of for-profit practices, the aggressive or alluring way ARTs are advertised, and the variety of techniques conceived to attract clients and to satisfy their whims.

The way in which ARTs are being promoted today by some practitioners and centres is an important pointer to the direction this speciality will follow in the future. There is ample conviction among medical ethicists that the type and style of advertising accepted by each profession determines the way the corresponding profession is perceived by the members of the wide society. Medicine can be viewed as a true profession or as a mere commerce. As a Position Statement of the Australian Medical Association on advertising puts it, “the promotion of a doctor’s medical services as if the provision of such services were no more than a commercial product or activity is likely to undermine public confidence in the medical profession”.

Aggressive advertisement is eroding the ethos of medicine, and changing a vocation devoted to the service of the ill to a commercial activity guided by the rules of the market, if not by the sacra auri fames. Advertising is not reduced today to the factual and verifiable information needed by patients to make an informed decision. It frequently shows a consumerist bent, includes declarations about the quality of the services offered, and induces in the public a feeling of urgency or need for the services promoted. The visiting of the pages of Internet dealing with in vitro-fertilisation is a display window of alluring and competitive marketing.

The way advertising and financial arrangements are used by some practitioners of ARTs throw doubts on their integrity and correctness.

Comparative advertising of ARTs is frequent because the great importance people grant to the choice of a doctor or a centre with credentials of high performance. Therefore, to be in the first places of the league tables made public by official or private organisations is a key to success, an aspiration that can cost a lot in professional and ethical values. To be able to present a high performance card, it is necessary to exclude from the services of ARTs the less than ideal candidates. Particularly unjust is the exclusion of patients with poor prognosis, which are neglected or set aside for the purpose of maintaining a high success index. It is also expedient to run the risk of high order twin pregnancies with subsequent embryo reduction, to go very close to the limit of ovarian stimulation, and to expand the concept of sterility to attract to ARTs young couples who would conceive without the help of ART[25]. There is a frequent dumping of cases with poor prognosis, although there are also ARTs centres specialised in the treatment of cases with very poor reproductive outlook.

A phenomenon that was of ordinary occurrence in the first years of ARTs was the publication of inflated rates of success or the use of parameters of scant value, but that were a bait for clients, particularly if those data came along with a self-satisfied declaration of excellence. This lack of professional honesty forced the publication of a calling to rectitude and integrity by the directors of the American Society of Reproductive Medicine[26].
Other widely accepted fault in professional integrity comes from the ethically deviant practices of guaranteeing outcomes, linked to contingent medical fees, programmes of sharing risks or the offer to refund money. All these practices are against the traditional ethics of medicine and reflect a grossly commercial attitude in those that promote and use them. What is worrying is the lukewarm response of the professional organisations in the face of those aberrant practices[27].

Other practices as egg sharing, an arrangement in which a woman is offered free or reduced-cost assisted conception treatment in return for ‘donating’ oocytes for the treatment of another woman [28], can be seen as a way to outmanoeuvre the legal prohibition of selling gametes. It is practised everywhere, but cannot resist the criticisms of being exploitative, misleading and contrary to the principle of non-commercialisation of the human body.
The entrepreneurial “geist” of some ARTs promoters does not recognise limits. Human gametes are sold to the best purchaser. “There is nothing wrong with bidding for human eggs”, they say. The encroachment upon the traditional practice by both commercial enterprises and physician-led groups who have inflated the cost of donor compensation 500% in the past decade[29].

Conclusion
In the field of ARTs work many people, with many different sensibilities and attitudes. Nevertheless, practically all of them are dominated by an ethos of discrimination. They appear full of compassion towards the suffering of infertile couples, and at the same show in the application of their techniques a cold and hardened stance before nascent human life.
Such disposition of mind makes practically impossible to achieve the goods peculiar to the calling of medicine. In diverse ways and despite the appearances on the contrary, they fall short of the professional, human and spiritual goods of medicine.
ARTs are a sad and interesting paradigm for the troubled destiny of medicine when doctors adopt as the rationale of their work technical refinement, marketing proficiency, relentless fight for recognition, and high financial rewards for their work. The deviation from the traditional mores embodied in the deep sense of genuine medical professionalism is leading ARTs practitioners to a progressive loss of ethical commitment and, inevitably, of patients’ trust.
I am sure that doctors will react against the commercialising of services and the manipulation of feelings so deeply ingrained in the mind of many leading doctors devoted to ARTs.
Perhaps the time is not afar when the wisdom of the doctrine of Donum vitae will be recognized, and its invitation to hope will be accepted: “to understand the incompatibility between recognition of the dignity of the human person and contempt for life and love, between faith in the living God and the claim to decide arbitrarily the origin and fate of a human being”. [30]

Only the references to a small sample of those declarations is here in place, particularly to show how varied are in their character and scope. Some of them are offered by national medical associations to enliven the professional responsibility of their members: CANADIAN MEDICAL ASSOCIATION. CMA Policy Statement on Medical Professionalism. http://www.cma.ca/inside/policybase. AMERICAN MEDICAL ASSOCIATION. Declaration of Professional Responsibility: Medicine’s Social Contract with Humanity: http://www.ama-assn.org/ama/upload/mm/369/decoprofessional.pdf. Others try to encourage the teaching to medical students of a common morality for all the health care professions, imbued with a sincere concern for the rights of the patients: TAVISTOCK GROUP. A shared statement of ethical principles for those who shape and give health care: BMJ 1999;318:249-251.


The World Medical Association adopted its statement on In-vitro fertilization and embryo transplantation in Madrid, 1987. It contains an almost unconditional blessing of ARTs, in virtue of their capacity to alleviate infertility, their role in the avoidance of genetic disorders, and their potential in enhancing research on human reproduction and contraception. All possible uses of ARTs (research, donation, surrogacy) are accepted under the condition of obtaining the free and informed consent from the parties and of complying with the laws of the state and the standards of the profession. A symbolic duty is mentioned to always act in the best interests of the child to be born.

A second statement, on the ethical aspects of embryonic reduction (Bali, 1995), after reminding of the dangers of high order pregnancies and recommending the physician to take all possible measures to prevent their emergence, accepts embryonic or foetal reduction as an acceptable procedure in cases of pregnancy involving more than three foetuses when the prognosis is unfavourable. The text of both Statements can be seen at: http://www.wma.net/e/policy/.

This is the paradigmatic case of France. There, the Article 17 of the Code of Medical Deontology (DECRET 95-1000, dated the 6 September 1995) reads: “Physicians are allowed the practice of ART only under the conditions foreseen by law”.

The Italian Code of Deontology presents as only purpose of ARTs the obviating of sterility. In the best interests of the child, it forbids any type of surrogacy or post-mortem fertilization, the application of ARTs to non-heterosexual and stable couples or to post-menopausal women, the commercial exploitation of gametes, embryos and tissues of embryonic of foetal origin, and the production of embryos for research purposes.

For example, the National Committee of Bioethics’ Code of Professional Conduct (Mexico, 2001) restricts in vitro fertilisation to treat infertile married couples. The use of surplus human embryos for purposes besides their transfer to the uterus is declared a crime against Human Rights. The production of human embryos for non-reproductive intention is judged unethical.

A striking example: the embryologist C.W. Kischer has studied the composition of the successive committees charged by American authorities with the preparation of Reports and Guidelines on human embryo research. To no one of those Committees and Panels a human embryologist had been appointed. According to Kischer that circumstance has prevented that the qualified opinion of such invaluable experts were known. KISCHER, C. W. The beginning of life and the establishment of the continuum. The Linacre Quarterly 1996;63(3):73-78.


[15] To the fundamental question on what respect is due to the human embryo, taking into account his nature and identity, the Instruction Donum vitae answers: “The human being must be respected--as a person--from the very first instant of his existence.” CONGREGATION FOR THE DOCTRINE OF THE FAITH, Instruction on Respect for Human Life in its Origin and the Dignity of Procreation: Replies to Certain Questions of the Day. PartI. Respect for human embryos. And the Encyclical Evangelium vitae (60) reiterates: “The Church has always taught and continues to teach that the result of human procreation, from the first moment of its existence, must be guaranteed that unconditional respect which is morally due to the human being in his or her totality as body and spirit”. Years before, the Vatican Council II in the Pastoral Constitution Gaudium et Spes, 24, affirmed in a very solemn way that “from the moment of conception, the life of every human being is to be respected in an absolute way because man is the only creature on earth that God has "wished for himself".

[16] The Ethics Advisory Board of the Department of Health, Education and Welfare declared in the Chapter 6, Summary and Conclusions of its Report “Research on In vitro Fertilisation” that “after much analysis and discussion regarding both scientific data and the moral status of the embryo, the Board is in agreement that the human embryo is entitled to profound respect; but this respect does not necessarily encompass the full legal and moral rights attributed to persons.” (Taken from JONSEN A.R., VEATC H R.M., WALTERS L., Source Book in Bioethics. A Documentary History, Washington, D.C.: GeorgetownUniversity Press, 1998:96.

[17] The Committee Warnock found “that the more generally held position, however, is that though the human embryo is entitled to some added measure of respect beyond that accorded to other animal subjects, that respect cannot be absolute, and may be weighted against the benefits arising from research”. DEPARTMENT OF HEALTH & SOCIAL SECURITY, Report of the Committee of Inquiry into Human Fertilisation and Embryology, London: Her Majesty’s Stationery Office, 1984:62.


[25] A case report has been published describing the occurrence of a quadruplet pregnancy after the transfer of only two blastocysts during IVF, suggesting that a concomitant spontaneous conception had occurred (MILKI A.A., HINCKLEY M.D., GRUMET F.C., CHITKARA U. Concurrent IVF and spontaneous conception resulting in a quadruplet pregnancy. Hum Repr 2001;16:2324-2326). The Authors, instead of recognising their mistaken diagnosis of infertility and the superfluity of the treatment administered, recommend that “IVF patients with patent Fallopian tubes should be cautioned against intercourse late in their controlled ovarian stimulation, especially if they would decline multifetal reduction.” Certainly, it is not easy to find a so patent case of technological bias.
[29] See the interchange of opinions on the just compensation of oocyte donors: SAUER M.V., Indecent proposal: $5,000 is not “reasonable compensation” for oocyte donors, Fertility and Sterility 1999;71:7-8; and BERGH P.A., Indecent proposal: $5,000 is not “reasonable compensation” for oocyte donors – a reply, Fertility and Sterility 1999;71:9-10.
PETER PETERSEN

THE PSYCHOLOGICAL AND SPIRITUAL REPERCUSSION OF ARTIFICIAL PROCREATION FOR WOMEN/FAMILIES VERSUS ANTHROPOLOGICAL, SPIRITUAL ATTITUDES A CHALLENGE TO PSYCHOSOMATIC AND PNEUMATOLOGICAL ANTHROPOLOGY

REPRODUCTIVE TECHNOLOGIES AND THE DIGNITY OF HUMAN PROCREATION: ANTHROPOLOGICAL AND ETHICAL ASPECTS

The Psychological and Spiritual Repercussion of Artificial Procreation for Women/Families versus Anthropological, Spiritual Attitudes
I speak only from my point of view concerning my own experiences as medical doctor and as psychoanalyst/psychotherapist/psychosomatic doctor in an average state university women's clinic in northern Germany. I worked before my retirement in 1998 for 22 years as psychotherapist in the women's clinic and I founded in northern Germany gynecological psychosomatics. In this clinic we made induced abortion and in-vitro-fertilization – I accompanied my colleagues and the female patients. I am no enemy of induced abortion and I am no enemy of in vitro fertilization, because I like my female patients and I like my gynecological colleagues.

First of all, I will present this topic from the point of view of psychosomatic gynaecology, since it is almost only this science within medicine that has concerned itself in detail with the questions to be discussed here.

I will discuss the topic with reference to homologous in vitro fertilization, whereby homologous retort insemination will serve to represent other fertilization techniques. The first part of this talk deals with some of the more obvious damages and symptoms. The second part is concerned with the oversimplified anthropology, which underlies medical fertilization technologies, and the resulting challenge for a new psychosomatic anthropology, which becomes most apparent in the view taken of a child’s arrival. I cannot conceal from you how ill at ease I feel whenever I come to terms with this most existential subject – it is a feeling of unease which to my mind is well expressed in the words of the Polish satirist Stanislaw Lec: ‘Technology is on its way to achieving such a degree of perfection that the human being will get by without itself.’

1. Obvious Impairment and Symptoms of Fertility-Technology

Psychosomatics in the first half of 20th century endeavoured scientifically to attain a new holistic view of man in health and illness (Heyer, Mitscherlich, 1946; v. Weizsacker, 1947, 1948). Body, soul and spirit belong to separate scientific fields and these fields require their own various attitudes of perception by scientists and doctors. A sense of aesthetics and universal medical-ethical responsibility are inseparable from such a holistic approach. Yet it seems to me that a certain psychosomatic direction at present is in danger of assuming the role of a blind assistant to a purely manipulative and alienated fertility technology. This type of fertility technology, to which broadly speaking even prenatal diagnosis, termination of pregnancy and ill-considered contraception belong, is there to ensure quality-conscious medicine, which will guarantee to produce only a small number of beautiful, healthy children, who can cope and get on in life. Seen from the point of view of the history of medicine, this is a tendency, which has been well known since Greek antiquity, supported by two motives: man’s archaic fear of his own deformity and the wish to achieve perfection with the aid of external medical manipulation (Seidler). I would like to mention some symptoms of this psychosomatic approach, and with regard to IVF.
2. (a) Mental and Psychosocial Effects of Reproductive Technologies on the Woman/Family and their Long-Term Consequences

In the last 20 years within psychosomatic medicine, the following has been recognized and accepted: reproductive medicine implies a considerable and important burden for the woman, the man and the later family (Berger, Brähler, Kentenich). Clinics and hospitals with a sense of responsibility therefore provide more or less intensive consultations before, during and after intervention (Strauß 1998, Kentenich 1998, Kowalcek 1998). Note that this practice of consultation has existed in the psychosomatic department of the gynaecological hospital of the Catholic University of Leuven (Prof. Dr Piet Nijs) since 1990 at the latest. As such, it needs to be stressed that this psychosomatic way of thinking and proceeding is completely in the minority: very few centres of reproductive medicine have forms of psychosomatic consultation at their disposal. Doctors of reproductive medicine who work and think in an exclusively somatic way (and these are in the absolute majority) deny the mental and psychosomatic problems that come along with reproductive methods in medicine. The individual biography of the woman and the family is suppressed (Kowalcek).

Nevertheless, there are many very different opinions and results from research about the psychosocial consequences of reproductive medicine for the family (including the child conceived via artificial insemination). These differences of opinion are, above all, caused by differing methods of investigation: studies that are first and foremost quantitative (based on statistics) speak of the ‘conspicuous inconspicuousness’ of the families (Gagel; Laster): the couples can be distinguished by their harmony, mental stability, and their contentment. However, statistical studies are noted for their high level of superficiality. The greater the number of patients examined, the lesser the reconciliation of these studies with reality – their truth content decreases as the number of those examined increases. Qualitative/depth psychological studies on the other hand bring very considerable damages to light (Berger): - The contentment of the families with the intervention above all reflects their need to justify their own sacrifice - The “social ability” of the families decreases. For example, their isolation from other people increases; the mother-child relationship as well as the relationship between the parents is strained; mothers avoid asking for help for psychological problems; the parents have few friends; they have an aversion to self-help groups, and an almost compulsive or obsessive feeling of responsibility to devote themselves to the family.
- The couples struggle to be recognized as “normal”. They keep the information about the artificial insemination a secret, and also withhold this information from the child conceived in this way.
- The mothers are emotionally indifferent and suffer from depression (psychiatric therapy with psychiatric drugs is necessary).
- Psychological difficulties are most common in this group in comparison with average parents; repressed fear; sexual dysfunction and anorgasmia; neurotic problems; physical/psychosomatic complaints; tendencies to portray oneself in a good light; a particularly stable psychological frame of mind (robustness); problems with the child from the parents’ point of view in the first year (sleep disorders, bouts of crying and screaming, fear of strangers, self-harm, parents have too much to cope with, the parents feel ‘alien’).
- Fundamental psychological disturbances in the case of the woman: essentially female development processes are avoided through fulfilment of the imperative, obsessive wish for a child; the female feeling of identity and the heterosexual relationship are interfered with; reproductive medicine is a tempting instrument of power which not only subjugates the body but also the state of mind of a woman also.

(b) Retort fertilization results in a disproportionately high rate of multiparous pregnancies (Maas, Berger): 37.1% multiple births in total (increased by 17 times); normal ratio of twins 1.2%, 10 times more through IVF about 10%; triplets from normal 0.013% to 100 times the frequency 1.3%; and
quadruplets increase 1000 times more in frequency from 0.0001% to 0.2% using IVF. Paediatricians and paediatric psychiatrists are well aware of the fact that mothers are considerably taxed emotionally in bringing up twins, and with triplets and quadruplets even more so. Concomitant with this there is a difficulty for these children both in ego finding and in the process of individualization. Further cause for concern can be found in the figures of 20% premature abortions, 26% clinical abortions, and a just under 50% occurrence of highly complicated pregnancies (Lehmann) (see Petersen 1984, 1985). It becomes apparent that the psychosomatic disturbances and disorders are knowingly and deliberately being accepted as the price to pay for what is to me a questionable goal. The step from deliberate risk-taking to reckless and arrogant self-confidence is not far.

Rate of Caesarean sections: 44-58% (3-4 times more than the normal rate); further alarming consequences for mothers: premature births 18-29% (normal rate: 7%; 4 times higher than normal). In the case of premature births: 28% of all children born before the 32nd week of pregnancy are deaf, blind, have early foetal damages or an IQ under 70% (Kentenich 1998; Berger). Prenatal mortality: 6%; triplets: 17% (several times the normal rate, Berger).

(c) Seen from the point of view of global medical responsibility, we are confronted with immoderation and wantonness with regard to the financing of IVF: the costs per living child artificially fertilized amount to something like 35,000€. This is luxury on a highly individual level, since we must bear in mind that for the costs incurred by 20 such births per year, that is more than half a million Euros, it would be possible – by contrast – to finance a complete social therapeutic centre with a staff of 20 qualified therapists for a whole year, which would enable, for instance, the treatment of 200 children with Down’s syndrome (who would otherwise be aborted). Similarly, several thousand women afflicted with cancer could receive counselling in their emotional crises resulting from cancer operations – a group not catered for at present that must make do without such urgently needed therapy. One look at the third world reveals that each day 47,000 people starve to death. If it is possible to train overseas development aid workers for half a million Euros, surely money spent here could mean hundreds of lives being saved.

(d) With regard to the choice of couples for IVF, the doctor often finds him/herself in an absurd position. (A collection of similar absurdities, see: R.Low ‘Leben aus dem Labor’ – p.179). Either he acts blindly – in which case he may enable a woman from a marriage ruined by alcoholism to have a baby artificially – but then s/he would face the reproach of having acted without any psychosomatic background information – or, on the other hand, if the doctor only chooses couples according to psychosomatic criteria, the process borders on selective breeding. If the possibility of artificial insemination is refused to a couple on the grounds of alcohol problems or because of highly narcissistic tendencies, how can a doctor establish valid criteria? S/he assumes for him/herself the role of destiny, yet s/he lacks the wisdom of fate. It is a well-known fact that Beethoven came from a family with alcohol problems and Mozart’s father could be seen as a perfect example of a narcissistic person. Beethoven and Mozart would, working purely on the basis of psychosomatic selection, most probably today stand little chance of being born. This train of thought is not mere conjecture – it serves moreover in its absurdity to illustrate the basic problem: the border between the useful, responsible, and the scientifically-feasible aspect of a physician’s activity has been overstepped in the direction of irrational chaos. The problem of ‘worthwhile’ and ‘worthless’ lives is once again raised.

(e) Instead of personal responsibility we now have a dissipation of responsibility, corresponding to what is known in family therapy as the psychosocial mechanism of delegation (Stierlin): that is, responsibility is unknowingly foisted from one party to the other. Within this framework of anonymity, conception is emptied of its meaning (Seidler). Psychopathological mechanisms are fostered and not
analyzed by the psychosomatic physician, who should help to solve them. The physician is the architect of destiny without being able to take responsibility for it. An example of making responsibility anonymous: triplets were the result of IVF in a prestigious German clinic of reproductive medicine. The father, not well off financially, returned to the doctor and, in a rage, accused her: “I ordered twins at the most! I demand that you pay maintenance!” The doctor rejected his accusation, reminding the man that she had made him aware of the risks in advance.

(f) Is it not a severe affront to our spiritual and aesthetic senses if a woman is subjected to the gross unpleasantness of a routine, which inevitably lasts weeks or months, in the arduous process of retort fertilization? She is under constant pressure to succeed. This, in a sensitive woman, can lead to depressive crises – quite apart from her having to endure the continual check-ups and frequent medical treatment (e.g. laparoscopies). All this may lead to psychosomatic disturbances and a complete lack of both spiritual and emotional sensitivity. It almost seems as if only women of a particularly robust nature can endure such a procedure. Is a woman not seen here purely in the role of a fertility machine? Is the male then not merely a provider of semen by masturbation? In the total absence of the aesthetics of sensitivity how far are we justified in speaking of strong ties of love and an intimate personal relationship (Bockle, Eibach)? Can the procreating and conceiving partnership of love be attained in the absence of physical aesthetics?

I don't mean these questions metaphorically – these are questions of reality. Because I experienced: these couples have, indeed, a very, very strong spiritual love – but: a spiritual love without physical and emotional feelings: the psychosomatic anaesthetization. That is the problem. And it's my question to your honourable Academy: How do you think about this very strong love of the couples without their aesthetic feelings?

I call this syndrome ‘psychosomatic anaesthetization’, that is, a mental-physical process of becoming dulled. The following example illustrates how blinded even high-calibre theological scientists look upon this damaging of cooperative identity. During a broadcast discussion with a doctor of reproductive medicine and with the leading German moral theologian in the area of reproductive medicine, I put forward, as so often before, the topic of psychosomatic anaesthetization. In response, the moral theologian made the following suggestion: the couple should sleep together before IVF in the laboratory and then aspirate the semen from the woman’s vagina. In this way, the intimacy, tenderness and sanctity of marriage and of procreation based on partnership would be saved. The gynaecologist corrected him dryly: that would be impossible as the semen would no longer be sterile. I personally just shook my head, since the cynicism and complete loss of spirituality was obviously a foreign concept for the moral theologian. He was simply concerned with the principle of the matter: the end justifies the means, the end being reproduction (not the procreation and conception) of a human being; the moral theologian thus overlooks the fact that perverse means also pervert the sense of the end, that is, humane procreation and conception.

In summary, the following can be said: I have only named one aspect of the disorders and damages of somato-psychosocial health. This aspect, however, suffices to be able to claim that reproductive medicine causes intentional short and long-term damages to health. In my opinion, the damages cannot be justified ethically. Intensive psychosomatic estrangement is the result – a syndrome that, due to civilizing influences, is a strain anyway.

3. Oversimplified Anthropology: Challenge for a More Deeply Understood Psychosomatic Anthropology

Some symptoms and disturbances of homologous IVF have already been mentioned: hybrids and recklessness are rampant; the luxury of individualism is being cultivated; what was absurd becomes
established under the guise of psychosomatic breeding; personal responsibility is being destroyed by the process of anonymous delegation; psychosomatic aesthetics are being debased. These symptoms can be traced back to an oversimplified view of man with the following basic tenets: Man is a machine – in this case a complicated physiological-anatomical fertility machine with a psychosocial component.

