Human embryo

The question of prenatal human life has occupied such a preeminence in the spheres of bioethics, moral theology, and law, that it could even appear excessive to some. The Magisterium of the Roman Catholic Church has dealt with the topic more than once, issuing documents of particular depth and authority, not to mention the number of speeches pronounced by the Roman pontiffs and the frequent interventions made by Bishops all over the world. In other Christian confessions and Judaism we register a much more modest, though meaningful, set of documents and studies, to which we must add a significant contribution from the reflections of non-Christian religions. The theme has also attracted much attention by the so called "lay" thought [in many European countries this expression refers to non-believing intellectuals] with which the Catholic position shares some points of contact, but also points of considerable contrast. The resulting ethical and scientific debate has produced in the past few years a very lively discussion, so that it will be difficult to elaborate a complete status quæestionis in these few pages.

In this article we shall discuss the essential guidelines of the biological approach to the nature of the human embryo (Section I), consider some perspectives that try to define the ontological status of the human embryo (Section II), propose a brief comparison of these perspectives (Section III), and finally focus our attention on a few themes of topical interest that deal with the potential use and application of stem cells derived from human embryos (Section IV).

I. Guidelines for a Biological Status of the Human Embryo

I shall describe here briefly the main conclusions that seem to emerge from the scientific analysis of the biomedical data on human development and reproduction available to us at present time. This data will enable us to identify the essential cognitive elements on which to found a "biological status" of the embryo. My treatment of the subject shall necessarily be brief and condensed, since it would not be possible to take into consideration all the matters of the current debate.

1. The Origins of Human Life. Current human cellular life originated with the appearance on earth of the *Homo sapiens sapiens* [2], and has expanded on our planet without interruption for tens of thousands of years. The individual organismic human life, also present on the earth since the appearance of our species, shows instead two stages of extreme discontinuity within the cycle that defines it, namely fertilization and organismic death. With the fusion of two human gametes, one maternal and the other paternal, and the reconstruction of a diverse diploid set of chromosomes, a new male or female organism begins its life, initially and for a very short time on a unicellular scale (a zygote) and then on a pluricellular scale. The first cell of each human organism is endowed with a new genome (an informational structure determined by the sequence of DNA nucleotides), that defines genotypically the organism with an identity that is specific (belonging to the human species) and individual (singularity with respect to the organisms of the parents, relatives of the family and other individuals of the same human species). It is true that the individual genotype (a genetic individuality) does not always have a complete and absolute uniqueness, as in the case of monozygotic twins (see below, n. 5) who can have an identical genome (cf. Yukota et al., 1994). Nevertheless, it is equally certain that the phenotype - that which constitutes the organismic identity in each phase of the vital cycle - is absolutely unique and unrepeatable. This phenotype is in fact determined by the interaction of two unrelated variables: the genotype, derived from the genome, and the environment, the sum of all the factors extrinsic to the genomic expression, which are able to modify internally and externally the human organism through physical, chemical, biological, psychological or cultural influences. The identity of the former factor (genotype), as in the case of genetically identical monozygotic twins, does not diminish the effect of internal and external variations of the environment that take place during distinct phases of the twins' life cycle, thus making it impossible to have a complete phenotypic equality.

2. The Nature of the Human Embryo and its Specific Identity. The human karyotype, with its specific genome, from the beginning of the process that starts with the fusion of the pronuclei during the early stages of fertilization, identifies biologically, that is genetically, the nature of the human embryo. This "nature" is conceived as a "natural capacity" —autonomous from an intrinsic and informational point of view— to develop into a being that can only express its natural qualities. Its subsequent manifestations, which will enable one to recognize the truly "rational," and not merely "animal," nature of the human being, will have to go through the full realization of its homeostatic, somatosensory and mental faculties. This realization normally takes place, given the appropriate conditions, in the child just after birth, and even further in the mature adult.

The "natural capacity" to realize a life cycle that is biologically specifically human, excludes, from the unicellular stage, any element of indefiniteness regarding the nature of the human embryo. According to Lambertino (1993): "Although it has not yet reached the final point (*terminus ad quem*) of its intrinsic dynamism, the embryo is a starting point (*terminus a quo*) already destined from its own nature (*ex natura sua*) to evolve into a final point (*terminus ad quem*); and not into any final point, but only into that corresponding to the ontological indications of its nature" (p. 127). The "natural capacity," *per se* necessary but not sufficient, could eventually —for intrinsic (genetic) or extrinsic (environmental) causes— fail to bring to term a complete development (so-called spontaneous abortion), induce a degenerative type of development (hydatiform moles, teratomas), or give rise to an abnormal development (congenital pathologies) which may in some cases not completely reveal the "rational nature" of the subject.
However, the natural capacity could never determine the development of an organism naturally different from that of the human species. The proposition that such a natural capacity of the human embryo constitutes it in the status of an "animated being," holding that fertilization already realizes that necessary "disposition" of biological "matter" (the organism) to receive a "form," does not seem to contradict any biological conclusions, and appears indeed very reasonable and convincing (cf. Ashley, 1976, pp. 121-126).