The ethos of doing the impossible. The ethos of the malleable nature of human life is founded on the concept of man as a machine – the ethos exemplifies progress in as far as it claims: ‘everything which is not yet possible must be made possible – even if this means using psychosocial methods.’

The ethos of the wish for a child and the fulfilment of this wish: The unfulfilled wish to have a child is in itself the all-important legitimization for artificial insemination.

I shall expand on the three already-mentioned aspects of the oversimplified concept of man and, at the same time, attempt to show which possible points of departure I see towards a more deeply understood psychosomatic anthropology and spirituality, a different approach.

1. The anthropological concept of a highly sophisticated bio-psychosocial fertility machine, which includes the libidinous physiology as well as the sexual stimulus-reaction automatism between man and woman dates back to Rene Descartes (1596-1650) whose successor created the idea of ‘l’homme machine’ (J.O de la Mattries, 1748). An important methodological tool for controlling the human machine is the concept of mechanical causality (Specht). All procedures governed by mechanical causality can be measured and even predicted using statistical average (the principle of calculative prognosis as opposed to intuitive prognosis). Cynical critics of this ‘heartless’ medicine speak of the similarity that humans bear to rats as being the medical-scientific definition of the human, whereas their similarity to God is a theological definition. The singularity of a person with his/her biographical individuality is forgotten in the process. Consequently the individual is not considered before IVF or microsurgery is implemented, should functional impairment of the fallopian tube occur as a result of an abortion. At best humans are conceded a sort of inner life, which, however, according to Descartes’ dualistic system contains the self-determining, reasoning, sentient soul.

A scientific approach of the kind required would take into account first and foremost the biography of a couple in the case of blockage of the fallopian tube after abortion, rather than blindly furthering the process of archaic regression in the patient through the use of microsurgery or IVF.

One thing becomes apparent from these observations: neither the natural nor neurotically motivated wish for a baby (or its negation in the form of contraception) nor a sound or unhealthy psychosomatic constitution of a couple can prove adequate scientific explanation for the conception of a child in each individual case. Apparently more intensive forces are instrumental in conception, forces that can possibly only be perceived through heightened sensitivity.

2. The ethos of doing the impossible, of manipulation is largely motivated on the part of the performing doctor by the mere fascination of what is possible; in the case of the research scientist curiosity plays a special stimulating role. This ethos sees its legitimization firstly in the elimination of suffering: women (men to a lesser degree) suffer as a result of having no children. It is secondly legitimimized in the principle that the end sanctifies the means; even if the manipulative means does seem questionable, the motive of making new life possible seems in any case worth achieving. Of course a doctor willingly overlooks the fact that, while according to his/her Hippocratic oath, it is his/her duty to save human life and to heal or reduce suffering, nowhere does it say that s/he should be instrumental in creating new life. There is mention of the creation of human life, however, in the laboratory scene in Goethe’s ‘Faust’ (Part 2, Act 1) where Homunculus is brought into existence in a retort under the supervision of Wagner – it is significant that this takes place in the presence of the devil: Mephisto behind the retort fertilization.

The manipulating physician or scientist is dominated by self-imposed ignorance: s/he denies processes or factors, which go beyond the concept of the fertility machine (in detail, Petersen 1985).
Let us now take a closer look at the means, which are said to be sanctified by the end, from the point of view of the women (see table).

The woman is subjected to a psycho-physiological programme of IVF routine (with hormonal stimulation, laparoscopy, the stress of waiting for fertilization, nidation, etc.) she is supposed to ignore her feelings of anxiety; partner-orientated, sensual and consciously fulfilled fertilization is replaced by fertilization in the sterile, neutral atmosphere of a laboratory.

The desired object is subject to another’s will and that is why the desire to have a child often says a lot about the (possibly neurotic) character of the couple with this wish, but next to nothing about the motherly or fatherly qualities present, or, in other words, the actual relationship to the child. That is why it is understandable when a catamnestic study in Berlin of sterile couples who had children after receiving medical treatment established strong reactions of disappointment accompanied by psychosomatic disorders (Becker, see also Petersen, 1984). The ethos of the wish for a child belongs to an antiquated ethical code: it is there to legitimize the dominance of man over man.

However, a new ethical code, based on the paradigm of the advent of the child can only be applicable in the conscious absence of an absolute desire for a child. This ethic corresponds, incidentally, to the principle of abstinence in psychoanalysis. The paradigm of the advent of the child places emancipation and the self-determining role of the child in the forefront, right after the moment of conception. The child developing after conception is accredited its own time framework, which it can choose for itself: it may come when it wishes. It is no longer the parents who determine the date of conception, but the child itself who chooses its time of arrival. The advent of a child is a spontaneous event and not something that is outwardly controlled, such as through the wishes of parents.

Thus the developing child, seen as a spiritual individual, is accorded the human dignity, which is today accepted as a birthright.

As a spiritual being, the child is not viewed first and foremost from the point of view of medical reproduction, it is not something reproduced by the parents but a product of its own developing spiritual self. Philosophically speaking it is part of the ‘categorical fundament’ (Low, p. 153 f) that the human being is not just a human being after conception but is also a human being during conception, even if s/he remains a developing being.

The parents’ wish for a child can, through conscious and sometimes painful denial, transform itself into a sensitive and deepened awareness, an awareness of the child as a spiritual being. The non-committal ambivalence of the wish becomes a committed loyalty and strong feeling of responsibility for a human being. It is the loyalty towards an as yet unseen being. This unseen being can be precisely perceived by some parents (the principle of intuitive prognosis).

In its very invisibility ‘what is missing is strongly present’ (Max Picard), its existence is potently felt. Gynaecologists are familiar with the powers of perception some women have who, at the moment of physical conception, receive real emotional and spiritual confirmation that a child is on its way to them – but such reports of men’s intuitive awareness of the advent of a child are also attested (Petersen, 1983, 1984b). These phenomena of the advent of the child are not psychologically explicable; they belong to the realm of the spiritual. Therefore I consider them to be no longer part of psychology, but as belonging to a pneumatology that is yet to be established.

Even if the results of this concept of psychosomatic anthropology are similar to statements in the Vatican’s ‘RESPECT FOR HUMAN LIFE (Donum Vitae) Congregation for the Doctrine of the Faith – Instruction on respect for human life in its origin and on the dignity of procreation’ issued on February 22, 1987, psychosomatics is always bound to the empiricism and to the dialogue between doctor and patient. Nevertheless in the case of psychosomatic empiricism, empiricism that also comprises psychology and pneumatology is concerned in this case (Petersen 1986, 1987).

Finally, I would like to say something by way of opposition to the increasing and widespread resignation often felt with regard to the ever-advancing progress of manipulative medicine. I think this sort of progress will expand to include the gene-technological breeding of a new human being –
homologous IVF and its technological variations such as surrogate mothers etc. are just the harmless vanguards of human gene-technology. So much the more urgent therefore, as a counterweight to manipulative medicine, is the challenge of a more deeply understood psychosomatic anthropology with its corresponding apparatus. That is not a purely academic and non-committal observation, but a question of the day-to-day decisions and of the existential conduct of every doctor and scientist. The more absurd the world is, the more the ship of medicine heads toward collision with the iceberg, the more it depends on every one of us, how we think, speak, act (Weizenbaum). The question to us doctors is: do we want to assist in fulfilling the wish for a child, and enable happiness without pain? Or do we want to stand by our patients in their suffering? Do we want to expose ourselves to ridicule for a short time – because we see through this type of medical progress and refuse to acquiesce in it – or do we want to make laughing stock of the role of ethics and spiritual anthropology in medicine? There is no denying that retort fertilization and future gene-technology constitute the broad and powerful current of the present – and yet (to quote Solzhenitsyn) living fish swim against the current, dead fish merely float with it.

Emotional response to individual fertility and the advent of a child in connection with

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<tr>
<th>Manipulation (e.g. IVF)</th>
<th>Therapy (e.g. psychoanalysis)</th>
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<tr>
<td>Passivity</td>
<td>Heightened awareness, activity</td>
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<td>Emotional “switch-off”</td>
<td>Increased sensitivity for emotional processes</td>
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<tr>
<td>Estrangement from one’s body</td>
<td>Intensified relationship to one’s body (and sexuality)</td>
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<td>Dependence on pattern of external control</td>
<td>Identification with individual inner motivation</td>
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<tr>
<td>Isolation (pathological narcissism)</td>
<td>Increased openness towards partner and potential child</td>
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<td>Obsessive compulsion – “I must conceive a child at any price”</td>
<td>Non-orientated, openness in thought à precise intuition</td>
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<td>Purpose-orientated, closed pattern of thought</td>
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ALICIJA GRZESKOWIAK

THE JURIDICAL ASPECTS OF THE MAKING OF LAWS IN PLURALISTIC SOCIETY FOR THE RIGHT TO LIFE

A pluralistic society is characterised by a variety of opinions and approaches. This means that each person can achieve his or her personal and cultural identity according to the choices he or she makes. A democracy, as is indicated by its basic principles, must be based upon the rights of man and the rule of law, but it must also be pluralistic in its organisation, in its institutions, in its activities and in the means it uses to obtain its goals. It must, therefore, consider the variety that is present within society. This pluralism of society should be based on a compatible axiological system that should make up the foundation and the unifying element of the community of the State. A democracy is assessed and evaluated according to the respect that it has for human rights, which are inalienable, inherent and universal. They belong to each and every person and do not depend upon race, age, sex, opinions, other characteristics of the person, or the circumstances in which he or she finds herself. These rights belong to man because of his humanity and are rooted in his inalienable dignity; they are fundamental, the same for everyone and of the same weight for each person. Man has these rights from his birth because he is born in such a condition; he has such rights by nature, they are inherent, and thus nobody gives such rights to man and nobody can deprive him of them. The approach to law that holds that the State is the author of natural law and can manipulate it, and argues that certain groups of people have certain natural rights and that others do not, is mistaken. One cannot accept the view that in pluralistic society the State, social groups and every individual man, when dealing with human rights, and above all when one is dealing with the right to life, can do as they please, that is to say make, abolish, or limit the contents of these rights according to the quality of life, the personal circumstances or the situation in which a person finds himself or herself, or according to the respective juridical status of people. Human rights cannot be disposed of at will; an individual himself or herself cannot dispose of them at will, nor, for example, can he or she renounce them, because they are inherent to his or her humanity and are inalienable. Such a characteristic, with reference for example to the right to life, was emphasised in the sentence of 28 May 1997 of the Constitutional Court of Poland, in which it was stated that the inherent character of this right does not derive from the legislative body, and thus such a right cannot be abolished by law because it does not fall within the range of competency of the legislative body to make or abolish the right to life.[1]

The right to life is the most important of the rights of man. The right to life gives meaning to the other rights because to have such rights and to enjoy them one must first have life. In making laws that concern the right to life we can see that there are two tendencies which are in opposition to one another. The first tendency stresses the need to recognise and defend natural rights, and above all the right to life, in juridical terms, and to observe them in line with the principle of the equality, universality and inalienability of such rights. The second tendency is based upon the principle of the pluralism of values and of the views on the origins, contents, meaning and defence of human rights, including the right to life. This view of the right to life is often linked to the view that the right to life is a private right that can be renounced or to the view that such a right is not held by certain groups of human beings. In making laws that concern the right to life there is no place for a pluralism of opinions as regards human life and its value. Pluralism in this area would cause injury to the common good measured by the good of man.[2] Pluralistic society should thus accept and express in positive law the truth of man, of his natural rights, and of human life. Such law must recognise and defend the right to life of every human being from the moment of his or her conception to his or her natural death. This duty to defend the right to life means that the State has an obligation to introduce laws that directly defend the right to life from the moment of conception to natural death, and at the same time that it has an obligation to reject any form of legalisation of the killing of a man. A law that
does not respect the right to life of every human being, or is against that right or injures man, is an unjust law. A law that legalises attacks on the right to life is always unjust; and a law that does not carry out the obligation to defend life in legal terms, which includes punishment in the case of the violation of the fundamental rights of man, is also always unjust. Such a law is not real law;[3] it is a lex imperfecta.[4] In such a context a law that provides for partial defence of the right to life is also an unjust law, and it continues to be unjust even if it assures something more than the laws that already exist or parliamentary bills that are to be voted on.[5]

In pluralistic societies the making of laws that are concerned with the right to life requires that the legislative body deals with and addresses certain questions. The most important question is the recognition and the guarantee - provided for in the laws that are established - by the legislative body that the right to life is a right possessed by each and every person. One is dealing here with inserting formulas into laws that assure and uphold the right to life for every human being from the moment of his or her conception until his or her natural death, as well as the inviolability of such a right. Given that this is a matter of natural law such guarantees must be provided for in the Constitution, to which other laws are subordinated.

Constitutions, and above all else the most recent Constitutions, usually guarantee and uphold the right to life by stating that every man (person, human being) has the right to life (article 7 of the Constitution of the Ukraine), adding, however, as is the case, for example, in the Constitution of Hungary, that such a right is natural and inviolable or that the State guarantees and upholds the right to life or that the right to life, or life itself, are inviolable or that life is protected by the law, and in this case it is assumed that the right to life is recognised as a human right. It is usually the case with Constitutions that more specific and detailed elements are not introduced when it comes to the actual contents of the right to life. Only in some Constitutions is the right to life from conception, and the obligation on the part of the State to defend the conceived child, expressis verbis. Such is the case, for example, in the Constitutions of Chile, Guatemala, Peru, and Ireland. It also happens that ambiguous provisions are to be encountered in Constitutions, provisions that recognise the right to life but indicate that one could defend life from the moment of conception and thereby provide the possibility for a legalisation of attacks on life. If such an approach is accepted, then in one and the same Constitution it is admitted that cases can exist where the right to life is not upheld and assured by juridical means. Such provisions have been introduced, for example, into the Constitutions of the Czech Republic, Slovakia, and Paraguay. In States where Constitutional provisions exist which uphold the right to life of every man from his conception, life from conception onwards is also protected by the law.[6] Such is the case in Irish law and in the legislation of certain countries of Latin America. But usually new Constitutions or changes to Constitutions do not contain norms that recognise in a clear way that every man has the right to life from the moment of his conception until his natural death and do not lay down an obligation to provide for the defence of this right between these two moments. The juridical provisions contained in laws concerning the right to life become relative and are often the subject of sentences made by Constitutional Courts;[7] such sentences at times decide the final contents of laws that bear life. This has been the case, for example, with Poland, where the Constitutional Court of that country recognised in its sentence of 28 May 1997 that the laws that legalised abortion because of difficult conditions experienced by the mother or her difficult personal situation were not in conformity with the Constitutional principle of a democratic State. Hitherto this sentence has been the only sentence of this kind issued by Constitutional Courts in States that have a pluralistic democracy. Most of the sentences of Constitutional Courts state that abortion is not in conflict with the right to life,[8] which in practice means the legalisation of attacks on human life during the first stage of its development.

It is usually the case that Constitutions delegate questions connected with the defence of the right to life to ordinary norms. However a juridical guarantee exists, which is also expressed in the international declarations and charters on human rights, that requires the juridical approach to human rights, which include the right to life, to be regulated by laws. This fact means that one cannot establish juridical
norms on the subject in the form of government decrees. However, in Slovakia, in 1986, a decree of the Minister of Health prolonged legal abortion procured for eugenic reasons to the twenty-fourth week of pregnancy.[9] This decree was converted by the national Parliament into law. The President of the Republic vetoed the measure and a group of parliamentarians asked the Constitutional Court of the country to express itself on whether this law was Constitutional.[10]

Legislative bodies, in making laws that concern the right to life, have demonstrated a propensity to leave a great deal of leeway in this area. Usually, the universality of the right to life is called into question when there is an exclusion of certain categories of human beings from this right. In the majority of laws that concern the right to life it is accepted, if not directly then indirectly, that in his or her first stage of development a human being does not have the right to life.[11] Often in law it is held that ‘to have the inviolable right to life it is not enough to be a human being, but other conditions should also be present (such as, for example, to be wanted or to possess physical health).’[12]

In analysing legislation on the right to life one can observe that the juridical recognition of the right to life or the lack of a denial of such a right does not in the least mean that the relevant juridical system defends such a right. The question of the defence of the right to life is dealt with in various ways. In the drawing up laws that refer to the right to life, three positions may be observed that are representative of the pluralism of views on the subject of the human right to life and the need to defend it. The first model, which is only rarely accepted in the legislative process but which has its foundation in biology, medicine, morality, and nature, argues that the right to life is an inherent right that belongs to man, comes ‘from his nature’, and exists from the moment human life begins, that is to say from conception, because it is at that moment that man begins his life. If one accepts such a position then the law must protect the right to life. The second model accepts that the right to life belongs to every human being from his or her conception but the law does not defend human life during the first stage of its development. The third model holds that the conceived child in a specific first stage of his life does not have the right to life because he is not yet the man that he will be and thus cannot have the same defence of his life that is possessed by a man. In some cases the juridical defence of the embryo or foetus can be established. This occurs primarily in the case of laws that govern research on human beings. Where these laws do defend, they defend more the dignity of the living being, who is not recognised as a man, rather than the right to life.

A very important question as regards laws that concern the right to life is the instruments that should protect such a right. First of all, the legislative body decides whether the law is a suitable instrument by which to defend human life or whether that life could be defended by social means or through social prevention. In pluralistic societies different opinions exist on the role of law in the defence of the right to life. Such opinions come into conflict when they address the defence of human life in its initial stage and for some time now also in its final stage, above all in relation to people who are gravely or terminally ill. In the first case reference is made to the possibilities of removing the defence of life that applies in the case of a person who has already been born, and every so often it is proposed that the defence of the conceived child should be guaranteed through the use of non-juridical instruments. Usually, legislators are of the view that juridical defence should be abandoned in favour of preventive means. It follows from this that in laws that concern human life at its initial stage the legal instruments become of secondary importance. In many laws it is directly laid down that human life from conception to a certain period should not be defended by the law or should be defended only in cases where the mother accepts the baby. The terms ‘wanted child’ or ‘unwanted child’ (wanted or unwanted by the mother that is to say) has appeared in much legislation.[13] It is held that the wanted child has a right to life[14] and has a value that is protected at a juridical level. Conversely, it is held that an unwanted child does not constitute a value for the law. The juridical value of the child is the result of a decision taken by the mother. Laws that leave the decision on the life or death of the conceived child during a certain period before birth to the mother are increasingly legalising the so-called ‘time-limit abortion model’ whereby the mother can ask for an abortion up to a certain time limit that is established by law.
The life of such a child is excluded from juridical defence; its life could possibly be defended in an indirect way through non-juridical instruments, for example through administrative and/or social means, in the belief that such instruments could influence the decision on the part of the mother to keep her conceived child alive.

According to some abortionist laws the life of a conceived child must be guaranteed through consultation with experts during which the mother is provided with information about the development of her conceived child and about the dangers of abortion, and references are made to instruments of help and care both for the mother and her child. But after such consultations the law assures to the mother the freedom to take a decision about whether to have an abortion or not, and for this reason, in reality, it is she who decides whether her conceived child will live or die. Such consultations envisaged by such laws are sometimes obligatory and sometimes optional. They take the place of the legal defence of the conceived child during the period when it is legal to have an abortion. But in reality they do not protect the child from death but only help the mother to take a decision after reflection, and their effect is therefore that this decision is reconsidered. The measures of this kind create a false type of juridical process in relation to the defence of the life of a conceived child by seeking to conceal a specific reality, namely the rejection on the part of the law in a democratic country to engage in an absolute legal defence of the life of a man from his conception onwards. The idea of consultation which was introduced in Germany in the place of the legal defence of life from conception onwards, as has been pointed out, ‘is not connected with the idea of the defence of life but serves, rather, to abolish punishment’. [15]

There can be no doubt that in the case of the defence of the right to life the need exists to refer to positive law. The defence of life cannot exist without its juridical defence. The question of the role of law in the defence of life was presented in a very clear way in the Instruction Donum vitae on respect for unborn life and the dignity of procreation of the Congregation for the Doctrine of the Faith. The task of civil law, as pointed out in this document, is to assure the common good, not least through a recognition and defence of fundamental rights. Such law, for the good of public order, should tolerate what would cause greater injury if it were prohibited. But the inalienable rights of the person, of which the right to life is one, must always be recognised and respected by the civil and political authorities. [16] If this point of view is accepted then legislators should recognise the need to pass laws that defend human life from conception until natural death.

If legislative bodies accept that law is an adequate instrument by which to defend human life from conception onwards, then they should choose the adequate part of law and its adequate instruments. Today, in pluralistic societies, the most debatable question is that relating to the role of penal law in the defence of human life during its prenatal stage and for some time now also during the final stage of life. In this case penal law is either treated as estrema ratio or abandoned [17]. Civil law has accepted without major problems the defence of the interests of the unborn child which can be defended by a special guardian. The unborn child has already received different rights: for example, the right to inherit, although on the condition that he or she is born alive.

The recognition by the legislative body of the right to life as a value, the defence of which is valuable for society, usually leads to the juridical-penal guaranteeing of human life. Penal law directly defends the life of a man who has already been born. The murder of such a person is recognised as a grave crime in all legislation of the democratic States of the world. But penal law is increasingly withdrawing from the function of protecting human life in the case of its initial stage and in recent years even in the case of its final stage. It is recognised that the intervention of law is not adequate because in such a case life would not have to be defended by juridical means. The Holy Father John Paul II has himself spoken of this problem: ‘legislation in many countries…has determined not to punish these practices against life, and even to make them altogether legal’. [18] This position is reflected in most of the abortionist laws which on principle exclude penal law as an instrument for the defence of human life during the first stage of the development of the conceived child. Some sets of legislation have
introduced exceptions to this by guaranteeing, under certain conditions, the defence of the life of the child, which, however, is always weaker than in the case of a man who has already been born. At the same time in some countries penal law is recognised as a suitable instrument for the defence of the freedom of a woman to practice her so-called right to abortion. For example, in French legislation on the subject elaborate laws exist that see obstructing abortion, for example through making access to information about abortion, to abortionist services, or to places where abortion is practiced difficult, as a crime.[19]

The role of law is also denied in relation to the defence of the life of a child conceived in vitro. Such a defence is necessary if we really want to protect the inherent right to life. The Instruction Donum vitae addresses this question and indicates that law should envisage penal sanctions in the case of the violation of the rights of the conceived child. ‘The law cannot tolerate – indeed it must expressly forbid – that human beings, even at the embryonic stage, should be treated as objects of experimentation, be mutilated or destroyed with the excuse that they are superfluous or incapable of developing normally’. [20] In analysing the role of penal law in relation to the life of the child who has been conceived in vitro, one notices in laws an opposite tendency, that is to say norms have been introduced that compel the destruction of life through the destruction of the embryo after a certain period of time. Such a norm is to be found in the Spanish law number 35/1988 of 22 November 1988 on the techniques of assisted fertilisation.

In pluralistic societies we are increasingly witnessing a process that involves the weakening of the juridical-penal defence of the life of the child during childbirth and immediately afterwards. In 1981, in Great Britain, a proposal was made to abandon coming to the aid of, and looking after, a child born ill, until the twenty-eighth day of his or her life, and neither the medical doctor who had not tried to save the child nor other people were to have been held responsible for that child’s death. In 1960 Williams had already written on the practice of medical doctors and nurses in relation to ‘very abnormal’ newly born children who did not try to keep them alive even though at the same time they did not do anything to kill them.[21] In 1987, in France, the ‘Federation for the Prevention of Handicapped Childhood’ sent the Parliament of that country a proposal for a law which envisaged that a medical doctor who did not provide sufficient care and treatment for a child until the third day of his or her life, in circumstances where the child was incurably ill and in a such a condition that one could predict that his or her life would not be worthy of continuation, would not be held to commit a crime. In this project the consent of the parents was envisaged for the killing of the child and the child in question was seen as a child that had been born but who was unable to live.[22] As a reason for such a policy it was argued that prenatal diagnosis does not always discover all the illnesses, so that one can kill the child because of the presence of certain illnesses through the practice of so-called eugenic abortion. If such illnesses can only be seen after the birth of the child then there must be a prolongation of the right to kill him or her after his or her birth during a period laid down by the law. These projects show how in societies in which the right to life has become relative its negation is becoming increasingly extended, and the same right that previously protected life is becoming increasingly the right to kill a man and to select men according to the criteria of quality, and with accompanying guarantees that such a crime cannot be punished. This tendency has been condemned by the Holy Father who points out that the ‘mentality…which accepts life only under certain conditions and rejects it when it is afflicted by any limitation, handicap or illness’ leads to a state of affairs where ‘the most basic care, even nourishment, is denied to babies born with serious handicaps or illnesses’. In addition, he observes, ‘the contemporary scene…is becoming even more alarming by reason of the proposals, advanced here and there, to justify even infanticide, following the same arguments used to justify the right to abortion.’[23]

Legislators are increasingly passing laws that allow the killing of infirm people. The content of these laws amounts to a legalisation of attacks on life and this means the abandonment of the juridical defence-penal of life within the limitations laid down by the law.[24] In the preamble to the Dutch law
‘on the taking of life on demand, on assisted suicide, on changes to the penal code and on the law on burial and cremation’, we find written clearly, among other things, the following sentence: ‘We Beatrix, Queen by the grace of God, have seen it right to exclude from criminal responsibility the medical doctor who, after observing the requirements laid down by the law, takes life in response to a request and helps a person to commit suicide’. [25] In article 293, 2, of the penal code of Holland it is laid down that the crime of euthanasia, of obligation and help in relation to suicide, cannot be punished if it is carried out by a medical doctor who has met all the relevant requirements. In Belgian law it was also established that a medical doctor who commits the crime of euthanasia does not in fact commit a crime if the patient, from a clinical point of view, is in a hopeless condition, when he or she is incurably ill, or when he or she is in a state of mental or physical suffering that is unbearable. [26] Until a short time ago there was not a minimum of doubt in society that human life had to be defended until its natural death. Euthanasia is a forbidden act that is subject to punishment, even though, since the moment when the principle of the subjectivisation of criminal responsibility akin to infanticide was introduced, this action has been punished with a less heavy sentence than is the case with other forms of murder. Since the time in pluralistic societies when human life became a relative value in law, a part of society has expressed itself in favour of excluding the life of the gravely or incurably ill from legal protection, and has supported such a position with reference to the right to freedom, to a worthy life, and to the so-called worthy death. Once again it is held that the right to life is not inviolable and inalienable. Similarly euthanasia, that is to say helping a sick person to commit suicide, has been allowed. Previously this was a crime that was punished. This situation means that in the same way as such actions have been decriminalised, penal law and law in general have been seen as instruments that are of no use in the defence of human life. John Paul II argues that following this path one would return to a state of barbarism. [27] It is rightly argued that ‘the laws that give the state the possibility of violating any human right, and the laws that allow the state an opportunity not to effect the obligation to prohibit or to punish in a rational and proportionate way actions that violate the fundamental rights of man by individuals, are not just. It is obvious that a State must envisage certain punishments so that respect for fundamental human rights becomes a reality in that State’. [28] As regards the life of a man, that is to say of a human being who has already been born (the approach of penal law), laws provide for the defence of life, leaving aside here the trend of recent years in relation to the subject of euthanasia. The position of most legislative bodies in relation to the defence of the life of the conceived child is different. Usually this subject is excluded from general juridical-penal defence and is treated separately in special laws or penal codes. In making laws on human life during its initial stage a specific characteristic is present. In these laws we encounter the absence of any norm that directly and clearly defends the life of the conceived child. Usually, legislative bodies do not enact special laws that defend the life of the conceived child. Instead, they pass abortionist laws that set out the conditions under which abortion can take legally place without there being any juridical responsibility. The conceived child, whom is the victim of abortion, is excluded from the protection of the law because the law assures that the person who carries out the abortion cannot be punished, that is to say the medical doctor or the mother. When such laws are made the most important thing for them is to establish the conditions under which abortion can be carried out; concern about the right to life of the child takes a secondary place of importance. Only when such conditions are known can one know what the nature of the juridical defence of an individual during the period when he or she has not yet been born. And it is here that one specifically encounters the special features of laws that are concerned with life during its initial stage. The question of the defence of the life of the conceived child does not exist on its own. Instead, it always exists within the context of abortion. The life of the conceived child is protected when abortion is prohibited. Thus the defence of the life of the conceived child is of secondary importance; it does not exist on its own; it depends upon the limitations placed on legal abortion; and its range is proportionately inverse to the range of legal abortion. In analysing abortionist laws we can observe the tendency to increasingly extend the right to kill a child through abortion, and
this means that in reality there is a limitation of the right to life of the conceived child, who is the victim of abortion. Abortion on demand is constantly on the increase either because the time period in which an abortion can take place is extended or because new reasons for carrying out an abortion are accepted. These reasons are often not expressed in precise terms, and this so that they can be interpreted with greater leeway. In practical terms, they allow the child to be killed as a result of any kind of wish on the part of the mother.[29] One need only glance over the lists of reasons for abortion that are to be found in the different sets of legislation on the subject[30] to observe how legal abortion is expanding through law and how the juridical defence of the unborn child is growing smaller. The Constitutional Court of Poland, in its historic sentence of 28 May 1997, opposed the tendency to increasingly expand legal abortion, and in this sentence it was stated that abortion is necessarily bound up with the killing of the growing foetus. The proposal to carry out an abortion for reasons involving the difficult economic life conditions, or the difficult personal situation, of the mother was assessed within the context of the value of life, and it was recognised that in the case of conflict between such goods and the value of human life, this last has a greater value. The legalisation of abortion on such grounds was thus denied. This sentence was a breach in the international trends to be found in legislation and Constitutions of recent decades as regards the question of abortion.[31]

Similar observations can be made about the norms that govern human life at its initial and final stages. They are not established to protect life but to make a breach in its defence. These observations may also be made in relation to the norms regarding in vitro fertilisation. In the laws on assisted procreation, as well, one is not dealing with the defence of life. This is because assisted procreation should be prohibited because the manipulation of human procreation is connected with attacks on life. For reasons of time I will not address here the other moral questions and evaluations connected with assisted fertilisation. Another point of view is the one expressed by the German legislature which prohibited assisted fertilisation in certain cases, with punishment in the case of transgression, and thus altered the position that had been adopted by other legislative bodies on the subject.[32]

When laws are made that refer to the right to life, the problem presents itself to legislating bodies of how to define the subject of this right. It would appear that such a question ought not to constitute any kind of problem for such a right. One is dealing here with the right of a man to his life and thus with a man and his life. A man is the subject of the right to life. This should mean, according to the principle of equality, that the law should recognise and defend the right of life possessed by each and every man. But in the laws passed in pluralistic societies such is not the case. Great freedom occurs with legislating bodies at the level of defining the term ‘man’. In such laws we find different terms to refer to man and in addition the word ‘man’ has different meanings. Usually, this term does not cover man during his prenatal stage, and this is something that one sees above all in abortionist laws. At a biological and medical level there are few people who affirm that a man does not exist after conception and yet in their laws legislating bodies rarely employ the terms ‘man’, ‘conceived child’, ‘foetus’, ‘embryo’ or ‘conceived human being’.

One can observe that in the legislation of a country a human being may be recognised as a man and is protected as such, whilst in another country he or she does not enjoy such recognition and such a defence. The concept of ‘man’ has different meanings in the international declarations and charters on human rights and in the sets of legislation of different countries. It can also happen that in the legislation of the same country in different fields of law the norms that exist employ the term ‘man’ with different meanings, and it can happen that in one field of law a person is a ‘man’ but he or she is not in another. Such contradictoriness is to be observed above all when civil and family law are compared with penal law.

In penal law in which not every human being is seen as a man laws are made that differentiate categories of human beings as subjects in law and create different statuses for them, which in turn determine their legal defence. In making such laws that belong to penal law, legislative bodies decide who is a man for that law and who is not, and as a result they also decide who will have a legal defence
of his or her life. Even though penal law often employs the term ‘man’, it does not provide a legal definition of that term. As is clear from sentences and commentaries, the fundamental norm of penal law – ‘do not kill’ – only guarantees the defence of the life of a man who has already been born. It is, indeed, usually to this figure that the term ‘man’ refers. This fact means that law defends in an absolute way the life of a man after he has been born. But some jurists have doubted whether children born with grave physical malformations, whom they have called ‘monstrous beings’, are really men in law. Williams wrote that ‘a being who in a clear way is a monster…could be killed painlessly’, and in this way he contested the view that a monstrous being is a man.[33]

In legislation that concerns the right to life one can observe diversity in the terms employed to describe man as a subject in law. But such terms are not always synonyms. As a result, this linguistic strategy differentiates the juridical status of each subject and guarantees to each subject a different juridical defence.

The diversity of terms employed with reference to a man can be seen above all else in legislation that concerns unborn human life. The aim is clear and involves not guaranteeing human beings at this stage of their life the juridical status of being a man and thus excluding them from direct and full juridical defence. In order to define a man in the different stages of his prenatal life, different concepts have been introduced into legislation, concepts such as ‘zygote’, ‘embryo’, ‘foetus’, and ‘human being’; only rarely are the terms ‘man’, ‘conceived child’ or ‘unborn child’ employed. Usually, the law gives such subjects different juridical statuses. The juridical situation involved often depends upon economic interests but also on ideologies, and on the manipulation of facts and knowledge.[34] The legislating body does not take into consideration what is emphasised in Donum vitae, namely that ‘zygote’, ‘pre-embryo’, ‘embryo’, and ‘foetus’ can indicate in the lexicon of biology successive stages in the development of a human being.[35] In the legislation of some countries, a group of human beings called ‘pre-embryos’[36] has been introduced, to whom are denied any human status at all.[37] The large number of terms that describe man at the different stages of his prenatal development, the recognition of such categories of human beings as separate subjects with different juridical statuses, bears witness to the arbitrariness that exists in law as regards life when very important questions have to be decided upon, namely who is a man for the law and who has the right to life.

With the advance and development of in vitro fertilisation, another problem has arisen in law: how the beings who are the outcome of assisted fertilisation should be treated. Given that the law usually treats the in vitro embryo differently from the embryo when he or she is in his or her mother’s womb, when the embryo is a so-called ‘pre-embryo’ or a ‘surplus embryo’ it is placed in deposits, frozen, destroyed or manipulated because there is no juridical argument to ensure its defence.[38] An analysis of the laws that are applied in different countries to experimentation on embryos or assisted fertilisation shows that three models which describe the juridical value of the in vitro embryo may be discerned. The first model involves the perception of a person, that is to say it is held that after conception a human being, a human person, or a man, exists, and that the way in which conception comes about does not have an influence on the status of the embryo concerned. In this model it is held that human life should be respected from the first stage of its
development and its defence increases with that development. The in vitro embryo has its own value even though it does not have the same value as a man. For this reason, it deserves respect. But this belief does not exclude the use of the embryo for external purposes, and thus for experiments as well. Such conduct is not in opposition to the principle of respect if it is carried out for important reasons. The interests in this case have to be evaluated, that is to say there must be a comparison of values between the defence of the in vitro embryo and other moral values.

The bases of the above mentioned three models make up the two opposing tendencies to be found in contemporary legislation: the first involves the belief that the life of a man in his prenatal stage must be defended against any attack, including those that may arise with the development of biomedicine; the second involves a preference for the advance and development of science and technology where the defence of the human embryo is of secondary importance. As an example of the first tendency one can refer to German legislation which is seen as restrictive; as an example of the second tendency one may cite Anglo-Saxon legislation, which includes British, Canadian and American legislation, which, in substantial terms, is permissive. Sets of legislation that prefer the advance and development of biomedicine are characterised by the fact that they do not have due respect for human life in the main until the fourteenth day after conception. As a result, there exist vast opportunities for the manipulation of embryos and the creation of surplus embryos that can be frozen, used for the purposes of research, or destroyed.

One can easily see how many efforts are being made by the law of modern States to deny the humanity of the conceived child, above all else during the first stage of his or her life after conception. One should emphasise that such efforts are made to increase legal abortion, assisted fertilisation, or research. In the case of the supporters of such manipulation of the term ‘man’ there is a further hidden purpose. It is usually the case that when a penal law is broken society condemns such an act, and this is especially the case with the killing of a man. But if a law denies that a man is human, which is not possible according to the truth of man but possible in law, then such an action encounters a very low disapproval on the part of society or after a short time is even not disapproved at all. This practice is often employed when abortionist laws are made or laws on assisted fertilisation or on research on human embryos. Such a practice has also been described by John Paul II: ‘Some people try to justify abortion by claiming that the result of conception, at least up to a certain number of days, cannot yet be considered a personal human life.’ When legislative bodies make laws that concern human life they increasingly differentiate the stages of prenatal life; they give different names to subjects, names that are different to that of ‘man’ (in some cases these subjects are not recognised as human beings); and they provide different forms of legal defence to such subjects. Thus we can say that society has pluralised the juridical defence of life and its field by making that defence dependent upon the status that is conferred by the law that has been passed on the human being during the different stages of his or her development from conception to birth.

The other juridical aspect of legislation concerning human life is the question of the clarification of the limits to human life. The law should indicate the beginning and the end of life. Human life begins with conception and ends with death. The problem does not seem to be overly complicated, above all during the modern age when the development of biology, of medicine and technology has been advanced and rapid. The law could refer to the results of such sciences and indicate in a precise way the moment of conception and death. But forms of law differ in their indications as to when the life of a man actually begins. Some legislators, like the German legislative body, hold that human life begins not with conception but after some time, that is to say at the moment of the formation of the individual or of the fixing of the embryo in the womb. The situation is different with respect to establishing the moment of the end of life, that is to say the death of a man. In order to establish this moment law accepts what is suggested by medicine, i.e. the moment of brain death. This question is very important above all with respect to the transplanting of those organs and tissues that can be taken from a corpse and not from a living man. John Paul II points
out that concealed euthanasia could take place when ‘in order to increase the availability of organs for transplants, organs are removed without respecting objective and adequate criteria which verify the death of the donor’. [44]

When legislators make laws that concern life they must indicate in a clear way that in them the subject of defence is life itself and that life must be the good that is protected. Even though laws exist on life, this does not mean that human life is recognised by legislators as a value which they always appreciate. The subject that is protected in such laws is not life. Laws increasingly protect freedom, the private life of a woman, or the so-called right to abortion as a good, and this last in pluralistic societies is increasingly recognised as a fundamental right. [45] The dignity of the human being could also be recognised as constituting one of these goods, although this does not exclude that in some situations the law will allow such a being to be killed, situations in which there often exists a conflict between different goods, as a result of which legislators choose the subject to be defended by accepting – as is the case in abortionist laws – that the life of a conceived child is a less valuable good and must give precedence to the defence of other legally-recognised goods.

In making laws on human life there is an aspect that appears to be formal but which, in reality, refers to the question under consideration: the terms of juridical language used by legislators. Every law expresses certain contents of law through its language. For this reason, language, an adequate choice of terms, and the phrases that are employed by legislators to express the juridical norm for the subject of their choice, are important. We may observe an interesting fact when we consider laws that refer to the right to life. The concepts that are used in the legislative texts do not usually reflect the true contents of the norm. In his Letter to Families John Paul II wrote that our epoch is an epoch of great crisis for truth and that this primarily means a crisis of concepts. [46] Every so often the right to abortion is listed amongst so-called new human rights. This is concealed with different terms, terms such as ‘the right to free choice’, ‘the right to free choice as regards pregnancy’, ‘free decision as regards the interruption of pregnancy’, ‘the right to choose the ending of a pregnancy’, ‘the right to free personal choices’, ‘the right to personal integrity including pregnancy’, ‘the right to decide in relation to one’s body’, or ‘the right to freedom as regards maternity’. [47] When legislators make laws on abortion, assisted fertilisation, and research on human embryos, they often manipulate language, and they do this primarily to conceal the real contents of these laws. [48] It is for this reason that we encounter phrases such as ‘operation’, ‘the interruption of pregnancy’, ‘the artificial termination of pregnancy’ or ‘abortion’. Such manipulations of language exist to conceal the real substance of the action involved, which is the killing of a conceived child. Such manipulations also have the purpose of mitigating the reactions of society brought about by the killing of a man during the initial stage of his life. Observing this phenomenon in the field of abortion, John Paul II writes: ‘perhaps this linguistic phenomenon is itself a symptom of an uneasiness of conscience. But no word has the power to change the reality of things: procured abortion is the deliberate and direct killing, by whatever means it is carried out, of a human being in the initial phase of his or her existence, extending from conception to birth.’ [49] The use by legislators of terms chosen by them in laws on research on embryos and cloning amounts to nothing else but the manipulation of language.

If it is accepted in pluralistic society that each individual can freely establish what is a value for him or her, some people argue that full autonomy should be given to each person to dispose of their life and the life of a human being who has not yet been born. [50] It is argued that through approval by a majority or by consent there should be established each time in the law what has value, i.e. the good that should be defended by that law, and that in the first instance such decisions should refer to human life. [51] The consent of pluralist society should decide in a real situation what the law should prohibit, what is right or wrong, what is a value for that law, what the law should prohibit and what it should allow, and whether the killing of a man is right or wrong. Consent regarding juridical solutions as regards life would not provide guarantees to the effect that in that law life is recognised as an inviolable value. Placing together the value of life, which should be defended by law, with the pluralism of
society and the solutions to conflicts about human life through compromise, always means that the law doubts the absolute value of the right to life or relativises it.[52] In this way, the right of a man which is inviolable and inalienable, depends upon the inclinations of the majority which could deny that right in the laws that it passes. Human life thus becomes the subject of pacts and negotiations. One reaches the point of discussing who should have the right to life and who should not, and discussion in parliament or in society, through the instrument of a referendum as well, in the negation of such a right, comes to be accepted. In pluralistic society law becomes ‘the instrument of the will of the legislating body that adopts the value of compromise, which satisfies nobody but which is accepted because it allows the avoidance of social conflicts’. [53] The pluralistic civilisation of society has brought with it laws that are made through the consent of the majority in order to legalise the killing of a man and to defend the person who kills him. This is the tragic situation towards which law that deals with the right to life is going. In this way, the legislative body acquires the power to deal with the right to life and its defence as it so pleases. In cases chosen by the legislative body human life ceases to be a good, that is to say a value worthy of respect and protection, within the community of the State. When a legislative body denies the right to life of certain human beings and upholds it for others, it violates a right that is inviolable and belongs to the human person. It enters into conflict with human rights, which, indeed, cannot be the subject of pacts, agreement, votes or referendums.[54] A State in which such a vision of law is dominant ceases to be democratic State of law based on human rights. Instead it becomes a tyrannical State that seeks to deal as it sees fit with the lives of the weakest and the most undefended, the lives of unborn children and the elderly;[55] and democracy becomes ‘open or thinly disguised totalitarianism’. [56] In such a case the democratic and pluralistic State ‘can take on some of the characteristics of the totalitarian State if its citizens do not have a morality of a universal character to assure, always and everywhere, respect for human life, for its dignity and the requirements that such life involves in public life’. [57]

7. For Constitutional sentences on the right to life see M. CASINI, Il diritto alla vita del concetto nella giurisprudenza europea (CEDAM, Padua, 2001); K. WIAK, Ochrona dziecka poczetego w polskim prawie karnym (RW KUL, Lublin, 2001).

11. In the literature that exists to help legislators it is often stated that the unborn child does not yet have his or her own right to life and that therefore the prohibition on killing begins at the moment of birth. See, for example, N. HÖRSTER, Abtreibung im säkularen Staat. Argumente gegen den § 218 (Frankfurt, 1991), p. 26.


16. Congregation for the Doctrine of the Faith, Donum vitae, III.


18. JOHN PAUL II, Evangelium vitae, n. 4.


20. Congregation for the Doctrine of the Faith, Donum vitae, III.


30. The broadest catalogue of reasons to allow an abortion was until recently to be found on the Russian legislation on the subject. This legislation allowed abortion until the twelfth week of pregnancy and in addition for thirteen special reasons in the period from the twelfth to the twenty-second week of pregnancy: for example in the case of rape, the death or handicap of the husband, prison, when the woman had had her children taken away from her following a court sentence, the presence of damage to the foetus, when the mother’s life was endangered by pregnancy or childbirth, divorce, poverty, unemployment, and bad housing conditions. After the reform of legislation on the subject of abortion, the following reasons for legal abortion remained: when the mother’s life was endangered by pregnancy or childbirth, the presence of damage to the foetus, rape, prison, the death or
handicap of the husband, and when the woman had had her children taken away from her following a court sentence. A broad list of reasons for an abortion is also to be found in the Finnish legislation on the subject, which allows abortion, for example, when the mother is under the age of seventeen or is over the age of forty, or already has four children: cf. A. GRZESKOWIAK, ‘Nowe tendencje’, p. 368.


34. L. CARRASCO, Lo statuto dell’embrione umano, Famiglia et Vita, 1999, 1, p. 45.


36. The term ‘pre-embryo’ was used for the first time by the embryologist A. McLaren to refer to the development of the zygote until the fifteenth day after conception. The term was used in the Warnock Report of 1984. During the drafting of the final version of this report a manipulation of language was engaged in to polarise the ethical discussion, and this term was introduced into the final document although it had not been employed during the debates of the commission: cf. D. DAVIES, ‘Embryo research’, Nature, 1986, 320, p. 208; cf. A. SERRA, ‘Lo stato biologico dell’embrione umano. Quando inizia l’essere umano’, in Commento interdisciplinare, p. 574.


40. R. ANDORNO, La distincion, p. 199.


42. JOHN PAUL II, Evangelium vitae, n. 60.


44. JOHN PAUL II, Evangelium vitae, n. 15.

45. GRZESKOWIAK, ‘Diritto all’aborto’ in Lexicon, pp. 239-247.


47. GRZESKOWIAK, ‘Diritto all’aborto’, p. 240.


49. JOHN PAUL II, Evangelium vitae, n. 58.

50. JOHN PAUL II, Evangelium vitae, n. 68.


54. Referendums on laws concerning the right to life that allowed for legal abortion or expanded the possibilities of abortion have been held in Switzerland; in Italy (whose Constitutional Court held such a referendum to be legal but adjudged that the introduction of abortion on demand was unconstitutional); and in Portugal, where the Constitutional Court of that country stated that such a referendum was in conformity with the Constitution but where the proposal to add further justifications for an abortion was rejected by the electorate. A referendum on abortion, and also on the right to life, was also held in Ireland. The Constitutions of Slovakia and the Czech Republic prohibit the holding of referendums on human rights. In Poland, Parliament has on different occasions rejected the proposal to hold a referendum on abortion and has instead approved social consultations. The result of these was that of 17,109,76 participants, 15,274,60 declared themselves against abortion: cf. A. GRZESKOWIAK, Prawnakarna ochrona dziecka poczetego w pracach Sejmu i Senatu (Ottoniamun, Szczecin 1994), p. 133.