3. The Development of the Human Organism. The process of development begins in the form of a rapid succession of mitotic karyokinesis and cellular segmentations, and then proceeds through the stages of compactation, cavitation, differentiation of embryoblast and trophoblast cell lines, and the formation of the three cell layers that through histogenesis and morphogenesis, give rise between the eighth and ninth week to the complete definition of the fundamental somatic structures of the fetus, the latter still being of small dimensions. This process begins, without interruption, from the stage of fertilization (syngamy), and -as long as negative factors do not intervene- continues throughout the whole period that precedes and follows the implantation of the embryo in the endometrium of the maternal uterus. This complex process, continuous, highly coordinated and teleologically ordered to the formation of an adult individual, starting from the phase of sperm penetration into the oocyte (or, more precisely, the fusion of the sperm head with the oolemma), is the result of an immediate activation of biochemical cascades in the oocyte due to the male gamete, and of a subsequent, gradual genetic activation of the new diploid set of chromosomes. Described by the term "development" or "epigenesis," this phase is characterised by a progressive, gradual and complete expression of the morphofunctional organismic plan already "contained" (in the "informational" and not "material" or "preformistic" sense of the term) in the genetic inheritance established with the syngamy. The active expression of this genetic-informational "content" is mediated, or made materially possible, by the interaction that initially takes place with the extranuclear material of the oocyte and, subsequently, with the components of the embryo (cells, extracellular matrix, tissues, organs), and eventually with its external environment. The latter would be the intracorporeal maternal environment (biochemical before the implantation, and also histological-organic after the implantation) and, at birth, the extracorporeal environment. If we exclude any artificial genetic manipulation, by no means can we consider the contribution from the environment as one of an informational type.

4. Cellular and Organismic Structure of Blastocysts. According to a few authors, a scientific description of the embryo in its very early stages of development (at least, it is said, until the "compactation" into the morular structure) would understand it as a mass of individual and distinct cells, each its own entity in contact with the other cells, all contained within the pellucid zone. These identical and neighbouring cells are not believed to constitute a single individual being, but rather each cell would behave as an individual, showing a certain degree of autonomy and central organization. After the 8-16 cell stage, the intercellular "fusion" would then bring to an end this condition: up until that stage, each cell represents, according to these authors, a "totipotent" entity, that is, able to produce a complete fetus (cf. M.J. Coughlan, *The Vatican, the Law and the Human Embryo*, Basingstoke 1990, pp. 69-70). This interpretation denies the "biological nature of the organism" in the pre-morular embryo, and considers it instead a "simple mass of cells."

However, such a view does not seem to correspond to what we presently know from studies of structural and ultra-structural morphology and of the interactions between the single cellular and extracellular components, or from the study of the *in vitro* development of early embryos. As to the organismic nature of the embryo it is sufficient to bear in mind that its structure —easily discernible with a simple observation at the light microscope— is not schematic and restrictive, a group of spherical elements (blastomeres), tangentially touching each other, suspended in a container (pellucid zone) whose function
appears to be solely that of blocking their extrusion from the embryonic structure, given their natural tendency to separate. This interpretative model, based on "geometrical-physical" restraints, fails to recognize the true biological complexity of the pre-morular embryo, for which we must also take into account the presence of an extracellular matrix—a typical structure found in the tissues of pluricellular organisms—surrounding blastomeres already having a number of adhesion points, thus revealing in the pellucid zone not only a supporting, but also a functional, role (cf. Pereda et al., 1989; Dale et al. 1991; Gualtieri et al. 1992).

To understand the totipotentiality of the blastomeres we must first of all discuss the cytological-embryological significance of the term "totipotential." It does not suggest any natural tendency to separate from the rest of the embryo to give rise to a new embryo, an event that is regarded as possible but not usually determined by its biological and developmental plan, and that would probably require the further intervention of other causal factors, intrinsic or extrinsic to the embryo itself. The "totipotent" or "multipotent" qualities relate firstly to the capacity the initial blastomeres have to "re-orient" themselves with respect to the initial path already acquired, if they change their position inside the embryo itself or are transplanted into another embryo. Secondly (and eventually) this quality refers to the possibility that they would have to go through the entire subsequent developmental process, once they had been isolated (cf. Slack, 1991, p. 19). Also the lysis of the pellucid zone, according to in vitro experiments, it is not by itself sufficient to induce an immediate and spontaneous dissociation of the blastomeres, which tend to adhere and remain in their original position, unless other chemical or physical factors intervene to change their position (cf. Suzuki et al., 1995).