55. JOHN PAUL II, Evangelium vitae, n. 20.
56. JOHN PAUL II, Centesimus annus, n. 46.
ÁNGEL RODRÍGUEZ LUÑO

The Dilemma of Catholic Legislators Faced With Proposals Seeking to Ameliorate Unjust Laws Promoting Artificial Procreation

1. Introduction
This paper will not examine all of the juridical and ethical-political problems raised by artificial procreation. Its task is to offer, by the light of Catholic morals and especially by the encyclical Evangelium Vitae (EV), several ethical guidelines for legislators and politicians who may be faced with proposals that seek to ameliorate unjust civil laws which promote artificial procreation.

Evangelium Vitae n.73 affirms that when a legislative vote would be decisive in order to pass a more restrictive law to replace either an already existing more-permissive law or one ready to be voted on, “an elected official, whose absolute personal opposition to procured abortion is well-known, could licitly support proposals aimed at limiting the harm done by such a law and lessening its negative consequences at the level of general opinion and public morality. This is not engaging in illicit cooperation with an unjust law, but rather it is a legitimate and proper attempt to limit its evil aspects.”[1] It is widely known that controversies have arisen concerning the interpretation of this moral solution and, consequently, its exact relevance for analogous situations. It is therefore necessary to clarify several points regarding the meaning and context of the teaching so that it can be applied with well-founded accuracy to the problems that occupy us today.[2]

A primary clarification regards the expression “imperfect laws” which is at times used in reference to EV n. 73. The expression, however, is neither used in the encyclical itself nor by any other magisterial, ecclesial document. The authors who do use it always put it in quotation marks. In fact, it’s an expression that can easily lead to deception. Thus, there are at least two fundamental reasons why it would be better not to adopt it:

1) From the point of view of political ethics, civil laws are just when they correspond here and now to the common good: laws that oppose the essential content of the common good are unjust or grievously depraved.[3] Just laws are always or almost always perfectible, at least regarding their technical-juridical efficacy and expression. Likewise, unjust laws can be defective in lesser or greater degrees. However, a third category that would fall between just and unjust laws does not exist.

2) While EV n. 73 affirms it is good to cast one’s vote in order to eliminate the disordered normative disposition of an unjust law, it does not affirm that the more restrictive law which results is just, or that it is in itself acceptable or defendable. Rather, from the immediate context, and from the entire development of Chapter III of the encyclical, it is evident that a law legalizing abortion, even if it is more restrictive than a preceding law, is an unjust law in all its effects. The teachings of John Paul II do not support a third ethical category of imperfect laws which would fall between just and unjust laws. This observation must be kept in mind in order to avoid many errors of interpretation.[4]

2. Fundamental Moral Principles Concerning Proper Conduct Before Unjust Laws
A second clarification regards the context in which EV n. 73 can be placed. The general context is the moral responsibility that citizens, and in particular legislators and politicians, have towards implementing a sound juridical order in their country. Such a responsibility strives to secure a juridical order that is thoroughly just: this is the goal to be pursued and it must never be renounced. Due to this, a logic of compromise such as the following would be utterly foreign to the perspective of EV: Catholics are absolutely opposed to every instrumentation of human embryos, such as that found in artificial procreation; other citizens, however, don’t believe it is wrong to use and store embryos like spare parts; given that everyone takes part in the State, it would not be just to demand that the law wholly admit either the position of Catholics or that of non-Catholics, since law must be a mediation. This type of reasoning is obviously erroneous because the protection of human life is not demanded by specifically Catholic ethics but rather belongs to the ethical-political culture of any society.[5]
Accepting a compromise of this kind would mean becoming an accomplice to a gravely unjust, discriminating principle fatal to those who are subjected to it. In the long run it would jeopardize the fundamentals of social life by putting them up for debate.

Once this crucial point has been clarified, it is necessary to point out that the immediate context of EV n. 73 concerns Catholic moral teaching regarding proper conduct before unjust laws.[6] Catholic morality teaches that unjust laws do not bind one in conscience; quite oppositely, there is a moral obligation to refrain from following their normative dispositions, to oppose them in a civil manner (e.g. through conscientious objection), not to support them with one’s vote, and not to collaborate with their application. Above all, there exists the duty to use all licit means to abrogate them. Regarding this last duty, EV n. 73 teaches that in a situation where it is not possible to entirely abrogate an unjust law, it is good and upright to work for its partial abrogation.

Nonetheless, political strategies that aim to reduce the harm of unjust laws (Harm Reduction or Harm Minimization) are not morally legitimate independently from the means they employ. On the contrary, the political obligation to minimize the negative effects of unjust civil laws is intimately linked with two irrevocable moral principals. The first maintains that, “if it is sometimes licit to tolerate a lesser evil in order to avoid a greater evil or to promote a greater good, it is not licit, even for the gravest reasons, to do evil so that good may follow from it, that is, to make into an object of a positive act of the will something which is intrinsically disordered even when the intention is to safeguard or promote individual, familial, or social goods.”[7] For example, no one could licitly obey an order to kill ten innocent people in order to keep someone else from murdering thirty. The second principal regards cooperation. “It is never licit to formally cooperate with evil,”[8] so it is therefore not morally permissible to collaborate in the promulgation or application of a gravely unjust law. The solution offered by EV n.73 must be interpreted in light of the two above-mentioned moral principles that the encyclical at times presupposes and at other times explicitly expounds.

3. The Foundation of Evangelium Vitae n. 73

Evident in the preceding reflections, EV n. 73’s moral teaching is not founded either on the permissibility of a more restrictive law considered in itself, or the philosophy that one may commit a lesser evil in order to avoid a greater one. In addition, EV n. 73 is in no way founded on a theory of compromise.

Rather, the teaching of EV n. 73 is founded on a judgment concerning the moral object of the action by which the legislator may support a more restrictive law only within the conditions laid forth in EV. The legislator chooses as the moral object of his action to eliminate all of the unjust aspects of the preceding law that he can, here and now, eradicate. He must do so, moreover, without becoming an agent in maintaining the other unjust aspects that he does not desire or accept but which he nonetheless is not in a position to abolish.[9] The real nature and meaning of the legislator’s action is that it is an act that partially abrogates an unjust law. The abrogative act is partial solely because total abrogation would not be possible.

Both the greater, and the “lesser”, evils are done by others. They are evils the legislator of whom we speak is not able to completely prevent. The depraved aspects of the law are eliminated as far as possible while the only thing he does, and desires to do, is to mitigate evil. His action only consists in limiting the evil done by others. Again, this includes the remaining lesser evil that is likewise done by others, not by the elected official of whom we speak. Simply put: it is not morally permissible to directly kill three innocent people, or to be an accomplice in their deaths, so that another person doesn’t kill ten. It is, however, permissible and dutiful to try to thwart the person who intends to kill ten people even if the end result, despite one’s efforts, is that only seven are saved. The action of the person who acts rightly is only the action of saving seven, since saving ten was not possible. The three who were not capable of being saved were killed by the action of another person.

The teaching of EV n. 73 will now be resumed in order to apply it to the laws regarding artificial procreation. It is good and dutiful to use one’s vote to sustain or promote proposals which ameliorate
an unjust civil law as long as all of the conditions are met which ensure that one’s political intervention is truly and solely an act of partial abrogation. The conditions which must be met are principally the following: total abrogation of the unjust law is not possible, one’s own vote is necessary to obtain the good sought, with one’s vote one does not become responsible for the unjust normative dispositions which will still be present in the more restrictive law, and finally, that every type of scandal and confusion of conscience be reasonably avoided.

4. Political Applications to the Issue of Artificial Procreation

At this point, one could examine the possibility that, in certain conditions, the common good would not be opposed by a civil law that did not prohibit a form of artificial procreation which, although morally illicit, guaranteed the three following rights in their entirety for every single human embryo: the right to be treated as a subject and not an object; the inviolable right to life; and, finally, the right to be born by and in the same, heterosexual, married couple. Actual civil laws regarding artificial procreation do not, as far as I know, guarantee these three rights. The possibility highlighted above, therefore, refers to a purely theoretical problem that is not necessary to investigate right now.

Presupposing, however, that existing artificial procreation laws are unjust, it remains to clarify how the moral principles explicated above can be applied to them. There are two fundamental criteria: the elected official must not be responsible for the injurious normative dispositions present in the more restrictive law, and furthermore, everything possible must be done to ensure that scandal and confusion of conscience do not arise.

The first principle is relatively easy to apply when political intervention is clearly abrogative from a formal point of view. If a group of elected officials do not have the majority needed to completely abrogate an unjust law but are, for example, able to obtain a majority in order to abrogate two articles of a law which allows “spare embryos” to be created and frozen, these elected officials are obviously only responsible for the abrogation of the two grievously unjust articles. They are not responsible for the rest of the articles to which they did not give their vote when the law was passed by parliament. The partial nullification of an evil is a good that does not require further justification.

At times, however, it isn’t possible to abrogate only part of a law. In order to partially negate a law it must be rewritten so that a new proposal is presented to substitute the old. In situations where this is not possible, what might be possible is political intervention that is not formally, but rather substantially, abrogative. This is not the same as cooperating with parliamentary approval for an unjust law since the only novelty in the approved text is the prohibiting of several gravely unjust practices that previously were legal.

The following example may be posited. A country has an artificial procreation law allowing the unlimited use of human embryos. This country’s parliament has 100 representatives divided into three groups. Group A has 40 members and accepts the existing law without desiring any change. Group B has 30 members who would like a more restrictive law but who would prefer to keep the existing law rather than accept a new one that would completely prohibit in vitro fertilization. Group C has 30 members and is opposed to any type of in vitro fertilization and artificial insemination substituting for the conjugal act.

The representatives in Group C, many of who are Catholics, could legitimately present a new legal proposal prohibiting all of the practices that they have persuaded Group B to join in prohibiting. Once the new proposal has been voted into law by Groups B and C, with the opposition of Group A, the situation is substantially the following:

_ The parliamentary majority which upheld illicit artificial procreation so that it is still legal is formed by Groups A and B (70 members).

_ The parliamentary majority which suppressed the previously legal artificial procreation techniques was formed by Groups B and C (60 members).

_ Group C, containing Catholics, is only responsible for the disappearance from the legal order of several artificial procreation practices that, prior to the new law, were legal. If some legislators of this
group either voted against the ameliorating proposal, or abstained, and due to their choices the more restrictive proposal did not pass, their conduct truly and efficaciously sustained the more unjust law at which moment they become jointly morally responsible for it.

Group B could have united with Group C in order to abrogate the whole law. They did not, however, desire to do so. Group B is therefore responsible both for the abrogation of several unjust practices as well as for the equally unjust practices which remain in force. A Catholic could not belong to this group.

The licitness for what Group C accomplished is not founded simply on the new law being more restrictive than the old. The foundation is that the moral object of their action consists in abrogating all of the unjust techniques possible to abrogate, without becoming really and substantially responsible for the unjust practices that remain legal. The legality of the practice is sustained in parliament by Groups A and B, but not by C. Group C is not substantially responsible for the negative aspects of the new law even if it seems so formally. The point to bear in mind is that the new law, while declaring unjust practices to be legal, does not permit an injustice that was previously prohibited. It does forbid many grave injustices that were previously allowed.

Yet another kind of situation can briefly be considered. Would it be permissible to promote a restrictive law in a country that, although it has no specific laws regarding artificial procreation, has an extremely permissive and unjust de facto situation? Many distinctions would have to be made in a case such as this. There can be de facto situations which are simply that, situations of fact which can be addressed by rigorously enforcing the existing norms of the juridical system. There are then other situations that are de facto only in appearance. When examined in light of the entire juridical order and health system they are in reality situations dealing with rights. This might occur, for example, if any improvements that the health authorities would like to make are impeded by the existing juridical order. The moral principles expounded above can be applied in cases such as these. However, this must be done with special precautions that are not possible to elaborate upon here.

Lastly, there remains to consider situations involving scandal. Human actions in general, and particularly those of politicians, carry a cultural and symbolic influence. Public morality is extremely important in a culture such as ours based on communication. It is even more significant for the Church and Catholics who, as followers of Christ, must be “lumengentium.” Since scandal and confusion must be avoided whenever possible, it is necessary to anticipate the influence which one’s actions have on a symbolic level. When a politician or group of politicians has the task of partially abrogating an unjust law (according to one of the morally licit ways already considered) it is crucial that the true and substantial nature of the endeavor be explained to everyone who is willing to listen and understand. That which is done must be good in itself, but it must also seem good to everyone with good will who observes it. Ambiguous and equivocal messages must be avoided. There are in fact two burdens to be assumed. In addition to the burden of a genuine struggle against one’s political adversaries, there is also the obligation to communicate lucidly and thoroughly with those who are not adversaries. Otherwise, misunderstandings and confusions will arise. Strenuous efforts must be made to avoid this.

In order to act with necessary clarity, it must be remembered that EV n. 73 intends to resolve a particular problem of conscience for members of a legislative organ in very specific, concrete circumstances. EV n. 73 is not proposing an ideal. The ideal is that citizens and politicians with well-formed consciences will persevere so that the entire juridical and political order of their country becomes, not just less unjust and injurious than it was, but actually just. This is the object of their moral responsibility. It is only within the context of the fight for this ideal, which requires opposition to unjust laws, that the aim to partially abrogate unjust laws can be understood. This is the background of the situation proposed by EV n. 73. It cannot be interpreted as a form of compromise with injustice without completely distorting its meaning and intention.
[5] Cf. for example KRIELE, M., Einführung in die Staatslehre. Die geschichtlichen Legitimitätsgrundlagen des demokratischen Verfassungsstaates, 4th ed., Opladen:Westdeutscher Verlag, 1990. Pertinent to this is an interview with Norberto Bobbio published in the «Corriere della Sera» April 6, 1981, in which he says, “It stupefies me that the populace leaves the honor and privilege of declaring that one must not kill to believers”. Equally relevant is an article published by Bobbio in «La Stampa» May 15, 1981, in which he responds to the criticism, begun by Giorgio Bocca, of the interview against abortion cited above. Bobbio writes in the article, “It wouldn’t be useless to remind [Bocca] that the first great thinker who formulated the social contract thesis, Thomas Hobbes, retained that the only right those contracting to enter society did not renounce was the right to life”. For additional information, cf. PALINI, A., Aborto. Dibattito sempre aperto da Ippocrate ai nostri giorni, Roma: Città Nuova, 1992: 72-75.
[8] The encyclical goes on to explain that formal cooperation is: “Such cooperation as occurs when the action done, either in its very nature or by the form it takes on in a concrete context, qualifies as direct participation in an act against innocent human life or as a sharing in the immoral intention of the principal agent. This cooperation can never be justified, neither by invoking respect for another’s liberty, nor by the fact that the civil law has provided for it: one can never absolve oneself from the moral responsibility incurred by one’s personal acts for which each one of us will be judged by God Himself” (n.74).
[9] Cf. FINNIS, J., Le leggi ingiuste in una società democratica. Considerazioni filosofiche, in JOBLIN, J., TREMBLAY, R. (edited by), I cattolici e la società pluralista. Il caso delle «leggi imperfette», Bologna: Edizioni Studio Domenicano, 1996: 99-114. Finnis correctly explains that the real meaning of the action of a member of a legislative body can be understood only in light of the procedural context and existing legality: «For example: a law of the type: “Abortion is legal until the sixteenth week” is an unjust law. However, a design of the law “Abortion is legal until the sixteenth week” could be proposed (a) in order to permit abortions which previous precedence prohibited, or (b) to prohibit abortions from the sixteenth to the twenty-eight week which previous precedence allowed. Choosing to support the design of law (a) is substantially different from choosing to support the design of law (b). Indeed, that which is under consideration—the object of deliberation in supporting the design of the law—is different in the two cases. In case (a) it consists in supporting abortion, in case (b) it consists in supporting prohibiting abortion, or at least all those abortions which the legislator has the opportunity in that moment to successfully prohibit» (p. 107).
[10] On this point, see CAFFARRA, C., La procreazione artificiale: aspetti etici e aspetti politici, a conference held February 8, 2003 at the Hospital of the Holy Heart of Negrar, Verona (the complete text is available at www.caffarra.it). It treats a delicate theme that cannot be thoroughly studied here. In brief, it is theoretically thinkable that in a certain country, due to its historical-cultural or religious tradition, the majority of citizens would not be likely to understand the negative ethical implications of substituting the conjugal act with artificial techniques in cases of sterility. In this hypothetical situation, it could perhaps not be contrary to the common good to have a law which forbids all artificial procreation practices which do not respect these three rights, but authorizes the practices which do respect them, such as valid artificial insemination and in vitro fertilization using a single embryo (this last one is a hypothesis which, for different reasons, is not currently accepted).

[11] These two principles in some way contain all of the other conditions. If a legislator supports an ameliorating proposal without his vote being determining (that is, necessary) to obtain the majority hoped for, or if it were possible to obtain total abrogation of an unjust law, it’s clear that he then also becomes responsible for the negative effects of the more restrictive law. It’s important to understand the guidelines for a vote to be determining. If it is possible to abrogate some articles of the preceding law without participating in the final vote on the resulting text, the final vote must be avoided. If the more permissive law would be abrogated even if the representative of whom we speak abstains or votes against it, he would generally have to abstain or, respectively, vote against it, in order to faithfully portray his convictions. This doesn’t mean, however, that he absolutely could not support the more restrictive law hypothetically given in this last instance. He could support it so that the great number of votes obtained by the more restrictive law would discourage other legislators from re-proposing a more permissive law within a few months. These, and other possible circumstances, must be prudently evaluated by representatives.


[13] It is particularly necessary to markedly distinguish this hypothesis from the one I have considered and rejected as the third scenario cited in my work: Evangelium Vitae 73: The Catholic Lawmaker and the Problem of a Seriously Unjust Law, «L’Osservatore Romano» 18-IX-2002 (English edition). «This is the situation of a country where abortion is illegal. Changes in public opinion, the position of political groups, and other factors make it reasonably certain that within a short period of time it will be impossible to prevent the approval of a very permissive law on abortion. The following problem then arises: would it be morally licit to take the initiative, with the intention of forestalling a further worsening of the situation, by promoting a law which decriminalizes abortion in just a few cases - rigorously defined - and which would also contain serious provisions aimed at preventing abortion?» I have held and still do hold that the answer must be negative.

[14] It must be clarified that although working to mitigate unjust laws is good and praiseworthy, the resulting more restrictive law which does not, at the very least, defend every single embryo and the three previously mentioned rights is unjust and one may not collaborate in its practical application.
Consultation for Sterile Couple

Sterility, a problem that is common in the relationships of many couples, has assumed – in recent times – new features because of increase of the eziopathogenic dynamics and of proposed solutions by a medicine that is “substitutive” rather than “reparative”.

In approaching a sterile couple, consultation plays a central role and has its own peculiar characteristics, different from other consultations in the obstetrics and gynecology[1]. In fact, the consultant meets a couple and not a single patient: the couple is studied and, then, subjected to eventual treatment[2]. Moreover, sterility is a problem of the couple because for generation, besides the absence of physical and/or psychological impediments, the couple’s wish to have a child is necessary.

Consultation with a sterile couple is provided in two phases: pre-diagnostic and post-diagnostic. In the pre-diagnostic phase, at the clinical level, the consultant is concerned with history, physical examination, and investigations, depending on the pathology to be studied[3]. The consultant is not concerned only with the technical aspects: he is dealing with a psychologically worn-out couple[4], that is not asking only for clinical diagnosis but also to be helped to confront the suffering caused by an unfulfilled desire for a child and the eventual failures and delusions in the search for a solution. Yet, the diagnostic procedures and the medical treatments can go on for years; the causes of sterility can be multiple and not always separable; the diagnosis can change in the course of the assessments; the final result can have a strong impact on the couple’s life, and thereby affect their sexual and conjugal relationship; social relations can be compromised because, deprived of a social function (procreation), the couple could attempt to hide sterility more so if the man is sterile[5].

In the post-diagnostic phase, the consultant must not only communicate the diagnosis but also suggest possible treatments: pharmacological (hormonal or antiphlogistical), surgical or psychological treatments, and assistance to the conjugal act.

In the face of a definitive sterility or, as is often the case, before an etiopathogenetical diagnosis of sterility, Artificial Reproductive Techniques (ARTs) are proposed too. Access to ARTs should be subordinated – in a correct approach at least from the deontological point of view – to an assessment of the psychological condition of the couple, information on the technique to be used, success rate and possible risks of procedure, and the ethical, social and legal implications. However, the reverse is most often the case: the couple is misinformed about the real success and moral quality of the techniques. The couple is often ignorant about the high rate of abortion associated with the procedures, their costs and mode of operation, possible risks for the woman and the embryo, use of frozen embryos or gametes[6].

Even if there are no follow-up studies on the consultation to sterile couple, it is still reasonable to retain that good information could make at least the couple think over recourse to the ARTs, in any case, it could induce them to ask for some guarantees: for example, recourse to ovarian stimulation only in case of a genuine therapeutic necessity (pathologies that cause ovarian insufficiency) and not simply in view of an increased success of the techniques[7].

To opt for the ART, therefore, involves the necessity to consider not only the couple but also the child that could be conceived[8]: a child that is not yet existent, but whose rights must be respected. Are the ARTs in the best interest of the child? What are the risks to his life and health? What are the characteristics of the family environment into which the child will be born? These are questions motivated by the radical difference between natural procreation and ARTs. In fact, while natural conception remains a private reality on which the doctor can intervene once it has already been ascertained.
(assistance to the pregnant woman, fetal diagnosis and therapy), ARTs require a “public act”, the complex activities of different persons from the couple, instruments, ideal environments, and financial commitment.

It is obvious, therefore, that the consultation offered to couples with sterility cannot be limited to only technical aspects[9]: it should also take into consideration the psychological conditions and ethical options of the couples.

Psychological Consultation with a Sterile Couple

An analysis of available literature on this matter reveals that consultation with a sterile couple is primarily viewed in its psychological aspects[10]. On the other hand, the experience of sterility causes in the couple the same reactions produced by other crisis situations (surprise, shock, incredulity, negation, frustration, anger, loss of control and anxiety, guilt feeling, embarrassment, disappointment, isolation, depression, affliction, mourning)[11]. This situation can become chronic as a result of repeated failed attempts[12] and the frequent difficulty in finding a solution[13]. According to some authors[14], psychological consultation would help the couple to reduce the successive “roller coaster” effect, particularly of failure of the ARTs.

This is a case of an understandable crisis if we think about the role played by procreation and parenthood in the development of self-esteem, recognition of sexual identity, acceptance of once corporeal image and social role[15]. This is a crisis that can assume different dimensions in the man and in the woman[16] and between the sterile partner and the fertile partner, so much as to influence the very relationship of the couple.

Psychological consultation is not requested by all the couples (18-21% according to a study by Boivin)[17], nor are they all satisfied, probably because it is offered after the medical consultation or with a compensatory intent or because of the patient’s solicitations, who is not, however, always in a situation to understand its necessity[18]. Rather, being able to manage a crisis situation could be advantageous not only for the psychological, social and sexual well being of the couple, but also for the good of fertility itself[19]. Much is true in the suggestion to seek psychological consultation, as help to manage one’s role in a situation of sterility and to remember the conjugal bond first than seeking a pregnancy[20].

It would, then, be opportune to consider psychological consultation as an integral part of the consultation for sterility, in which the specialist will be concerned, in addition to the medical necessities, also the psychological and emotional needs of the couple[21].

Ethics Consultation with a Sterile Couple

In addition to the clinical and psychological considerations, it is, however, fundamental to also evaluate the ethical implications of the choices regarding the problem of “sterility”. The proposal of diagnostic procedures (for instance, the method of sperm collection), medico-surgical treatments or ARTs, in fact, is not ethically neutral. Rather, in the case of choice of ARTs does not depend only on the knowledge of the risks and the success rates, or on the ability of the couples to manage crisis, but, in the first place, on the couples’ ethical beliefs, the idea of person and family to which they subscribe, and their notion regarding the goals of medicine[22].

Each decision, in the biomedical field, is preceded by a phase of “un-decision”[23], during which all the aspects of the reality under consideration are evaluated: clinical, psychological, ethical aspects. It is specifically the ethical dimension that guarantees the human quality of the decision itself, thereby showing that it is not solely a technical evaluation that is needed.

Ethics consultation[24] provides the forum to analyze the “why” of a choice: the status of the conceived, the implications of recourse to the ARTs for the couple, family and society; the meaning of
human generation; the possibility of experiencing fecundity in sterility. Among these “whys”, the question of the meaning of human generation deserves priority attention: in fact, the response to this question will provide the key to answering the other questions.

What are the characteristics of the generative act that would be substituted with the ARTs? It is not a vegetative activity, like digestion or respiration; it is not solely a biological act; it is not merely an addition of gametes. It is an act that, beginning with one person, involves the other person in its totality and reciprocity: and it is in the context of this relationship, in this communion and union of body and soul, in this embrace of love, that the generation of a new human life can be realized. From the gifts of the persons springs forth the gift of life: a gift that transcends and transfigures the biological fact, also present[25]. An act that requires a great responsibility: the responsibility of the choices in the awareness of the consequences; the responsibility of accepting the consequences of these choices. Can such an act be reduced to a simple succession of technical interventions?

The ARTs - both in the intra-corporeal and extra-corporeal forms - substitute the conjugal act in the generation of new life, thereby causing a division between the union of the spouses and the possibility to procreate. Far from being the result of a direct and immediate conjugal union, the new life becomes the product of a technical procedure that can also be perfect from the scientific point of view but remains, in any case, impersonal[26]. It is not the parents that give life to the child but a doctor or biologist: not an accidental, but a determined presence. The role of the spouses is limited to a cold and impersonal production of gametes: with masturbation for the man; collection of the oocytes by means of laparoscopy or under ultrasound control for the woman.

The artificiality and unnaturalness of the ARTs is found in this substitution: not from the biological element, but that which is specified to be human generation. “Artificiality” is not, therefore, equivalent to the use of technology: for it can be used permissively in many fields of medicine and, thus, also in case of sterility. Recourse is made to technology, to artificiality, in the stimulation of ovulation and in microsurgical interventions, but this with the aim of restoring functionality to an organ necessary for procreation that would be impossible otherwise. Furthermore, collection sperm during the conjugal act with a perforated condom (Semen Collection Device)[27] or from the depths of the vagina to then introduce it in the female reproductive tract, are done by recourse to technology, to artificiality: however, the intervention of the doctor is successive to the conjugal act already confirmed. This situation represents a form of help, assistance to the conjugal act.

On the other hand, artificiality assumes a negative connotation when it cancels that which is specific to generative act, as is the case with recourse to in vitro fertilization (IVF) or micromanipulations of gametes or insemination with sperms collected outside the conjugal act.

GIFT (Gamete Intra-fallopian Transfer) is also proposed as one of the forms of assistance available to the conjugal act with the collection of sperm during the conjugal act: is this technique really a form of help? The debate is still open and the evaluative approaches have been varied: it appeals to the temporo-spatial criteria (the time and route necessary in order for the spermatozoa and oocytes to re-enter the fallopian tube and begin fertilization) or to unique and direct causality. The morality of an act, however, cannot be measured in centimetres or minutes, or in relation to a causality/concausality whose evaluation could be, among other things, arbitrary.

Once more, the central question is then: what is the meaning of human generation? And again, is the specificity of the generative act respected by a technology that requires sperm collection during the conjugal act and of oocytes by use of laparoscopy, in order that both can be transferred into the fallopian tube? Or should we rather say that, from the moment the technical intervention is predominant in respect to the presence of the spouses and procreation, even though it follows the conjugal act, it is dichotomised from union of persons, that is, GIFT is a form of negative artificiality?
Ethics Consultation with a Sterile Couple: An Experience

Recognition of the need to understand the ethical aspects of the consultation provided to a sterile couple led to an attempt to have an organized study of some sterile couples at the Institute of Bioethics of the Medical School of the Catholic University of the Sacred Heart in Rome. We shall now present the data obtained in the period January 2000 – June 2003.

a. Subjects. Fortycouples requested ethics consultation. The couples’ median age at the time of ethics consultation was 42,5 years (range 30-35 years). Thirty-seven couples were in search of their first pregnancies. The couples had already begun a diagnostic course with a women’s complete study but men’s insufficient male study. Thirty couples were very anxious in their search for a child; ten appeared to have accepted their situation, even though they continued their search for solution to their sterility. Twenty-five couples were not satisfied with their former consultation experiences because of the lack of information and consensus about the diagnostic procedures and the possible interventions. In fifteen cases the doctor had guaranteed a solution without giving any explanation. The couples requested ethics consultation for the following reasons: 1. search for a holistic approach to the couple's sterility (40/40 couples); 2. desire to receive explanations, and elaborate perplexities and fears (40/40 couples); 3. deepening of knowledge on sterility and on possible interventions (30/40 couples); 4. dissatisfaction with past ARTs experiences (20/40 couples); 5. disagreement between the spouses with regard to procreative choices (2/40 couples); 6. necessity to reflect on one’s ethical position (40/40 couples).

b. Procedures. Three different approaches are possible in the course of an ethics consultation: the authoritarian approach; the pure facilitation approach; the ethics facilitation approach[28]. The authoritarian approach gives emphasis on consultant as the primary moral decision maker at the expense of the appropriate moral decision maker. This approach places the personal moral values of the ethics consultant over those of the other patients in the case. The goal of the pure facilitation approach is to forgo consensus among involved parties, even if the patient’s right to choice is violated. The ethics facilitation approach helps to identify and analyze the nature of the value uncertainty, without misplacing moral decision-making authority or acceding to the personal moral view of the consultant. In the ethics facilitation approach, the goals of consultation are: 1. to identify and analyze the nature of the value uncertainty or conflict that underlies the consultation; 2. to facilitate resolution of conflicts in a respectful atmosphere with attention to the interests, rights and responsibilities of those involved. In accord with the ethics facilitation approach and only after the clarification of the ethical view, the following aspects have been taken into consideration in ethics consultation management: 1. an approach to sterility that is not solely technical but pays attention to the whole person and all the people involved; 2. help offered to the couple in the management of their emotions during the decisional process; 3. evaluation of all the relevant aspects for an autonomous and informed choice by the couple; 4. definition, clarification and sharing of the linguistic and symbolic terms used; 5. identification of the relevant ethical principles involved; 6. evaluation of the different alternatives with discussion and rational justification of the choice retained as more ethically acceptable.

To this end the consultant must know all the available clinical data (epistemological moment), to individualize the emergent problem and to analyze the values under consideration, the couple’s wishes, human and material resources (anthropological moment), to join the couple in searching for an eventual solution (operative moment).

c. Results Except for a few cases where consultation was done by telephone, meeting with the couple took place at the Institute of Bioethics, on the basis of fixed appointment with the particular couple even in the case where others made the initial request. The first phase of the consultation was narrative. The couple spoke of their previous diagnostic and therapeutic experiences and of their future expectations: the desire to have a child, the suffering caused by sterility; the effect of this situation on the relationship; the anxiety produced as a result of pressures from their families; the fear of not finding
a solution. This narration made it possible for the consultant to precisely determine a series of factors to manage:

* the “frustration” factor. The sterile couple lives an experience of inadequacy and frustration. The women are usually the first to accept that fertility is a problem that should be talked about and investigated. And in fact, the woman was usually more studied than the man. On the other hand, it is difficult for the man to admit the existence of a problem for the couple and accept a clinical study. If the diagnostic investigations produce results that indicate that the cause of sterility is masculine, the man lives this situation negatively, with a feeling of loss of his role. The meeting and the narration were showing, in fact, that in 5/20 (25%) cases of sterility, the man was losing his “voice” during the consultation and was consequently considered guilty by the woman;

* the “medical” factor. The presentation of the preceding diagnostic course also formed part of the narration. In 20/30 (57%) cases the investigations undertaken were incomplete and without any diagnostic gradualness: for example, invasive procedures were performed on the woman (hysterosalpingography) even before excluding by means of non-invasive investigations the presence of other causes of sterility. These led the couple to consult other experts, resulting in an overlapping of studies, interpretations and therapeutic interventions. In 10/30 (28.5%) cases, the ARTs were suggested before the completion of the diagnostic procedures and the evaluation of possible pharmacological or surgical interventions;

* the “ignorance” factor. The couples showed two kinds of “ignorance”: a primary ignorance and a secondary ignorance. The former [25/35 couples (71%)] concerned, in the first place, knowledge of anatomy and physiology of reproduction on one hand, and of the ARTs, on the other. Regarding the physiology of reproduction, specifically, there was lack of clarity on alternation between the fertile and infertile periods in the woman and on the possibility of recognizing the fertile periods through a survey of the diagnostic signs of fertility (cervical mucus, basal temperature). This knowledge is necessary especially in cases of subfertility, since a determination of the fertile phase would allow the couple to have sexual intercourse aimed at conception. In addition, ultrasound monitoring of ovulation that is requested for diagnostic reasons, does not allow the couple the possibility of freely and simply managing their knowledge of their fertility, even where this knowledge is limited. Further, almost total is the ignorance regarding ARTs: the couple does not know the techniques, the associated risks and their success rates. The secondary ignorance [15/35 couples (42.8%)] was, instead, a consequence of scarce or wrong information by the expert on the post-diagnostic interventions. Five couples (14.2%) lamented not having received the information they requested regarding the intervention that were proposed to them: what does an ICSI consist of? What is the difference between GIFT and FIVET? In one instance a couple was deluded with the promise of a homologous artificial insemination even though the man was affected by secretory azoospermia documented by a testicular biopsy;

* the “ethics” factor. The ethical question was always under consideration (35/35 couples): the couples were interested in comparing their ethical beliefs with those of the consultant and to know the ethical implications both of the diagnostic procedures, the therapeutic treatments and the ARTs, that are available in other centres. They were, however, three cases that proved difficult to manage. In the first case, the spouses did not have the same ethical beliefs and were, therefore, in disagreement regarding how to confront the sterility: the spouse who was refusing recourse to the ARTs opposed the other spouse who seemed to be imposing the choice of ARTs. In these cases, it became necessary to determine whether to conduct part of the consultation separately, listen to their arguments in order to try and find, in an opportune time a solution they both share. In the other two cases the search for a child was compensatory and informed by a desire to compensate an accidental loss of a child or following a voluntary abortion of another child. In the course of the consultation the lack of elaboration of mourning was evident.

After listening to the positions and collecting the application, the consultation moved to the second phase of ethics consultation: dialogue between the consultant and the couple. Without allowing himself
to be emotionally involved with the couple, the consultant tried to manage the obvious situation of
tension, expressing his readiness to accompany them and facilitate the solution of the conflict
situations. It was necessary to respond to the clarifications requested and fill the gaps in their technical
knowledge; the ethical, psychological and social implications of recourse to the ARTs were examined;
effort was made to re-awaken in the couple the awareness that they are the protagonists in the search
for a solution for sterility and not simply “providers” of gametes. Finally, the couple was invited to
return for consultation or, nevertheless, to contact the consultant again even by telephone in case of any
doubts or uncertainties. Twenty-five couples out of thirty-five remained in contact with the consultant,
to inform him about the results of the diagnostic investigations, decisions regarding the couple’s
project, successes obtained, possible disappointments; they were confident that they will always find in
the consultant a person willing and available to listen and not one overwhelmed by mere technical
concerns.

Operative Indications

The data obtained are helpful in making some conclusions regarding the centrality of information and
the need to offer an inter-disciplinary consultation to sterile couples.
The first factor that the consultation must seek to remove is the “ignorance” factor. Unless one is
knowledgeable, he will not be able to make a responsible choice. In the case of sterility and the relative
treatments, the information must be particularly accurate firstly because of the impact the diagnostic
and therapeutic procedures have on the person, on the life of the couple and the unborn. Secondly,
accurate information is important in the case where the option is for the ARTs to throw light on their
experimental content.

* Communication of the diagnosis. From a study undertaken by Van Balen et al., it is revealed that
in 38% of the cases the couples misunderstood the results of the diagnosis[29], either because –
according to the authors – the diagnosis is modified in the course of time and is not adequately
communicated, or the language used is not comprehensible. As a result of this it is necessary that the
consultant has not only the intention of informing the couple – something that is not always the
operative in cases of samples taken for testing purposes –, but he should also verify that the couple has
understood that which they have been told. The information must also include the nature of the
diagnostic course that is going to be effected: the choice of a process of diagnosis rather than another;
the possible disadvantages for the couple or for the single partner; the possibility of alternative
diagnostic procedures, if those being considered contrast with the ethical beliefs and psychological
sensibility of the couple. An example, in this context, would be the collection of sperm for diagnostic
ends with Viricare[30];

* the choice of medical therapies. Information is also essential for obtaining consent for
the pharmacological or surgical treatments. Particular reference is made to the choice of ovarian
stimulation[31], for which the woman is told about the possible risks (including: ovarian hyper-
stimulation syndrome; increase of embryonic chromosomal alterations; an unclear relationship between
ovarian stimulation and insurgence of mammary or ovarian tumours; multiple pregnancies). On the other
hand, in the choice of a therapy all possible risks are evaluated in the light of expected benefits, and the
iatrogenic morbidity is to be greatly considered, above all when a treatment does not have an
immediate benefit for the physical health of the woman and the damage can be induced by physicians’
malpractice[32]. For this reason, the physician must do all he can to minimize risk, and also avoid
stimulating women who belong to groups at risk, and the woman must be left free to choose whether to
undergo treatment or not, with the awareness that when the stimulation of the ovary is indicated in the
artificial insemination protocols, it is aimed at increasing the success of the technology in relation to
the various attempts made;

* the ARTs. The ethical and juridical difficulties arising from recourse to the ARTs apart, it would at
least be desirable that the couple be well informed about the procedures, which they eventually wish to undergo. Also, where these procedures are utilized, a written consent is required. The need for exhaustive information derives, also, from the fact that the ARTs are always in experimental phases[33]. This means that, like any other form of experimentation, the subject of experimentation must be adequately informed about the procedures, possible benefits and risks for the woman and the possible unborn child. On the other hand, the couple are two adult subjects capable of taking decisions; so, any paternalistic behaviour on the part of the doctor is unjustified. Surely, doubt remains regarding the actual capacity of the couple to choose, given their emotional involvement with the entire process, and of the physician objectivity to help them decide, given the fact of possible economic gains and experimental goals. It is important not to obscure the fact that the interlocutor is the couple and not the single patient: it is possible that the two partners do not share a common position and that one of them does not consent to the procedure. Is it then sensible to impose on one, the choice of the other? And if the one refusing is the one who will bear the greater burden of the choice (it is thought that it is the woman who “pays” more in terms of the physical commitments involved in the programmes of ARTs), to what extent is it permissible to involve her in a choice that she does not share. Finally, it should be kept in mind that an ART leads to the birth of a child that was non-existent at the moment the decision was taken and who could have refused the procedure, particularly if the procedure becomes the cause of anomalies. An anti-thesis to this position could be that many children would not be born without recourse to the ARTs, but it is also true that many fertilized embryos in vitro did not achieve autonomous lives and, moreover, it is impossible to talk of choice between existing and non-existing when that existence has not yet began.

Conclusion

Consultation provided to a sterile couple is, therefore, a moment of meeting, listening and searching – where it is possible – for a solution that must be part of an inter-disciplinary effort. The relationship with the sterile couple, in fact, does not finish with the diagnosis of sterility: this is the point of departure for a journey in which patience and impatience, hope and desperation alternate; a journey, in the course of which the couple can also crash with the failure of the treatments. And because the search for pregnancy begins and is justified in the light of the value of man, procreation and family and hence primarily for ethical reasons, the ethics consultation assumes an important function both as the moment of integration of the different and indispensable competencies, and as a way of helping the couples -with sterility untreatable with pharmacological, surgical and psychological treatments or with assistance to the conjugal act - to find other ways of living their legitimate desires for parenthood, by rediscovering fecundity in conjugality[34].

[26] Sgreccia E., La fecondazione artificiale di fronte all'etica, Medicina e Morale 1993, 1: 183-204.
[29] van Balen, Trimbos-Kemper, Verdurmen, Perception of diagnosis and openness of patients...
[34] Cesari G., La fecondità nella sterilità, Medicina e Morale 1993, 1: 283-291.
Tubal factor infertility accounts for approximately 40% of cases of female infertility. Identifiable causes of tubal infertility are post-infectious tubal damage, endometriosis–related adhesions and post-surgical adhesion formation.

The normal process of capitation and fecundation of the oocyte requires a series of prerequisites: the ovariansurface free from adhesions, the fimbrial-ampullary portion of the tube free to embrace the ovary and, besides tubal patency, a normal activity of the ciliated and secretory cells of the tubal mucosa. Furthermore, the muscular layer of the tube must be undamaged and able to contract.

In recent years the treatment of tubal infertility has witnessed a shift from microsurgery to in vitro fertilization–embryo transfer techniques (IVF-ET). Due to the wider availability of assisted reproductive technologies, the number of women with mechanical infertility treated by tubal reconstructive surgery has decreased, most couples being referred to IVF-ET. According to the American Society for Reproductive Medicine / Society for Assisted Reproductive Technology Registry published in 1999, the percentage of term pregnancy per ovum pick-up in women without concomitant male factor is 31.2% in women under 35 years of age and 24.8% in women between 35 and 39 years of age[1].

The United States IVF-ET registry does not report the cumulative pregnancy rate. In a recent paper Sharma et al. reported a cumulative live birth rate of 66% following four cycles of IVF-ET[2]. Overall, 36% of patients continued treatment after the first attempt. The dropout rate was 64% in the second attempt and 61% in the third attempt.

It is important to underline that IVF-ET is a “palliative” technique, which means that it does not eliminate the problem but bypasses it.

Reproductive surgery is performed with the aim of allowing ovum pick-up by restoring normal anatomic relationship between the fimbriae and the ovary. However, even though reproductive surgery may be successful in restoring normal anatomy, it may not be able to restore normal function of the tubal mucosa.

The percentages of success of the surgical treatment are therefore strictly correlated to the type of tubal lesion besides the surgical technique performed.

Recent refinements of laparoscopic instrumentation and technique allow laparotomy (incision of the abdomen) to be avoided for tubal reconstructive surgery in most instances.

The advent of salpingoscopy, a new endoscopic technique that allows direct evaluation of the tubal mucosa, has allowed improved selection of patients who are candidates for tubal surgery by identifying the patients with good reproductive prognosis.

A diagnostic laparoscopy with salpingoscopy should always be the first step in case of tubal infertility. The procedure will continue with operative laparoscopy only in presence of a normal mucosa.

The following is an analysis of the various types of surgical procedures according to the level and kind of tubal pathology.

Proximal tubal occlusion
Lack of passage of the contrast medium at the level of the intramural-isthmic portion of the tube during an hysterosalpingography or a laparoscopy with chromopertubation may be due to a true occlusion consequent to post-infectious fibrosis or to an obstruction due to technical artefacts, a spasm of the uterine tubal ostium, a valve mechanism produced by an area of endometrial focal hyperplasia or to plugs of amorphous material.
This is a relatively infrequent finding. In 1992, we reported that out of 665 patients undergoing laparoscopy with chromopertubation for primary or secondary infertility, in only 35 patients (5%) a bilateral proximal occlusion confirming a diagnosis of a previous hysterosalpingography was found[3]. Of these patients, 17 refused any further therapy. After a mean follow-up of 25 months, 3 (18%) of these patients spontaneously conceived an intrauterine pregnancy; 4 out of 5 patients who underwent a repeated hysterosalpingography had bilateral tubal pathency. Therefore, the diagnosis of bilateral tubal occlusion proved to be incorrect in 7 out of 17 patients.
The surgical treatment of proximal tubal occlusion necessitates a laparotomy, the use of an operating microscope for a precise surgical approximation of the tissues, microsurgical instruments and sutures of calibre 8-0 or 9-0.
Following microsurgical tubo-cornual anastomosis, an intrauterine pregnancy rate of 50 – 60% has been reported in the literature.[4]

Reversal of tubal sterilization
Tubal sterilization is one of the most used contraceptive methods around the world. It has been reported that about 1% of the patients undergoing this procedure subsequently request a reversal of tubal sterilization. The standard procedure for reversal of tubal sterilization is microsurgical tubal anastomosis by laparotomy.
The term pregnancy rate reported in the literature after this procedure is greater than 80%.[5] Advances in technology and in particular recent improvements in laparoscopic microsurgical instrumentation allows us today to perform this procedure by laparoscopy with the same precision obtained at laparotomy.
Laparoscopic microsurgery, however, demands a higher degree of technical skills. The surgeon needs to have extensive experience in both microsurgical and laparoscopic procedures. Following laparoscopic microsurgical tubal anastomosis an intrauterine pregnancy rate of 83% (154/186) has been reported[6].

Periadnexial adhesions
In case of periadnexal adhesions, the classic open-abdomen surgery has been completely substituted by laparoscopic surgery, obtaining the same results in terms of reproductive outcome with all the advantages of the laparoscopic approach (minor post-operative pain, shorter hospital stay, decreased risk of post-operative infections, quicker return to work).
Recent prospective studies have demonstrated that the most important prognostic factor in terms of reproductive outcome after reproductive surgery is the status of the tubal mucosa as evaluated by salpingoscopy[7].
For salpingoscopy, a 2.8 mm rigid salpingoscope that allows a detailed vision of the tubal ampullary mucosa is used. The salpingoscope is introduced into the abdominal cavity through the operating channel of the laparoscope. The peritoneal ostium of the tube is identified and cannulated, and the tubal mucosa is evaluated. At the ampullary level four or five major folds are noted, with minor folds interspersed between them.
The status of the tubal mucosa is classified according to the classification proposed by Brosens as follows:
* Grade I: normal mucosal folds are seen
* Grade II: the major folds are separated and flattened but otherwise normal (might be considered a grade I tube distended by increased intraluminal hydrostatic pressure)
* Grade III: focal adhesions are seen between the mucosal folds
* Grade IV: extensive adhesions are present between the mucosal folds and/or disseminated flat areas are noticed
* Grade V: there is a complete loss of the mucosal fold pattern
Grades I and II identify a normal mucosa. Grades III to V identify a tubal mucosa damaged by a prior pelvic inflammatory infectious disease. The intrauterine pregnancy rate reported in the literature after microsurgery by laparotomy or operative laparoscopy in non-selected patients is approximately 50%. The advent of salpingoscopy allows the identification of the patients with normal tubal mucosa who then undergo laparoscopic salpingo-ovariolysis, resulting in a term pregnancy rate of 70%. It is to be stressed that there is no correlation between periadnexal adhesions and intraluminal damage. Data from Brosens and Marana indicate that about 80% of patients with periadnexal adhesions have a normal tubal mucosa. In conclusion, 80% of the patients with periadnexal adhesions have a normal tubal mucosa and therefore a 70% chance of a term pregnancy after a laparoscopic salpingo-ovariolysis. Most of the pregnancies occur within one year from surgery. In the presence of periadnexal adhesions, the first step should be a diagnostic laparoscopy with salpingoscopy in order to identify the patients with a normal tubal mucosa in whom laparoscopy would continue with salpingo-ovariolysis.[8] The patients with damaged tubal mucosa will not benefit from surgical correction.