5. Monozygotic Twins, Epigenetic Determination and Individuality of the Embryo. Among the eventualities of human embryonic development, the phenomenon of monozygotic twinniness is the most controversial, both from the perspective of the scientific explanation of the ontogenetic process (cf. Serra, 1993, pp. 89-93), and from the point of view of the meta-biological interpretation of the phenomenon. For some philosophers and theologians it constitutes an apparently insurmountable objection to the individuality of the embryo, at least until the stage of its development in which the monozygotic twinniness can still take place, that is, within the second week of life. According to this view, the zygote or the early embryo cannot be ontologically a human individual since it still has the capacity to become two human individuals (cf. N.M. Ford, When did I begin?, Cambridge 1988, p. XVI). Now, the absence of individuality would exclude the applicability of the widely-used notion of "person" given by Severino Boethius (480 ca.-524), an "individual substance of rational nature," which supposes an individua substantia.

The objection is based on the philosophical assertion that the individualization of a living being requires the absence of a biological possibility to divide itself into two or more living beings. With regard to this interpretation we should point out, first of all, that is seems to endorse quite a close application of mathematical logic to a biological being that cannot be defined geometrically and synchronically, but rather physically (organic mass) and diachronically (life cycle). Moreover, a complex biological process cannot be reduced to an algebraic operation, but should be comprehended in terms of the modality through which it really takes place. I think that this objection is based on a confusion between arithmetic unity and metaphysical unity, which has been already convincingly distinguished by Thomas Aquinas (cf. Summa Theologiae, I, q. 11, a. 1, ad 2um) and later by Henri Bergson (cf. L'évolution créatrice, in Oeuvres, Paris 19844, pp. 505-506).

Whatever the process that forms monozygotic twins, it cannot be understood as the division of an organism into two identical organisms, such that the first one no longer subsists and is substituted by two organisms, lacking any continuity and indistinguishable from the first one. On the contrary, the separation
of a blastomere or a cellular mass from an embryo, giving rise to a second embryo, leaves the first original embryo (even if it is now composed of a unique blastomere) its own physical identity in space and time, though such a separation modifies the morphologic integrity toward which the unitary development of the embryo was originally led. At the same time, the conditions are now set for the formation of a new individual embryo, that can begin its own biological existence with the establishment of a second "plan of development."

Those who deny the existence of an original individuality based on the possibility of monozygotic twinship seem to apply analytically to the embryo the notion of "individual being" according to the double formal connotation of unity and separation. However, in terms of the multilevel character of its structure, the kind of unity associated with organic features is always of a relative nature, and thus they are not able to ground the individuality from an ontological point of view. The separability of a living being, due to its interactions with the environment, is not a property of the biological being as such, but rather a description we give of it. The unity is not primarily an attribute of the living matter as such, but rather of the being, which unifies the whole process. It is the "being" (esse) that structures the living entity in an aliquid (ens), and allows it to remain, distinct from the others, the subject of a unique relationship with itself in its own development in space and time. The whole embryo, "insofar as it is," as a subject to which we can refer, is immediately unum and aliquid, that is, an individual. Whatever the stage of its cellular and molecular organisation, the living being is in relation with itself, and this relation is ontologically founded on its unity. This is nothing but an aspect of the original richness of being (esse). If, during the course of its early embryonic development one or more blastomeres separate from one another, or later at the blastocyst stage, and the division (splitting) of the inner cell mass gives rise to another living being of the same nature (embryo co-twin), then the new being that is so originated is also an unum and an aliquid —that is, an individual.

6. A Singular and Continuous History. When conceiving individuation from the transcendental properties of being, theoretical reasoning grounds the real identity upon that which makes one entity different from another, a difference that plays a role both at the biological and ontological level. The actual "place" of this difference is history, through which the being realizes its essence in time through its becoming. Thus the human embryo is instantaneously and simultaneously a biological and a metaphysical individual, and the beginning in time of a biological individual (an organism) coincides with the beginning of a metaphysical individual (a person). This "one and singular history" begins, and shall continue to be described, in the domains of genetics and embryology. It was also foreseen by an author of the 5th century, St. Vincent of Lerins, when he wrote in his Commonitorium: "Bodies, still growing and developing throughout the years, remain the same as before. There is certainly much difference between the flower of youth and the harvest of old age, but they are the same who were once adolescent and those who become old. And so the age and condition change, but the one individual always remains the same. Unique and identical stays the nature, unique and identical stays the person. [...] Nothing new can be found in the adults that was not already present in the young boys, perhaps at an embryonic level. There are no doubts in this regard. This is the true and authentic law of organic process. This is the marvellous order disposed by nature for each growth. In mature age, all that the wisdom of the Creator had first formed in the small body of the young, unfolds and develops into more and more ample forms" (Commonitorium Primum, 33: PL 50, 668).

II. The Question of the Ontological Status of the Embryo

1. Introduction to the Problem and its Formulation. The question of the "ontological status" of the human embryo entails asking such questions as: what is the "being" of the embryo and the human fetus? Is it the
same "being" that we ordinarily recognize in the new-born baby, the child and the adult? Or, instead, are we dealing with a "being" that is different, similar or not yet identical? When and how does the life of a "human being" like ours begin? The question is much debated today, not so much for its intrinsic theoretical interest, but rather for the practical implications that derive from it regarding the "respect" due to the embryo and the human fetus, and their legal protection. The ontological question, therefore, implies a very practical, ethical question: what type of "respect" —or rather, what "care," what "love," what "welcome"— should we have for the human embryo and the human fetus? In concrete terms, the subjects involved in this second question are different: the generator couple, the gestant in particular, the doctors and the obstetricians; and, in the past few years, physicians and biologists engaged in the techniques of assisted procreation and the researchers who investigate fertilization and prenatal human development; and finally, also the legislator.

As recently shown by some documents of the Roman Catholic Magisterium, the moral question of the duties towards the embryo and the fetus does not depend, from a logical or philosophical standpoint, on a previous and unequivocal solution of the ontological question (cf. CDF, Quaestio de abortu procurato, EV 5, 674; Donum vitae, EV 10, 1174-1179; Evangelium vitae, 60). The same is also stated by some "secular" documents, such as the Warnock Report. The Catholic Magisterium, adopting a cautious point of view, concludes that "what is at stake is so important that, from the standpoint of moral obligation, the mere probability that a human person is involved would suffice to justify an absolutely clear prohibition of any intervention aimed at killing a human embryo" (Evangelium vitae, 60). Some authors, adopting a utilitaristic point of view, agree that respect ought to be shown to the embryo, but with different levels of protection depending on the supposed interests of the generator couple, of the new-born baby, or of scientific research: in other words, the value to be assigned to the life of the human embryo is not intrinsic nor absolute, but rather instrumental and relative.

The relevance of the ontological status of the embryo, in relation to its "moral" and "legal" status, if not decisive, cannot however be easily underestimated. It is important to know what or who a given being is, in order to discern how to treat it, even if our behavior towards it necessitates a further acknowledgement of what is "good" and what is "evil" in regards to the human embryo itself (cf. Angelini, 1991, pp. 152-157). It must pointed out, however, that a new (and weak) relationship between factum and bonum is now beginning to replace the classical (and strong) relationship between esse and bonum, that is, between ontology and morality. Experimental knowledge appears to have overtaken every field of knowledge, even replacing our metaphysical knowledge of human nature. When trying to know what or who the embryo or fetus is, and trying to discern as a consequence what behavior is "good" (in ethics) or "rightful" (in law), it is today common to turn directly, or exclusively, to biology or medicine [3].

Those who intend to deal theoretically with the ontological question as an introduction to moral considerations (cf. Gilbert, 1991, pp. 33-74; Serra, 1993), and those who, judging "metaphysical" knowledge too pretentious, begin directly with the ethical or legal judgments of practical reason, both appeal to biological knowledge of the embryo and the fetus (see above, I). The Magisterium of the Catholic Church is also explicitly interested in the field of embryology. It reminds, for instance, that modern genetic science «has demonstrated that from the first instant there is established the programme of what this living being will be: a person, this individual person with his characteristic aspects already well determined». Even if it has not been explicitly engaged within scientific and philosophical debates, the teaching of the Magisterium has always taken into great consideration the "clear confirmation" coming from the biological sciences (cf. Evangelium vitae, 60). Indeed, this teaching is consistent with a theological tradition that has devoted a great deal of interest in biology, and dates back to Albert the Great, to Bonaventure, in particular to Thomas Aquinas. With regard to the topic of prenatal human life, these authors always employed the knowledge of medicine and embryology that was available at their
Concerning the relationship between the embryo's ontological and biological status, it should first of all be acknowledged that such a relationship is implicit and unavoidable, since no ontological status leaves aside factual considerations of a genetic, cytological, embryological, neurological and obstetrical nature. It is sufficient to remember the notions of "conception," "individuality," "epigenesis," "nesting," "sensitivity," "fetal movements," "vitality," etc., that refer to as many phenomena, properties or biological processes. And, on the other hand, every empirical concept concerning a biological being also implies a philosophical view of the living being, that makes the latter intelligible, not only in the analytical sphere (tissues, cells, subcellular structures, biomolecules, genome), but also at the synthetical level (for example, from an organic, systematic and organismic point of view). Whoever denies the existence of any type of philosophical or "meta-biological" presupposition in its own scientific interpretation of physical facts through experimental research, establishes an implicit metaphysical option in favor of a radical reductionistic-physicalistic approach (statistical, mathematical, chemical, physical, etc.) to the study of living nature.