Distal tubal occlusion
In the presence of distal tubal occlusion, the classic procedure of microsurgical salpingoneostomy by laparotomy is no longer performed since the pregnancy rate (about 25%) of non selected patients is presently inferior to the one obtained by IVF-ET. Laparoscopic salpingoneostomy offers the same pregnancy rate but with a less invasive technique. Several classifications have been proposed in order to identify the patients that may most benefit from tubal reproductive surgery. Various parameters are considered such as, the type and extension of periadnexal adhesions, the degree of tubal occlusion, and the status of the tubal mucosa. In 1988, the American Fertility Society proposed a scoring system in order to allow the comparison of results obtained from different Authors. It is based on the following parameters: type and extension of the adhesion and, in addition, for the classification of distal tubal occlusion, thickness and rigidity of the tubal wall, distal ampullary diameter, and the percentage of mucosal folds preserved at the neostomy site. The importance of intraoperative salpingoscopy to visualise the entire length of the ampullary mucosa as an important prognostic parameter was recognized. However, salpingoscopic findings were not included in the scoring system as salpingoscopy was being practiced in very few centers. Numerous prospective studies have lately demonstrated that even in the case of hydrosalpinx, the most important prognostic factor is represented by the status of the tubal mucosa. It is therefore of utmost importance the identification of the patients with normal tubal mucosa by means of salpingoscopy. In fact, recent prospective studies have demonstrated that patients with normal mucosa (Grades I and II) will have a term pregnancy rate of 65% after salpingoneostomy. Studies of Brosens and Marana have demonstrated that in case of hydrosalpinx the percentage of patients with normal tubal mucosa is 35-45%. In conclusion, 35-45% of the patients with hydrosalpinx have a normal tubal mucosa, and therefore a 65% chance of a term pregnancy after a laparoscopic salpingoneostomy. Most of the pregnancies occur within 15 months from surgery. Therefore, when an hydrosalpinx is present, the correct approach should be a diagnostic laparoscopy with salpingoscopy. A salpingoneostomy will be performed in the patients with normal tubal mucosa [9]. In the patients with damaged tubal mucosa, the laparoscopy will be limited to the diagnostic step.
SURGICAL TREATMENT OF ENDOMETRIOSIS ASSOCIATED INFERTILITY

Introduction
Endometriosis is defined as the presence of endometrial glands and stroma outside the endometrial cavity. Endometriosis is associated with a decrease of the reproductive potential of women. In addition, it may cause pain symptoms such as dysmenorrhea, dyspareunia, chronic pelvic pain.

Incidence – Prevalence
Actual incidence of endometriosis is poorly defined, as the correct diagnosis implies histologic verification. In clinical practice, diagnosis is made frequently by visual inspection of the peritoneal surface via laparoscopy. It is an invasive technique; therefore, asymptomatic patients with endometriosis are not identified.
Using women seeking tubal ligation as a control group, prevalence rates for endometriosis were found in two studies to range from 2% to 18%.
The prevalence of infertility in patients with endometriosis ranges from 30% to 40%.[10]
The prevalence of endometriosis in infertile patients ranges from 20% to 25%.

Classification
The classification system presently used is the revised American Fertility Society classification[11]. This classification identifies four stages, giving scores according to the site, type and extension of the endometriotic lesions and adhesions.

Infertility
There are many mechanisms by which endometriosis may exert an adverse effect on fertility.
In the minimal and mild stages, the reproductive capacity of women is altered by mechanisms not yet fully understood. Reporting on these mechanisms goes beyond the purpose of this chapter.
In the moderate and severe stage of the disease, female fertility is decreased mostly for mechanical reasons. Olive[12] has reported that with expectant management the pregnancy rate is 21% in the moderate stage and 0% in the severe stage of endometriosis.

Surgery for endometriosis associated infertility - Stages III-IV
Surgery is the appropriate management of moderate and severe stages of endometriosis. In fact, endometriotic cysts greater than 1 cm in diameter respond poorly to medical treatment. Furthermore, medical treatment is ineffective on adhesions[13].
In recent years, operative laparoscopy has surpassed laparotomy as the treatment of choice.
Several studies have in fact demonstrated that the pregnancy rate after operative laparoscopy for moderate and severe endometriosis are the same as the one obtained by laparotomy, with all the added advantages of the laparoscopic technique[14].
The aim of surgery is the treatment of all visible endometriotic implants, resection of the adhesions and restoration of the normal anatomic relationship between the fimbriae and the ovary.
In a recent study we demonstrated that following laparoscopic treatment of infertility associated with moderate and severe endometriosis, the pregnancy rate is 55%, in agreement with the results reported in the international literature[15].
ALDO ISIDORI

PREVENTION OF MALE INFERTILITY

Couple sterility is a phenomenon unfortunately on the increase, in Italy alone affecting around 50,000 couples per year. In this condition the male “factor” or “responsibility” is calculated as about 40-45%, i.e. equal to the female factor. This is surprising, if it is considered that until twenty years ago its prevalence was calculated as about 20%. Its increase is due to two factors. The first is a social-statistical element: male infertility, once hidden or denied as shameful (in part due to its erroneous association with impotence), and thus not investigated, is today recognised as a well defined clinical condition, and a seminological examination of the male partner is one of the first investigations performed in sterile couples. In the past, such an examination, if performed at all, was done so only after repeated, costly and invasive examinations of the female partner. This cultural improvement has led to the “discovery” of cases of male infertility which would previously have been ignored. In addition, the more sophisticated investigative methods (today seminology is a science in its own right) have increased the number of recognisable andrological pathologies. On the other hand, the lack of information and ability to prevent these pathologies has greatly increased their impact. Moreover, in addition to this, another, more important factor has arisen: the exponential increase in elements having a negative influence on the male reproductive apparatus. These can be generally avoided by opportune prevention.

There are many different main causes of male sterility. In fact, due to its functional and anatomic complexity, the male reproductive apparatus is more vulnerable than that of the female to the influence of negative factors. These can be classified as:

a) CONGENITAL: chromosome and/or genetic errors; malformations

b) ACQUIRED: infective; traumatic; hormonal; anatomical: cryptorchidism; varicocele;
environmental and occupational

Environmental and occupational causes represent new “enemies” for male fertility. It is not a coincidence that the increase in cases of male sterility has occurred above all in industrialised Countries. Among the main substances detrimental to spermatogenesis, the following can be included:

“Anthropic” or environmental toxins, detrimental to the male reproductive apparatus: they are capable of acting both on the hypothalamus – pituitary gland – testicular hormonal systems and directly with toxic effects on germ cells; Pesticides, PCB and dioxins, heavy metals (lead, cadmium, mercury, oestrogens present in meat, fruit, milk and derivatives, water etc as well as in the air).

Pharmaceutical products; Legal drugs(tobacco, alcohol); Substances of abuse; Hormones (oestrogens).

Finally, the high percentage of andrological pathologies in various occupational categories should be considered. In this area both stress and toxic factors related to the work typology play a part: (tab. 3)

<table>
<thead>
<tr>
<th>Professionals</th>
<th>17.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural workers</td>
<td>2.4%</td>
</tr>
<tr>
<td>Miners</td>
<td>8.0%</td>
</tr>
<tr>
<td>Industrial workers</td>
<td>5.3%</td>
</tr>
<tr>
<td>Construction workers</td>
<td>9.8%</td>
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<tr>
<td>Transport workers</td>
<td>11.3%</td>
</tr>
<tr>
<td>Shop workers</td>
<td>9.2%</td>
</tr>
<tr>
<td>Serviceworkers</td>
<td>2.7%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2.8%</td>
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</table>
It is also thought that many of the causes listed, as well as provoking couple infertility, may lead to faulty or uncritical assisted reproduction procedures (ART), or worse, to foetal malformations, with obvious and heavy personal, psychological, economic and social impact. Such procedures are too often used due to ignorance on prevention or lack of faith in the possibilities of treatment of male infertility. Apart from congenital defects, the impact of all forms could be drastically reduced or even eliminated with a knowledgeable policy of prevention. This must start from the earliest age, even from birth: in fact, many causes of infertility occur in the years from early infancy to adolescence when, if discovered, they may be corrected. The detrimental effects of such conditions are however often irreversible by the time the subject reaches adulthood.

Andrological prevention strategies should be applied at both a medical-health and educational level, with different aspects for different ages.

1) medical-health level: pathologies of conditions which may lead to infertility: at birth: genital malformations and cryptorchidism; in adolescence: cryptorchidism, varicocele, late puberty, urological infections, viral infections (e.g. parotitis); young adulthood: varicocele, sexually transmitted diseases, exposure to environmental toxins, use of legal and illicit drugs, sexual behavioural disorders, lifestyle.

2) educational level: deep foundation in andrological prevention and information for the family, doctor (paediatrician, G.P., school doctor, sports doctor, etc) and individual. Information in this area is particularly lacking: in fact, male subjects rarely have their reproductive system medically examined, with the possibly ensuing permanent damages.

As well as physical observation of their sons, parents, together with educators, should instruct them in moral and hygienic rules, watching over their behaviour and instructing them in the fundamental ethical aspects of the sexuality, on sanctity and dignity of their body and on the social and moral value of pre-matrimonial chastity. A very relevant factor in sterility of the adult is in fact the precocious, promiscuous and disordered use of sexuality when young. Parents, together with their doctor, should also inform their children of the harmful effects of legal drugs (cigarettes, alcohol) and illicit substances, unfortunately even in early adolescence.

The “fault” of the medical culture, in this area, is very relevant. Actually, due to ignorance, a doctor – unless expressly requested to do so – will rarely examine a boy’s reproductive apparatus at various ages. In this way pathologies already present or situations of potential risk, which as stated above could be corrected if identified in time, are simply not observed. An example is the importance of the anti-parotitis vaccination.

The first and only check is almost always that of the medical examination at call-up, that is at 18 years: this is often too late. This “filter”, by the way, is about to be abolished in Italy.

As well as physical aspects, the doctor, with great tact and full respect for the innate modesty of youth, should instruct the “patient” in moral and hygienic aspects of sexual life, indicating the dangers of disorderly practices (masturbation, coitus interruptus, abuses, etc) above all detrimental not only to health and morality but also to individual dignity. The youth should also be advised of the merits of a healthy lifestyle.

The wise prevention of causes of male infertility – and their possible correction once identified – as well as being implanted in a dutiful medical code of practice, would allow a significant reduction in uncritical and indiscriminate recourse to assisted reproduction procedures, with their negative ethical, clinical and public resources impacts.

In harmony with the words of the Holy Father (Donum Vitae): “many researchers are committed to the battle against sterility, with full protection of the dignity of human procreation; some have reached results which once seemed unimaginable. Men of science must be encouraged to proceed in their research with the aim of preventing causes of sterility and remedying them, so that sterile couples may succeed in procreating with respect for their personal dignity and that of their child”.

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* ISIDORI A. La sterilità maschile Arch. Med. Mutual. LXXV, INAM Ed. Roma, 1974
FEMALE INFERTILITY PREVENTION

In the last decades we have assisted to a profound modification of the female image and identity, due to the new role and engagement of the woman in the society. The increasing fields of activities have led the woman to a deep change in her behaviours and attitudes. Moreover it has to be considered the importance of some new environmental agents which may affect the reproductive performance of the women in the industrialised society. The effects seem to be really evident if we consider the steroid hormones, antitumoral substances, metals and oligoelements (critical is the presence of ions in the uterine cavity) and a lot of other chemicals such as pesticides, preservatives additives and drugs that can alter the reproductive capacity of the women.

Environmental chemicals may alter female reproduction through direct or indirect mechanism. Direct effects usually occur if an environmental chemical is structurally similar to an endogenous molecule and capable of entering reproductive organs. The chemical may alter normal cellular progresses such as differentiation, mitosis, meiosis, programmed cell death, migration, intracellular communication, DNA repair., or mitochondrial function. For example, chemicals that interfere with mitochondria, function may cause growth retardation due to a deficiency of energy available for cellular growth. Indirect effects may occur if a chemical requires metabolic conversion within the body before it is capable of exerting a toxic effect. For example, phytoestrogens are not toxic until they are bioactivated in the gastrointestinal tract or liver.

Principal chemicals that can alter women fertility are: endocrine disruptors, heavy metals, solvents, pesticides, smoke and a lot of other industrial chemicals. Endocrine disruptors are exogenous chemicals that often mimic hormones. Block hormonal action or trigger inappropriate hormone activity. Chemicals with known estrogenic or androgenic properties include some pesticides, phytoestrogens, phthalates and some industrial waste products. Several studies indicate that exposure to estrogenic or androgenic pesticides leads to reduced infertility, abnormal sexual development or hemaphroditism in some invertebrate, fish, reptilian and mammalian species. Moreover the exposure to estrogenic pesticides is linked to alterations in reproduction in women such as precocious puberty and early menopause. Classic examples of endocrine disruptors are DDT, Diethylstilbestrol and phthalates. These chemicals are used in the manufacturing of plastic products, and can adversely affect reproductive function in laboratory animals, causing spontaneous abortions, inducing birth defects, prolonging estrous cycle, suppressing or delaying ovulation, reducing the size of the preovulatory follicle. Other endocrine disruptors are phytoestrogens, even if several studies on animal models have shown that high phytoestrogen exposure results in persistent estrus and precocious puberty, alters uterine growth, inhibits ovulation, blocks implantation, induces oocyte degeneration and altered pituitary hormone levels, the phytoestrogen effects on women are not well established. Several studies indicate that these chemicals are beneficial to women, due to a reduction of the risk of uterine and breast cancer, others studies show an adverse action linked to alterations in menstrual cyclicity and premature thelarche. Lead, mercury, cadmium and manganese exposure have been linked to adverse reproductive outcomes in humans. In the United States it is estimated that more than 42 million people are exposed excessively to lead through drinking water and that up to 52% of residential homes contain unacceptable levels of this metal. In laboratory animals lead suppresses FSH, affects gonadotropin receptor binding in the ovary and alters steroid metabolism. In women lead has been linked to an increased risk of spontaneous abortion, miscarriages, intrauterine fetal death or preterm delivery, menstrual irregularities and severe menstrual cramps. Moreover it has been shown that in rats the exposure to manganese reduces the number of ovarian follicles and causes persistent corpora lutea.
About the solvents, a recently case control study examined the link between occupational chemical exposure and risk of infertility: The relative risk were increased for women exposed to organic solvents, mainly due to ovulatory dysfunction. The principals solvents are perchloroethylene, toluene, xylene and styrene, that have been linked to adverse reproductive outcomes in laboratory animals and humans. Styrene exposure for example lengths the estrous cycle and induces embryonic death in rats and may interfere with menstrual cyclicity in women. A lot of pesticides may alter the reproductive function in women too. In rats, methoxychlor accelerates vaginal opening, induces abnormal estrous cyclicity, inhibits luteal function, blocks implantation. Kepone causes persistent vaginal estrus, anovulation and tonic levels of serum estradiol. The new role in our society have led women to acquire typical male behaviours, such as smoking, alcohol and coffee assumption, thus reducing their own reproductive capacity. Cigarette smoke contains more than 4000 chemical compounds, including 43 carcinogens or poisons and more than 300 polycyclic aromatic hydrocarbons. Among poisons, cigarette smoke also contains methyl isocianate, a substance responsible for killing 2000 people in India, accidentally released into the air in 1984. Moreover they also contain nicotine and its metabolites, that are known to cause vasoconstriction, reduce tissue oxygenation, and concentrate in reproductive tissue. In a study cotinine, a nicotine metabolite, was detected in blood, urine, saliva and follicular fluid in both active and passive smokers. Cadmium is also found in cigarette smoke. In humans cadmium accumulates in the ovaries of smokers and in follicular fluid of smokers undergoing IVF. In laboratory animals cadmium exposure produces an increased proportion of oocytes and embryos with chromosomal anomalies, and a block of the oocytes maturation at metaphase II. The effects of cigarette smoking on female reproduction are not well known. However several epidemiological studies have revealed a consistent and highly significant incidence of infertility or subfecundity among smokers compared with no-smokers. Several studies also indicate that smoking may alter the success rate of assisted reproductive technologies (ART). One recent study found that active smokers had a 50% reduction in implantation rate and ongoing pregnancy rate compared with no-smokers. Unfortunately only few data are available regarding potential mechanism by which smoking results in infertility, subfecundity and ART failure in women. In laboratory animals, chemicals in cigarette smoke increase the rate of follicular destruction, accelerate the loss of reproductive function, and alter meiotic maturation in oocytes. In human, several studies suggest that the mechanism also involved follicular depletion. It is well known in fact that smokers become menopausal 1-4 years earlier than aged-matched no-smokers. In fact smokers have high FSH levels indicator of diminished ovarian reserve, during fertile age. Another factor linked to the new women life style, that can alter women fertility, is also the increased assumption of alcohol. It is not yet well known the exact mechanism by which alcohol can have a detrimental effect on fertility, but in a recent Danish study of 2003 it has been shown a linkage between alcohol drinking and female reproductive capacity. This association has been found only for women over 30 years, with a relative risk of infertility of 2.26 comparing women consuming more than 7 drinks per week (12 g of ethanol per drink) to women consuming less that one drink per week. A high intake of alcohol has been associated with anovulation, altered levels of female hormones, and also with a high risk of fetal loss. It is however controversial whether a moderate alcohol intake has these adverse effects too. Another substance of everyday life that can cause female subfecundity is caffeine. In a multicenter European study it has been clearly shown that women assuming more than 500mg of caffeine per day had an increase in the time leading to the first pregnancy of 11%. A schematic approach to identify the main causes of female infertility focuses on the alteration of the normal ovarian function, on tube alteration and on all those cases unexplained infertility (sine causa infertility). The mechanism that rules the extraordinary and fragile hormonal and reproductive function of the women can be influenced by an multiple of external factors. The most frequent are metabolic, physic or
psychological stress events. Surely the stress perception is a subjective condition, but the relationship among individuals behaviour, external environment an hormonal production, with the temporary or lasting alteration of the reproductive function is identifiable in multiple daily situations. A typical example of psychic stress can be found in female athletes. Women have become increasingly physically active in the recent decades. While exercise provides substantial health benefits, rigorous physical activity is also associated with an unique set of risks for the woman. The female reproductive system is highly sensitive to physiological stress, and reproductive abnormalities (delayed menarche, primary and secondary amenorrhea, oligomenorrhea) occur in 6-79% of women engaged in athletic activity. Although specific hormonal profiles of athletes with reproductive irregularities may vary across athletic disciplines, exercise-associated reproductive abnormalities generally stem from dysfunction at the hypothalamic level. The incidence of inadequate luteal phase, anovulation and oligomenorrhea is considerably greater in athletes than in non athletes. The exact incidence of these abnormalities is unknown, as many eumenorrheic athletes are actually suffering hidden menstrual irregularities such as inadequate luteal phase or anovulatory cycles. A study of 1979 shows that only 50% of runners ovulated during a test month compared with 83% of controls. The hormonal profile of women engaged in sports which emphasise low weight, such as ballet, long distance running, gymnastics and figure skating is characterised by hypoestrogenism resulting from disruption of the hypothalamic-pituitary ovarian axis. Specifically suppression of hypogalamic pulsatile release of GnRH, which normally occurs every 60-90 min, limits pituitary secretion of LH and to a lesser extent of FSH, which in turn limits ovarian stimulation and estradiol production. Moreover a prolonged follicular phase or the absence of a critical LH or estradiol surge mid cycle, results in the mild or intermittent suppression of menstrual cycles observed in these athletes. Original hypotheses for reproductive dysfunction in these athletes emphasised body composition and effects of “exercise stress”. The body composition hypothesis suggests that menarche occurs in girls when body fat rises to 17% of body weight, and menstrual function is lost when body fat decreases to less than 22% of body weight. Although widely accepted, this hypothesis is based entirely on correlation rather than experimental evidence. In fact body composition does not very significantly between eumenorrheic and amenorrheic athletes. The suppression of reproductive function in women engaged in sports emphasising leanness may be a neuroendocrine adaptation to caloric deficit. Recent research suggests that leptin, a protein product of the obesity gene, which is secreted by the adipocytes may be a significant mediator of reproductive function. Leptin levels fluctuate in response to fat stores and energy availability: leptin levels positively correlate with body mass index in human and lower in the presence of fasting. Additionally, the diurnal rhythm of leptin concentration is suppressed in response to low energy intake. Several studies have shown that rodents without an active form of leptin tend to be amenorrheic and infertile, while other studies suggest chronic low leptin levels are common in amenorrheic women. Furthermore leptin receptors have been found on hypothalamic neurones involved in the control of the GnRH pulse generator. Hormonal reproductive profile of amenorrheic omen engaged in physical activities is very similar to that found in women affected by eating disorders like anorexia nervosa, a typical disease of adolescents and young girls. The intense desire of leanness in order to maintain a physical image closed to the stereotypes of our society along with a considerable reduction of BMI leads to an alteration of the hypothalamic-pituitary-adrenal axis, to the reduction of leptin levels and to the alteration of GnRH pulses; all these processes lead initially to oligomenorrhea, then to amenorrhea and finally to the complete loss of reproductive function. The age of onset may range form 8 years to the mid thirties, with peaks occurring between the ages of 13 and 14 years and between the age of 17 and 18 years. In Western cultures the prevalence of anorexia nervosa is estimated to be approximately 0.5% among young women, and almost 90 - 95% of patients with this disorder are female, white and middle to upper socioeconomic status. A previous study of the 1990has shown that a high percentage of women, going to a infertility centre, had an hidden eating disorder. Stewart and coll. showed that about 17% of
these patients were affected by an eating disorder and that 8% of them suffered from anorexia nervosa; however, taking into consideration only the women exhibiting chronic anovulation, the prevalence eating disorders raised up to 58%. A peculiarity of this study was represented by the evidence that none of the women with such disorders had divulged this problem to the infertility clinic; patients in fact often fail to volunteer information about eating disorders to their gynaecologist and may sometimes appear to be of normal weight. Fortunately the majority of these patients were able to conceive spontaneously after adopting a normal eating behaviour, reaching an ideal body weight. It should be underlined that this disease is not a modern ailment. There have been records of self-induced weight loss over the last few hundred years, with first modern account occurring in the late 19th century. It has probably become more prevalent due to the abundance of food and to the present cultural image of thinness and success being inseparable. During the active stage of anorexia nervosa, infertility is expected.

Mammalians shared their energy among 5 major metabolic activities: cellular maintenance, thermoregulation, locomotion, growth and reproduction, therefore suppression of reproductive function may be a mechanism which allow the body adapt to a chronic energy deficit. The following infertility is due to a combination of anovulation and a rejection of sexual activity; this may be due to their low self-esteem but may also be due to reduced libido resulting from low concentrations of circulating sex hormones. Resumption of gonadal function requires nutritional rehabilitation with weight gain: many studies have concluded that menstrual cyclicity may be restored on attaining 90% of the predicted weight for height, even if 13-30% of women, reaching this aim, remain anovulatory. Persistence of amenorrhea despite weight gain, may be related to continuation of abnormal eating practices and mainly to the duration of the disorder. Existence of an anxiety disorder has also been established to complicate the treatment of such patients. Psychosocial stress may underlie several cases of unexplained infertility. Evolutionary biologists have developed a model called “the reproductive filtering model”, which argues that the high cost of reproduction is naturally abolished when the likelihood of producing viable offspring is relatively low. Moreover, also obesity and excessive weight gain, associated with an overproduction of insulin, often in consequence of peripheral insulin resistance, may affect female reproduction capability. Insulin has mainly an anabolic function, allowing the storage of nutrients as fat tissue, but it is also responsible of an exaggerate production of androgens from the ovaries. Polycystic ovarian syndrome represents in this concern, a classic clinical syndrome in which such metabolic alterations are associated with ovarian functional disorders. PCOS ovary, site of the androgen hyperproduction, appears with an increased thickness of the external surface, producing in the long run a mechanical block of the ovulation. This syndrome, which is more and more frequent, is characterised by hyperandrogenism, subfertility and metabolic disorders. About 40-50% of women affected by PCOS is overweight or frankly obese and often show exaggerated insulin levels and reduced insulin mediated glucose metabolism. Nevertheless it is not well established if the augmented b-cellular activity is a genetic determined condition or it is caused by an imprinting exerted during the early years of life or, alternatively, by circulating factors. Androgens, b-endorphines, and free fatty acid are considered potential candidates in augmenting b-cell sensitivity to glucose. Androgen excess, in postnatal life, can promote the discharge of fatty acids from the visceral adipose tissue, while, on the other side, directly influencing b-cell activity, creating an imprinting towards an anabolic balance. The availability of high caloric foods could be an environmental factor determining the occurrence of obesity and secondary insulin resistance, that can be responsible for further stimulation of the b-cells. Both primary and secondary hyperinsulinism could maintain and worse the ovarian steroidogenic dysfunction, since insulin may have a LH-like activity. Anyway the persistence or the increase of obesity, then of insulin resistance, may progressively exhaust the endocrine pancreatic, with the appearance of glucose intolerance. On the other hand these patients spontaneously conceived at a more advanced age compared to controls, and once getting pregnant, these patients develop gestational
diabetes in a more frequently, as a consequence of a reduced pancreatic activity. Really important it seems to be the reduction on body weight. Most of these patients have a central distribution of adipose tissue and an increase of the waist / hip ratio. Amonerrhoeic women are those with a worst metabolic disorder (more insulin resistant, more obese). It has been suggested that the reduction of body weight in such population is linked to a resumption of the menstrual cyclicity. Indeed the reduction of 6-8% of the body weights associated with a reduction of LH, testosterone, insulin, and with the increase of SHBG and menstrual cyclicity. The treatment of PCOS with insulin sensitising drugs, like metformin, associated with life-style changes, could prevent the progression towards gestational diabetes and towards the disorder of the glucose metabolism of this syndrome. Even disorders of the opioid system, and hypothalamus-pituitary-adrenal axis disorders, could be linked to the physiopathological mechanism of PCOS too (and exaggerated adrenarche, that is high adrenal hormone levels, is often present in this syndrome, may be due to a genetic alteration onto a stressingpre-puberal event).

Tubal causes of female infertility, indeed, have their physiopathologic “primum movens” in the pelvic inflammatory disease (PID). It is known that female genital organs can be subject to bacterial and viral inflammation; this particular condition is due to the easy access of the vagina from pathogen microorganism, and to particular life styles. The world-wide prevalence ofSexual transmitted disease varies not only from region to region and country to country, but also within countries and even at different times within the country. These fluctuations reflect trends in such variables as the composition of the population, behavioural patterns, immunologic status of individuals, pathogenic properties of microorganism, available prevention measures, disease control efforts and the interaction among these factors.

The most comprehensive study of the etiology of infertility to date was conducted by the WHO 10 years ago, and it has show, over 5800 couples all around the world, that up to 64%of the female patients in African sample and 28-35% of patients in other areas of the world, had infertility that could be traced to prior infection.. Every years in the United States more than 1 million of women suffer of such infective disease, and almost one of four women after PID develops a potentially irreversible complications, such as infertility in 20% of cases, chronic pelvic pain in18% and ectopic pregnancy in 9%.Ectopic pregnancy not only results from a tubal damage, but also contributes directly to other reproductive problems: the infertility rate is 50% after ectopic pregnancy, and 10% of these patients have subsequent ectopic pregnancies.

The magnitude of the infertility problem correlated to a inflammatory disease throughout the world is very significant: in the sub-Saharan Africa, in Zimbabwe, where there is a 40% of uretritis, 25% of genital ulceration, and 20% of vaginal discharge and/or PID, there are 60-80 millions infertile couples, and in some areas the infertility prevalence is over 30%.

Post-infectious infertility has been recognised since a lot of years, in 1980 Westorm ,in Sweden found that infertility after PID develops in 6-60% of patients, depending on the severity, the number of infections, and the age when the initial infection occurred. A study of the Centers for Disease Control in the US have estimated that, after a single episode of PID, approximately 12 “f the patients will be infertile; after two episodes 25%, and after three or more episodes more than 50%. Main micro-organism linked to the inflammatory disease are the Chlamydia trachomatis and Neisseria gonorrhea, that if not promptly treated can develop a PID in 20-40% of Chlamydia infections and in 10-40% of Neisseria infections. Both these micro-organisms can cause salpingitis and PID, that can develop tubal occlusions and pelvic adherence, Chlamydia, however, due to a more silent subclinic inflammatory situation can produce more severe alteration if compared to other micro-organisms. The diagnosis, and subsequently the treatment of such disease is sometimes very difficult due to the not manifested, and sometimes absent, symptomatology; This delay of treatment that can led to tubal alteration that can not easily treated even with medical or with microsurgical or laparoscopic techniques. Even if the aim of the treatment is to maintain the fertility, there are no data about the different antibiotics used to reach
this goal. However there is some evidence that timing of treatment may influence tubal patency. Data from a mouse model shows that treatment with tetracycline 7 to 14 days after infection is much less effective in preserving fertility than is treatment very early in the course of infection. Moreover also a study on humans, has shown as the risk of post infectious infertility is higher when the treatment of the PID is delayed, especially if the micro-organism is the Chlamydia. It is also well known the relationship between the intra uterine device (IUD) and the higher probability of genital infections, especially due to Chlamydia and Neisseria.

It is obvious the necessity of a sensitisation and prevention campaign able to assure an early diagnosis, and complete and adequate therapy, the best instruments to prevent the post infective infertility. Worldwide statistics clearly show that current prevention programs need to be improved. WHO promoted in fact an educational program to heighten awareness the causes, dangers and ways to prevent STD, with contraceptive methods that protect against both STDs and unplanned pregnancy, reducing the likelihood of an abortion. But the most important aspect of preventing infertility or tubal damage secondary to infection is not the design of more potent agent, but the prevention and recognition of the earliest signs of infection. Prevention of tubal damage does not begin with the treatment of salpingitis, Rather the physician must begin the educational process at the patient’s first visit. The second opportunity is the recognition of the early signs of infection in the asymptomatic patients. These signs should be used to develop a significant history and to determine at what degree of risk the particular patient has placed herself. A great challenge for the future for research in gynaecology and obstetric is the development of simple, inexpensive, rapid test for the early diagnosis of the common pathogens responsible for PID, for young and sexually active patients. The early diagnosis and the treatment of infected individuals is the key to preventing the spread of STDs and subsequent infertility.

Moreover, the development of a new easily self-applied vaginal contraceptive against the common STDs and HIV, due to spermicidal, bactericidal and virucidal preparations, preferably controlled by the female, would make great strides against the problem of post infectious infertility, while simultaneously providing protection against undesired pregnancy.

A main challenge is also the pharmaceutical research about the develop of vaccines against Chlamydia and HIV; this development alone would have a dramatic effect in reducing the spread of STDs and secondary infertility all over the world. However, little headway has been made in developing vaccines, especially for HIV, may be due to scientific problems, but also to inadequate finding for this kind of research: vaccines are not a top priority for the pharmaceutical industry, since in general vaccines are not profitable. It must be noted that less than 10% of the NIH’s overall AIDS budget will be direct toward such studies.

Talking about the unexplained infertility, it should be considered one of the most common aspect of our society. We noted, from long time, a delay in the first pregnancy. This has to be considered a characteristic of our industrialised society, where consumerism, solitude and a no social vision of life are dominant. Factors that influence directly the time of the first pregnancy are social, economic and professional ones. Social problems are obvious: there is a delay in the planning of the first pregnancy because the couple has different objective in the working fields, and parenthood is not a priority but it is subordinated to such professional values. It has also to be considered the environmental pollution and the cost linked to children, other two factors that led the mean age of the first pregnancy in the industrialised Country from 25 years in the 70’s to 35 years in the last decade.

If we consider pregnancy rate for menstrual cycle in relation to the female age, we can note a progressive decrement toward 0 over the 40’s; and if we consider three categories of women, under 35 years, between 35 and 40 years and over 40 years we assist a dramatic reduction of the pregnancy rate. This is due to the fact that during years the follicular ovarian cohort diminishes, thus intensifying the hypofisarian stimulus on the ovary that become more and more not responsive: it is well known that between 40 and 50 years most of the menstrual cycle are anovulatory, thus explaining the difficult to
obtain a pregnancy in the advanced age. This difficult is also present in the assisted reproductive technologies: the fertility index decreases with the woman age, even increasing the dose of exogenous gonadotropins administered, and after 40’s this reduction is really considerable.

Couple infertility, nowadays, according the OMS, affects 15-205 of couple in the industrialised Country, with almost 100 million couples infertile all over the world.

But what is the couple doing with such reproductive problems?

Often infertility is considered as a pathology to treat in any case, and the couple programs pregnancy, believing firmly in the omnipotence of technology and of society, going towards the assisted reproductive technologies. Mass media often underline the concept of man owner and manipulator of life. Consequently the strong desire of pregnancy, and the economic business behind infertility, led increasing scientific efforts in order to develop more and more complicated assisted reproductive technologies: during years we have assisted to a development of such techniques form ovulation induction with gonadotropins, to intrauterine insemination, to intra fallopian insemination, to in vitro fertilisation, and finally to the manipulation of gametes with the intra cellular sperm insemination (ICSI).

It should be noted that 75% of patients treated with gonadotropins, for ovulation induction, undergoes directly IVF, without any adequate diagnostic and therapeutic procedures. This is due a cultural impoverishment of physicians that are prone to miss several diagnostic steps, preferring directly IVF to obtain a pregnancy, a more economically convenient choice.

At this point we have to answer to a question: can parenthood desire go over the natural biological limits? Even if we don’t consider ethic problems, it should be noted that women over 40 years old, undergoing assisted reproductive protocols, have a success rate 4 or 5 times less if compared to women under 30 years old, thus producing a considerable economic effort for the Society.

It is very important, in such situation, to evaluate the clinical history of the infertile couple in order to address them towards the most adequate and correct diagnostic-therapeutic management.

2. AHLES B.L.. Toward a new approach:primary prevention care of the woman with polycystic ovarian syndrome. Prim Care Update Ob/Gyns 2000,7(6):275-8
17. LAGA M. Epidemiology and control of STDs in developing countries. Sex Transm Dis 1994,4:45-S50
Naprotechnology® una nuova scienza della la salute della donna che ha, come peculiarità, la capacità di funzionare in accordo con i cicli mestrali e di fertilità della donna. Usando la prospettiva del Creighton Model FertilityCare™ System e strumenti standardizzati di monitoraggio del ciclo mestruale e di fertilità[1], Naprotechnology® presenta diverse applicazioni per le donne in età riproduttiva. È il primo sistema che collega la pianificazione familiare con il monitoraggio e la difesa della salute riproduttiva e ginecologica. Il suo uso ha applicazioni nella pianificazione familiare, nella valutazione e nel trattamento dell’infertilità e di altre malattie riproduttive, nelle emorragie anormali e nelle condizioni ormonali anomale del ciclo mestruale, tra queste la sindrome premestruale e le cisti ovariche ricorrenti, la datazione dell’inizio della gravidanza, ecc. La Naprotechnology® ha applicazioni mediche, chirurgiche e perinatali.

Lo sviluppo di Naprotechnology® ha avuto inizio con un progetto di ricerca nel 1976 che fu portato avanti come valutazione indipendente del Metodo di Ovulazione Billings. Da ciò si è sviluppato un modello medico standardizzato di valutazione della fertilità. Questo è chiamato Creighton Model FertilityCare™ Systemed è un metodo standardizzato e prospettico di osservazione dei vari parametri biologici dei cicli mestrali e di fertilità. Lavorando con il Creighton Model System è subito apparso evidente l’esistenza di alcuni markers biologici (biomarkers) che erano comunemente associati a donne con disordini riproduttivi, inclusa l’infertilità.

Quando tale ricerca ha cominciato a crescere e svilupparsi si è subito iniziato a studiare i motivi alla base della anormalità di questi biomarkers. Si effettuarono valutazioni del ciclo mestruale attraverso un’attenta stima ormonale sia della funzione ovulatoria sia di quella luteale, accertamenti con ultrasuoni per determinare la presenza o l’assenza di disfunzioni correlate all’ovulazione e laparoscopia diagnostica per determinare meglio eventuali malattie organiche presenti. La nuova scienza della Naprotechnology® è stata introdotta a partire dal 1991[2] e fino ad oggi circa 250 medici negli Stati Uniti hanno ricevuto una formazione sui suoi aspetti clinici. Un programma molto attivo di Naprotechnology nella valutazione e nel trattamento dell’infertilità è presente anche in Irlanda ed è stato formalmente approvato dai vescovi irlandesi[3]. Questo progetto di ricerca, iniziato 27 anni fa, raggiungerà l’apice della sua prima fase nel luglio 2004 con la pubblicazione del primo e definitivo manuale sulargomento intitolato The Medical and Surgical Practice of Naprotechnology®[4]. Il manuale esporrà in dettagli le varie tecniche usate per la valutazione e il trattamento dell’infertilità (insieme allo spettro completo delle applicazioni della Naprotechnology®).

In questa breve presentazione l’intero spettro delle applicazioni della Naprotechnology, anche in relazione all’infertilità, non può essere presentato. Tuttavia ora è stato dimostrato che donne con problemi di infertilità hanno alla base problemi organici e endocrini. Le anormalità organiche includono condizioni come l’endometriosi, l’ovario policistico, la malattia adesiva pelvica correlata a infezione, l’anovulazione dovuta a cause ipotalamiche e non solo. In relazione ai parametri endocrini sottostanti, queste donne soffrono quasi tutte di una qualche forma di disfunzione ormonale che può essere oggettivamente determinata e valutata. Inoltre gli ultrasuoni hanno rilevato anche un’elevata incidenza di eventi di ovulazione anomala in questo gruppo di pazienti[5]. Questi difetti di ovulazione possono essere identificati con tecniche diagnostiche con ultrasuoni.

Se osservate con il Creighton Model Fertilità Care™ System, queste donne avranno un’alta incidenza di cicli con muco limitato (un ciclo in cui la quantità di muco prodotto è notevolmente ridotto). Inoltre piccole emorragie premenstruali, emorragie con code finali marroni e l’instabilità della fase successiva al picco, costituiscono biomarkers aggiuntivi che evidenziano i difetti ormonali latenti e quelli correlati all’ovulazione.
Il Creighton Model System è anche in grado di identificare specificamente il picco di fertilità in un determinato ciclo. In questo modo fornisce alla coppia la possibilità di avere rapporti incentrati sulla fertilità (FFI)[6]. Un rapporto sessuale incentrato sulla fertilità, di per sé, può essere di aiuto: in un resoconto non irlandese, si è evidenziato che alcune donne sono rimaste incinte solo con un rapporto sessuale incentrato sulla fertilità, dopo che si erano sottoposte senza successo alla fecondazione in vitro.[7]

La disfunzione ormonale latente e/o i problemi organici e correlati all’ovulazione possono essere identificati attraverso una serie di valutazioni ormonali mirate (che possono essere realizzate con l’assistenza del Creighton Model System), una serie di valutazioni ecografiche dell’ovulazione, la laparoscopia diagnostica e l’isterosalpingografia selettiva[8]. Una volta identificati questi problemi sottostanti, possono essere stabiliti i trattamenti che includono gli induttori dell’ovulazione, l’assistenza ormonale nel supporto della fase lutea, farmaci che aumentano la quantità di muco, la ricostruzione chirurgica della pelvi e la rimozione delle patologie organiche sottostanti (Naprotechnology® chirurgica).

I dati presentati di seguito mostrano il successo di un programma con Naprotechnology. Confrontando il trattamento con Naprotechnology® in donne con endometriosi con un approccio simile pubblicato dalla Johns Hopkins University (Figura 1), il tasso di successo della Naprotechnology® è risultato essere significativamente più alto rispetto all’approccio della Johns Hopkins. Un successo simile, ma ancora più evidente, è stato osservato in donne con ovario policistico in cura con la Naprotechnology® associata con resezione bilaterale cuneiforme dell’ovario. Nel caso dell’endometriosi, a 24 mesi, circa il 65% delle donne ha ottenuto una gravidanza con la Naprotechnology® contro il 49% ottenuto con il solo trattamento dell’endometriosi. Il tasso aumenta a 75% a 36 mesi. Con l’ovario policistico il tasso di gravidanza è approssimativamente del 72% a 24 mesi contro il 30% dell’approccio della Johns Hopkins; a 36 mesi, supera l’80% con Naprotechnology® contro il 40% dell’approccio Johns Hopkins (Figura 2). Questo può essere ulteriormente valutato considerando i tassi grezzi di gravidanze e i tassi di costruzione della famiglia confrontando gli approcci della Naprotechnology® con quelli della fecondazione in vitro (IVF) per una varietà di condizioni differenti. Ciò si può vedere nella Figura 3. In tutti i casi l’approccio della Naprotechnology® si è rivelato statisticamente più significativo degli approcci che usavano la fecondazione in vitro.

La maggiore significatività statistica si osserva anche confrontando gli odds ratio della Naprotechnology® con quelli della IVF. Per esempio, con l’endometriosi, il tasso di successo con Naprotechnology® è approssimativamente 2.6-2.8 volte maggiore degli approcci con IVF (Figura 4). Se si considera l’approccio della Naprotechnology® in merito alla costruzione della famiglia, oltre il 90% delle coppie arrivate in un programma di Naprotechnology® avrà coniugato la propria famiglia entro i primi 5 anni (Figura 5). Bisogna puntualizzare che nessun programma sull’infertilità in nessuna parte del mondo raggiunge il 100% di successo o comunque una percentuale ad essa vicina. Esiste ancora un alto numero di aree sconosciute nel trattamento dell’infertilità. Dunque il supporto per l’adozione come obiettivo finale è importante in un programma di Naprotechnology® ed è incoraggiato e favorito una volta che la coppia arrivi al punto in cui non vuole più proseguire con programmi di valutazione e trattamento dell’infertilità. Pertanto è legittimo includere l’adozione tra i componenti del programma di Naprotechnology® e in questo modo si osservano successi notevoli nella costruzione, globalmente intesa, della famiglia.

Un ultimo punto deve essere evidenziato. La Naprotechnology® è dedicata all’analisi delle cause che soggiacciono ai problemi di infertilità e funziona in maniera concomitante con i cicli mestruali e di fertilità per ottenere la gravidanza. Il trattamento medico è indirizzato a correggere i problemi latenti e, nei casi di infertilità correlata all’ovulazione o ad altri tipi di ipogametogenesi, i trattamenti sono rivolti a cercare di migliorare tale processo, ma sempre cooperando col processo di fertilità naturale. Per questa sua modalità di approccio, la Naprotechnology® porta in sé anche la speranza di una eventuale cura per il problema dell’infertilità (e altri disturbi riprodutivi correlati come l’aborto spontaneo).
Esempio per esempio altre cause correlate ai problemi di infertilità. Alcune di queste cause sono fattori immunologici molto complessi che non sono ancora ben conosciuti, ma con l’approccio della Naprotechnology® questi fattori saranno studiati e si migliorerà continuamente la terapia. Perciò la speranza per il futuro risiede in questo approccio o in altri ad esso simili.

ADOPTION AS AN ALTERNATIVE TO THE FIVET

The object of this report is to analyse the legal institution of adoption considering its use as a possible alternative to assisted reproduction techniques. For this we must undoubtedly part from two details that are more or less controversial. One is that both procedures serve the same purpose. In this case it could be described as the attainment of a child by a couple or by a single adult. As is notorious, both cases are not identical for everybody nor are they worthy of the same treatment on the part of the Magisterium. In effect, Catholic matrimonial morals and the proposal of natural law that has been secularly sustained by the Church, limits the alternative to adoption by a married couple or assisted reproduction also with respects to a married couple.[1]

In this sense, there does not exist a strict relationship between the attitude towards the formula of adoption and that had with respects to Fivet. For example, adoption of a child by a single person may be considered from the perspective of the interests of the child or pondering the need at a given moment of having adopters and the situation of urgency that we are facing. We are dealing with prudential criterion that impinges on a reality that we cannot disregard. Adoption is not true reproduction, which Fivet is. Consequently, to the latter is applicable all Christian anthropological construction on reproduction, in the strictest sense. As we will see, this will affect the case of the adoption of already fertilised embryos.[2] They are not adoptions but rather Fivet, and they do not imply making the child theirs legally, but also naturally. Other cases imply diverse factors that are modifying for different reasons moral opinion on this issue.[3] To put an example, the Church may accept the licit nature of an adoption by a single person, although without a doubt our preference is for adoption by a married couple when this is possible, but hardly can the same be done with regards to adoption by a de facto couple. The other relevant data is that one method, adoption, does not pose the moral problems existing with Fivet and other forms of assisted reproduction. Consequently, we must study the differences between both realities to appreciate the legal and moral advantages that may be presented by adoption. We cannot underestimate, however, a possible obstacle to a lineal vision of the matter. It is very possible that far from the rhetorical justification that is usually employed, Fivet may have a different purpose of filling the life of a couple with a human being that is desired in itself. Indeed, those who turn to Fivet from a subjective perspective, or the same technique considered alone, may imply a series of diverse purposes other than merely making theirs a child that is present in the adoption. Amongst these purposes it is possible to highlight, the search for a genetic connection between the parents and the children, the recovery of a deceased loved one through post mortem fertilisation, overcoming natural obstacles to unacceptable forms of reproduction, like that of two people of the same gender, or research itself for the subsequent development of therapeutic techniques. For these purposes, very present in Fivet from the beginning, although concealed under the discourse of a “remedy for infertility”, adoption would not be an alternative, not due to moral reasons but rather in that it does not offer the solution to a combination of practices that would not only lead to ethical problems with regards to the means or object but also with regards to the purpose. It does seem that adoption would be an alternative to the desire of a married couple of having a child to love and educate. The question is, thus, to place adoption as an alternative that is morally acceptable in light of Catholic Magisterium. However, we can and we must go further. Indeed, Fivet has had a very negative effect on the totality of legal ordinances, forcing modifications almost of a constitutional nature, evidently by way of a restrictive interpretation of human personality.[4] None of this has occurred with adoption, which, although it sets forth certain problems, substantially the formidable increase in the power of the administrative authorities over the family environment, it has followed an evolution affirming the rights of man, substantially those of the minor, liberating itself to a certain extent from its hereditary past.

From this perspective adoption is a legal alternative which, “imitating nature”, uses adoption in a dual
manner. Firstly, it offers a home, a family, to a child that needs it, on the other, it satisfies the affective needs of a family and allows it to express its altruism by becoming the home for this needy person. Fivet and adoption, despite their differences, have coincided and been the centre of a controversy that has arisen simultaneously in various countries during the last few years. Diverse representatives with radical ideology have used these two realities as a modifying lever of the judicial order. In Spain, where the debate has been very intense, some public representatives have been skilful when it comes time to “putting one’s finger on the wound”. Recently, as a result of the controversy raised due to the possible adoption of minors by homosexual couples, the socialist president of the Autonomous Community of Extremadura indicated that in his Autonomous Community it was understood that it was necessary to find families for children with that need, and not children to people who desired them. This statement, which certainly clearly reflects the concept of the “interests of the minor” in Spanish adoption law, is an interesting starting point to approach the question of adoption as a possible alternative to assisted fertilisation.[5]

The controversy outlined introduces us to another question, marginal in appearance, but which, as we are trying to show, has a strong connection. During the last few years both the Fivet as well as adoption have been used as elements of standardisation. Indeed, more than covering a need that we could denominate as objective, of a response to social problems relating to the fall in the birth rate or the urgency of finding a solution to the problem of defenceless minors, both the Fivet as well as adoption find themselves amongst the elements that determine the alleged discrimination of homosexuals.[6]

Consequently, the claim by same appears as an effort in favour of equality and the suppression of barriers that has had firm political support, as well as support from institutions like the United Nations. This opens a new front where the Magisterium once again finds itself compelled to take on the defence of natural law against the process of sentimental arbitrariness that has been imposed as one of the most defining characteristics of our post-modern society.[7]

In this manner the aim is to obtain, in the name of equality, the legalisation of inequality, subverting the basic institutions of law. Thus, matrimony, institutionally a reality that unites a man and a woman for the sake of forming a family, and that solely for this reason constitutes a reality that is legally protected, is transformed into an à la carte institution that has as its sole objective the standardisation of a certain sexual relationships, for an arbitrary term depending on the free will of the spouses. That this is not matrimony is notorious, irrespective of the fact that national and international institutions disregard such an elemental reality. The place where the person is received with dignity is in matrimony, foundation of the family. Evidently, it is necessary to describe married couples where the person is not welcomed as it deserves, where the encounter is not affectionate and where the newborn is not received as a gratuitous, but it is not possible to imagine this combination of conditions outside the family. It is especially significant to observe how this gratuitous welcome does not exhaust its importance in the individual, who sees his condition recognised by the parents and the community, but rather transfers his stamp on the place of the welcome, that is the family, which at that moment acquires its true meaning. The paternity / maternity experience, constantly reiterated, open to receiving the gift of life, constitutes a community that overcomes the technological aspect so as to appreciate the donation, love and solidarity.[8]

This perspective of donation requires a donor. This breaks the logic that is merely productive and constitutes man as someone who is not the property of anybody. This perspective allows us to discover the concept of gratuity, which without God lacks all meaning, and allows man, which is this manner receives and is received, to pass on this experience to the rest of the community that surrounds him, and to the world where man, by participating, acquires the status of guardian of love.[9]

If we exclude the circumstances that refer to the Fivet, which is not a direct object of our analysis, we can state that in the recent past adoption and Fivet have followed divergent paths.
Indeed, in principle, adoption was conceived as a method that fundamentally referred to the interests of the adopter, or rather as a legal means by which to cover other objectives pertaining to inheritance or the maintenance of the family name. Moreover, adoption was contemplated with a strong distrust during the whole elaboration process of continental law. Examples of this relative rejection would be the prohibition of adopting if legitimate children existed, in order not to be detrimental to the heirs, and the norms on the difference in age and the minimum age for adoption that delayed same until a clearly mature age, for example, in Italian law until fifty years of age. The minimum differences of age required for the adopter and the adopted is also good evidence of the manner in which the lawmakers contemplated the institution. On this point, we can observe notable mistrust of the reasons for an adoption by a person from the opposite sex, for example.

The aim was to avoid an intrusion within the natural family, clearly privileged and in relation with which adoption was contemplated as a kind of interference. Naturally, we must understand that under the denomination of adoption, Roman adoptio, very disparate realities have been observed. In the institutions covered in the Hamurabi code, like the “marutu”, which has as its object the assumption of the legal paternity on the part of one person over another, to place the latter in the situation of being able to inherit, we can observe the use of the institution for diverse purposes, including educational.

The legal origin of the majority of our legislation is found in the Roman adoptio, which in the definition put forth by Eduardo Volterra is presented as the passing of a free alius iuri subiecta person to the authority of another free person.[10] The method was a triple sale of the son that produced the suppression of the first bond. Subsequently followed the claim of paternal authority by the adopter, to which the former did not oppose. Amongst the purposes of said action was notably the desire not to lose the family name and the maintenance of the cults linked to the domus, to the lares and penates. It was reasonable that with the Christianity the institution fell into certain disuse.

Naturally we cannot forget the political practice of adoption as a form of succession that was used during the empire. In Justinianeo law adoption will appear as a legal business transaction between the parents, to which the adopted child gives its conformity, having previously suppressed the emancipation. It is necessary to remember that this process is linked to the modification of the rigidity of the primitive Roman parental authority, which even during its time surprised because of its harshness.[11]

In intermediate law, adoptio in hereditatem prevails. In the absence of carnal children, clearly privileged after the preponderance in Christianity of the natural family, it was possible to create fictitious offspring. The lex rubiraria allowed the transmission of assets in the absence of a will by means of three systems. One, the adoption of a hereditary title, two, the transmission inter vivos through a series of written procedures, and three, the transmission of the assets by tradionem et testibus. Carlomagno imposed public control, requiring the presence of the King, or a count, or before the missi domini.

Christian law tended to protect the natural family by means of the institution of legitimacy. This practice, in contrast to the free disposition of the assets, favours the legal adoption by heirs as contrasted with other ordinances.

Indeed, Common Law ignored adoption in its legal tradition. According to Caroline Bridge, the first territory of the Commonwealth that recognised a form of adoption was New Zealand in 1881.[12] In any case, throughout the industrial revolution illegal adoptions were taking place where wealthier families were taking care of children living under conditions of abandonment. Some of these formulas were extended by medieval institutions, like taking in children as pages or servants. During the hard times of the Industrial Revolution, these formulas created situations of abuse, reinforced by tendencies to lighten state loads in orphanages by sending the children to rural families, where it was very common for them not to receive moderately acceptable treatment.
In this sense, we can consider that under this law the tendency towards legal adoption may be considered as an effort in the search for the protection of minors, in contrast to other clearly debatable formulas. This line culminates in the Adoption Act of 1926. Under civil law adoption was conceived as a form of imitating one's own filiation. The fundamental objective would be to obtain heirs to the family assets or name by those who would not have been able to obtain same. This factor is fundamental for understanding a series of dispositions common to comparative law aimed at guaranteeing the situation of possible legitimate heirs, present or future. In such a manner is understood the condition of age that required the adopter to be fifty years old, and forty under certain conditions, fundamentally that they could not have children. In this sense, it is possible to find a clear distinction between the equivalent adoption and the more contemporary model. The intention of the former was to protect the rights of the legitimate children, the latter to guarantee equality in the treatment of the children, protecting the adopted child from suffering discrimination. The legal requirement that the adopter not have legitimate or legitimated descendants is understood in this manner. To that was added the requirement of having a good reputation and, finally, the convenience of the action from the adopted child’s perspective, in principle based fundamentally on patrimonial criterion so as to avoid abuse with regards to the minor’s assets.

The fundamental change in direction arose around the phenomenon of the world wars, with its tremendous consequences, seen in the number of orphans. The Spanish Civil War, slightly before, also marked this trend within Spanish law itself. The phenomenon of abandonment and the interest in attempting to find a family for minors in this situation has decisively modified this institution. The reigning concept in an adoption, and the intermediate formula that has arisen, all evolve around the interests of the minor. In contrast to the previous law, this concept pushes in the direction of the elimination of all distinctions between natural and adoptive filiation, which to a certain extent contributes to the subsequent abandonment of the distinction in the filiation between the so-called legitimate children, today matrimonial, and the illegitimate or natural children.

To this process has contributed the growing power of the state and their concern for the situation of minors within conflicting family environments. Legislation has limited the classic paternal authority, which passes to be interpreted in view of the situation of the children rather than as the rights of the parent. The effect has been a growing intervention of the judicial authority and, what is more debatable, that of social workers, resulting in a good number of minors being declared defenceless. To this it is necessary to add another phenomenon that could be considered paradoxical, which is, the observation of the psychological inadequacy of the state or social institutions, for example the orphanages, to cover the needs for the correct upbringing of the children. The paradox lies in that the growing state intervention takes place within a context in which it is recognised that children need a family atmosphere for their correct upbringing. Thus, adoption appears as a fundamental solution to a problem that contemporary society suffers with force.

It would be ingenuous to believe that this data completely defines adoption. Indeed, the developed countries present characteristics that explain the new pre-eminence of adoption and also, by the way, of the desperate resource of Fivet, in a good number of cases. We could cite the following. The delay in the age of matrimony in countries like Spain, to the age of thirty, means that women enter marriage with their fertile age very advanced, to this it is necessary to add the continuous use of birth-control methods with effects on the fertility of women and the decrease suffered by masculine fertility as a result of problems linked to lifestyle, and others of an unknown origin. The effect is a growing number of couples with fertility problems, of which some turn to assisted fertilisation methods but many others turn to adoption. Due to the shortage in the number of non conflictive children in their early years ages that can be adopted in the developed countries, a new phenomenon has arisen, international adoption.[13] It is necessary to highlight that this phenomenon is grievous and difficult for the adopters, and shows their enormous will in trying to constitute a family with descendants. Evidently,
the fact that many of the adopters already have their own children likewise proves an altruistic attitude and solidarity, fact that evidently cannot be obviated.[14]

According to Aristotelian tradition, this desire, correctly channelled, is clearly virtuous. Indeed, the satisfaction in the virtue, raising a child, reinforces the kindness of the act. However, it is important not to forget that this desire is not always legitimate in the methods used. Indeed, in adoption abuses of this type can be observed. For example, in some forms of international adoption. In the Fivet the statement of the alleged right to a child has directly led to abuses against human dignity.

The desire to have a child combines in this case with the interests of the minor, whom, usually in developing countries, find themselves in a situation of abandonment. It is necessary to highlight that the law, both nationally as well as internationally, has had to make an effort to provide guarantees so as to avoid inevitable abuses that could arise in these adoptions. International adoption law has benefited from the protective current of minor’s rights that appears included under the concept “the superior interest of the child", in Spanish legislation pertaining to the interests of the minors. Thus, the Declaration of Children’s Rights of 1959 declares that

"The child will enjoy special protection and will have opportunities and services, all this set forth by the law and through other means, so that the child can develop physically, mentally, morally, spiritually and socially in a healthy and normal manner, as well as in conditions of freedom and dignity. Upon promulgating laws with this purpose, the fundamental consideration to be adhered to will be the superior interest of the child."

Along these lines, the Convention of the Hague relative to the protection of minors and international cooperation relative to the protection of minors and cooperation in the field of international adoption intends “to establish guarantees so that international adoptions take place in consideration of the superior interest of the child and respect of the fundamental rights that are recognised to children pursuant to international Law."

Within the regional European environment we can observe the same tendency, which will have, evidently, effects in the field of adoption. Together with the Agreements within the core of the European Council, we can detain ourselves on the Charter of Fundamental Rights of the European Union, which, in article 24, states that

1. Children shall have the right to such protection and care as is necessary for their well-being. They may express their views freely. Such views shall be taken into consideration on matters that concern them in accordance with their age and maturity.
2. In all actions relating to children, whether taken by public authorities or private institutions, the child's best interests must be a primary consideration.
3. Every child shall have the right to maintain on a regular basis a personal relationship and direct contact with both his / her parents, unless that is contrary to his / her interests”.

The most contemporary adoption is governed by the concept of the interests of the minor[15]. This substitutes other considerations like lightening the state loads in relation with orphanages, which to a certain extent initiates the process, or the interests of the legitimate children to the inheritance. I almost dare to affirm that the loss of relevance of the inheritance itself in the strongly socialised systems that we find throughout a good part of the world also contributes to the tendency outlined.

It has been said that the concept of the interests of the minor is a concept that is legally vague. This is true but it is also true that it remits to a combination of social valuations that are outlined in legislation and jurisprudence. The conditions that in general are required in practice are truly revealing of another contemporary phenomenon. As the crisis relative to the legal treatment of the family, more than the family in itself, worsens, the ideal description reinforces the role of the family in the strictest sense, which is the one that, apart from ideology, is required in adoptions, in that it is understood that it favours the interests of the minor. As a vague juridical concept, the superior interest of the minor, it is necessary to distinguish three ambits, one of positive certainty, or non debatable elements, another of
negative certainty, or clearly excluded situations, and an “intermediate area”, of variation or uncertainty, where there is room for several options within the margins of valuation.

In English law, the commission that prepared the Children Act of 1989 included some of the criterion that could be used in this determination. These would be: The wishes and feelings of the child, considered in view of their age and discernment, their physical, educational and emotional needs, the probable effects of any change in their situation, their age, sexual atmosphere and any other characteristic of the child that the court may consider relevant, any harm suffered or risk of suffering it, capacity of each of the parents, or the person being considered to satisfy the needs of the minor and, finally, the range of powers at the disposal of the tribunal.[16]

This pre-eminence of the interests of the minor explains likewise the line of argument with regards to adoption by homosexual couples. From the perspective of homosexual activism, and the radicals that support it, the question is put forth as a problem that evolves around the so-called right to a child. The idea, evidently, is not to carry out acts that may produce a child, but that they be handed over a child that to a certain extent reinforces the “normality” of their love.

The opposing argument has not been centred on the naturalness of the family in the strictest sense, or on the irreplaceable elements of the institution of marriage, but rather on the affective and psychological needs of the minors and the inconveniences for them of being raised in an environment with such special roles, as occurs with a homosexual couple. It is very significant that in the debate in Spain there were continuous appeals to call on the psychologists, whom would constitute here a kind of a new technocracy, or what MacIntyre has denominated the dominance of therapists.[17] This evidently proves that even the scientific reference in the determination of the interests of the minor, for example parting from psychology, must part from an axiological option.

For some radicals this would lead to total arbitrariness in the determination of the interests of the minor, which in reality it cedes, although not nominally, faced with the interests of the strong spirit, to use the sadistic expression, present in adoption for example on the part of a couple of the same gender. This position is reinforced in the scientific crisis when doubts are cast on the objectivity of the therapist, similar to what we have observed has happened in cultured morality and in its concept of naturalness.

On the other hand, for those who interpret that reality, that is, the truth, outlines an axiological structure, marked, for example, by the concept of telos, this determination of the interests of the minor is possible in a different form to the one that we could denominate dominant although in crisis.

It is possible to determine the interests of the minor in view of the telos of the human individual, and in connection with the socially relevant values. It is possible in connection with the natural rights of the families, with the definition itself of same, with the validity of the subsidiariness in the operation of the social and political institutions, with the interpretation of what education is, and so forth for a long etc.

Naturally, this vision can darken at certain moments, as occurs at present in the majority of our societies, but it is not very difficult to prove that this is due “to the false prudence of wise and to the abuse by the powerful”

Artificial fertilisation has, seemingly, a much less complex history. Stemming from veterinary science, its objective in humans seems to be directly related to overcoming problems of infertility. The purpose is to obtain a child, preferably a descendant of the person turning to fertilisation. Louise Brown was born in England, fruit of the efforts of the doctors Patrick Steptoe, gynaecologist from Oldham General Hospital and Robert Edwards, physiologist from Cambridge University. Her parents had attempted for many years to have a child, but an obstruction in Fallopian tube of the mother prevented this.

The technique applied for such a surprising process, that reminded many of the foresight of the work of Aldous Huxley “Brave new world”, was being developed since 1966, but had always failed a few weeks after the embryo was transferred to the mother.
From 1978 onwards the technique improved its limited success, and was extended to many countries, constituting a hope of having children for women with impediments of diverse types. Although from a demographic point of view the phenomenon of in vitro fertilisation with the transfer of embryos (Fivet) has had a scarce impact - some hundreds of thousands of births during the first twenty years -, with regards to legislation, especially in Family Law, and the Human Embryo Statute, the effect has been very notable. In this manner, the presence of sperm or ovule donors has meant that assisted fertilisation has had an impact on questions such as the recognition of the children in couples, investigation into paternity, prohibited in this context in Spanish legislation, constituting an exception to the general rule, or even to the obviousness that the child belongs to the mother that gives birth. (Although under Spanish law this rule has been maintained to avoid substitute or surrogate mothers).

Very soon the technique had its detractors, as well as staunch partisans. Among the first we could highlight Jacques Testart himself, technical creator of the first French test tube baby. The warnings with regards to the Fivet have been divided into two categories. The first makes reference to the possible effects of the deviations of the technique with respects to the first proposed objective, to overcome diverse forms of infertility. Thus, denounced was the appearance of diverse forms of surrogate mothers, with gestation by commission, admitted under some laws but clearly rejected under continental legislation. Likewise the procreation of children for diverse reasons other than for their own existence, as siblings created to act as donors for some already existing brother. Moreover, an announcement was made with respects to attempts to overcome menopause with the famous mother grandmothers, there was discussion on the possibility of creating children for homosexual couples with diverse combinations, the application of a massive eugenics, or even the possible creation of human-animal hybrids. It was considered that the biggest step would come with human cloning, in principle rejected with big declarations, but then admitted by some under the so-called “therapeutic” cloning, more exactly known as research cloning.

Other doubts on the Fivet were centred on more nuclear aspects of the phenomenon. They explain, to a good extent, the desertion of Testart from the practice and the criticism that the technique suffered very soon by very relevant authors like Jerome Lejeune.[18] The impression that in vitro fertilisation implied an advancement with respects to other techniques of assisted fertilisation, and the transfer of human procreation to the laboratory, detaching it to a certain extent from its personal aspect: procreation of a person by other parties within a framework of profound commitment and meaning, in such a manner that it became a technical act that seemed to many to be unworthy.

The position of Pontifical Magisterium was very clear on this aspect, but it is convenient to recall that it was not only one: although to a certain extent it was pioneer,[19] soon it was accompanied by prestigious bioethics like León Kass himself, of Jewish confession.[20]

Certain bioethical thought has wanted to present these doubts as characteristic of an almost superstitious naturalism. To a certain extent it is said that technical intervention is in itself human, and that the final objective sought was good: to overcome the inconveniences of sterility. Moreover, it has been argued that the child fruit of in vitro fertilisation is the most sought after child, with very profound personal and economic costs for the parents, and even detached from sexual impulse. There are no accidents in in vitro fertilisation, it is argued: all the children fruit of same are wanted, with the importance that this concept of “desired child” has, after the generalisation of deliberate abortions. Sufficient time has elapsed so as to carry out a balanced examination of this criticism based on experience, and we can say at this point who was naïve or who was superstitious.

One of the most profound bioethical concerns is the risk that technology entails for human beings themselves, given that the human being has gone from being the subject of all scientific action to being the object of same: from manipulator of nature to object of its own manipulation, in a manner that was unthinkable before the scientific revolution.

The relevance of the technical nature of human procreation resides, firstly, in the substitution of the concept of procreation itself by that of production, even if it is with a beneficent objective, however, it
has a second link in its impact on the phenomenon of freedom. It is the main supporter of novelty. Thus, the tendency to control it is a vain effort of dominating the future or, if one wants, of manipulating the human of the future. Allied with positive genetic manipulation, that is, with the predetermination of personal qualities, chosen externally, it is a threat to real change, for the sake of an absurd effort to control.

It is true, however, that from the beginning artificial fertilisation has shown a tendency to stray from this line that we are describing, through the inclusion in practice of donors outside the realms of a couple, or being directly situated outside a matrimonial environment, with the fertilisation of single women, or finally, becoming the means used to totally avoid the naturalness of procreation through substitute maternity, in the politically more correct expression, more exactly denominated surrogate mothers or hiring of uteruses. Legislation like the Spanish has prohibited this last modality, but there is certain pressure for its legalisation. The reason for the latter is the same reason underlying, for example, arguments to extend the premises for the selection of gender, the clinics intention of enlarging the market. This economic aspect of the Fivet has been constantly obviated, a very clear example of the ideologisation of the problem. Thus, the whole discussion on the Fivet enters into rhetoric of good intentions that is at the least suspicious.

The Fivet is not a very effective technique, clearly in regression in veterinary science, for example, that has followed in its legislative translation an exact opposed direction to that of adoption. If adoption evolves from a patrimonial conception to the hegemony of the interests of the minor, in the legislation on assisted reproduction nothing similar exists. Moreover, in a similar manner to how the new legislation on adoption has required a modification of the most classical conception of paternal authority, with a tendency to change authority with responsibility, the Fivet has required a change in the consideration of the human being in the prenatal phase, going from the almost total non-protection of what under Spanish legislation is denominated pre-embryo to the point of the selection of the re-implant or abortion to protect the level of the quality of the result of the action.

In the Fivet, together with the greater issue for us of the unworthy separation of a loving union and reproduction, we observe other tendencies. The first is the severing of the Fivet from its alleged therapeutic objective. Indeed, with great clarity from the beginning in Anglo-Saxon law, and with growing incidence in continental law, although the rhetorical claim is to overcome forms of infertility, this symptom is not a requirement for turning to these techniques. Moreover, there exists a reasonable doubt, which goes beyond that expressed by Testart in his book “the transparent embryo”, that the intention of providing children to couples that need them, is the underlying main tendency of the Fivet, given that under this excuse the Fivet has allowed research on human embryos to reach levels that would have been unreachable without this ideological alibi. The action taken both in budgetary terms as well as in the modification of legislation or in international declarations seems excessive when faced with the 1600 children a year that are born in Spain, for example, with these techniques. On the other hand, if the Fivet is physically grievous for whoever consents to use same, it is not greater than international adoption in budgetary terms. It is convenient to remember that faced with the shortage of adoptable children in developed countries, this formula is the most used. But, moreover, the complex analysis to which whomever wishes to adopt is subjected to, with regards to the suitability of their customs, their reasons for adoption, their past life, the couple's stability, equality regarding other children etc., does not take place with those who consent to the Fivet. In the strictest sense, we would be talking of a therapy with no control of the symptoms, in which prevails the interest manifested by whomever wants to turn to the Fivet, without any other consideration. Certainly, the interest of the nasciturus hardly appears. This explains the difficulties of limiting the Fivet when, for example, I have knowledge of the so-called mother-grandmothers, that is, whom have surpassed the age of menopause, or of the conflicts with post-mortem fertilisation, which still prohibited under various legislation, reappear periodically at least as a vindication. It is contradictory to the interests of the minor to be born an orphan exprofeso, or of an unknown father exprofeso, or of a biologically unknown mother.
exprofeso, or of an old mother in identical form, but this argument doesn't especially impact the Fivet since its own logic is diverse. This is why it is possible to conclude that the Fivet cannot be repaired or has no manner of renewing itself into an ethically and legally acceptable practice. It is not about perfectioning the technique so as to limit its high rate of abortion, or of regulating it to avoid its most prominent edges, the Fivet is in itself reprehensible.

This is the opposite to adoption, based on the interests of the minor, and although as all human institutions it is susceptible of suffering reprehensible deviations, adoption is an act of altruism that should be fomented in that it solves the need of a born minor and it allows a married couple to receive the gift of being able to offer their love, be it because of the impossibility of having children by another morally acceptable method, or because of a well intended act of solidarity with children deprived of a family.

We could say that faced with this biological fact and the law, both institutions follow a diametrically opposed path. That is why it is very unjust for those of us opposed to the Fivet to be labelled biologists. Indeed, adoption overcomes a biological difficulty, for example, sterility, using the law to make a child legal, where the affection establishes the paternal-maternal relationship, without any biological relationship. The children are not biologically their children, but the law and the refuge given makes them theirs in the strictest sense, in such a manner that it makes up any difference with the biological child. In the Fivet the difficulty is overcome by means of a technical intervention that substitutes the encounter of two people's love, such that the biological aspect, substituted the matrimonial encounter, is the most relevant. This claim is very clear when attempting to overcome essential biological difficulties, as it is to obtain a child from a dead person, or to obtain a biological child from people of the same gender by means of some form of cloning.