Within the plurality of anthropological orientations that characterizes contemporary culture, it is possible to identify different theoretical perspectives that have implicitly conceived various ontological conceptions of the human being, and in some way also of the embryo and the human fetus. Henceforward, I shall indicate the properly and fully human status by the traditional term of "human person," without necessarily relating it to any particular meaning that the term "person" has gained during its long and troubled history or that it might gain in the present time (cf. Novaes, 1991, pp. 27-85). Due to the ambiguity that seems to surround the term "person" today, a number of authors have suggested alternative terms. However, there is as yet no agreement. The dispute is not only semantic, that is, a question of mere terminology, but rather a question of deepening the ontology of what our common language means by such a term. Without offering here an exhaustive analysis of each position, and thus necessarily reducing their richness and nuances, I will summarize the complexity of the underlying debate within the framework of the following conceptions of human person.

2. The "Strong" Concepts of Person. There is, first of all, a strictly ontological concept of person, founded upon a substantial or a relational ontology. Concepts of person based on a substantial ontology are those proposed by Boethius, as rationalis naturae individua substantia (cf. De persona et duabus naturis, III, 4-5), by Thomas Aquinas, as individuum subsistens in rationali natura (cf. Summa theologiae, I, q. 29, a . 3), and by Richard of St. Victor, as rationalis naturae individua existentia (cf. De Trinitate, IV). Since having a "rational nature" is characteristic of the human being only, according to such definitions each member of the species Homo sapiens sapiens is ontologically a person from its initial constitution as an "individual substance". The notion of "person" becomes coextensive with that of "human being" —here intended as a human individual—all along its life cycle. Considering that the beginning of existence of a new human being normally coincides with the biological process of fertilization, in which a new human "individual substance" is generated, the embryo is a person beginning at the unicellular stage (zygote). Within an hylomorphic interpretation of reality (Aristotelian composition of matter and form), most of the advocates of the substantial ontological concept of person argue, as a logical implication of an "immediate" substantial individuation, the metaphysical thesis of an "immediate" infusion of the soul (known as the thesis of "immediate animation"). Not all of those who adopt the Boethian definition acknowledge that the human embryo is a person from the fertilization stage. They do so for two reasons: the first concerns the rational nature of the human being, and the second, its substantial individuality.

In the first case, that is, in relation to the rational nature of the human being, the thesis of "mediated animation" or "subsequent animation" is proposed, a theory that historically goes back to a few statements
by Aristotle and Aquinas (cf. Di Giannatale, 1981; Caspar, 1991b, pp. 239-255; Seidl, 1992). According to this thesis, the infusion of the rational **soul** [5] (*forma corporis*) takes place only when the corporal organism is sufficiently developed as to receive its "form" (cf. Zalba, 1972, pp. 35-57; Ashley, 1976, pp. 113-133; Cottier, 1995). In support of this view (as a kind of reason *ex parte Dei*) there is also the consideration of the very high frequency of early spontaneous abortions (pre-clinical abortions), before the implantation of the embryo in the maternal endometrium. To this phenomenon one could also add the degenerative processes of development that follow the fusion of gametes, like the formation of hydatiform moles and serious fetal malformations, such as anencephaly or other forms of aplasia. In view of all this, it is inconceivable, according to these authors, that God would "waste" so many souls that had been infused "immediately" into the embryos. The second objection to the "immediate animation" doctrine, that which concerns the person's substantial individuality, is grounded in the thesis of "subsequent individuation" or "epigenetics." This thesis maintains that the embryo is to be considered an "individual" beginning when, during its development, only one fetus can be formed, that is to say when phenomena of monozygotic twins and the so-called "embryonic fusion" or "embryonic recombination" (chimerism) are no longer possible. It is argued that the absence of ontological continuity and identity between before and after the formation of twin or chimerical embryos militate against a substantial individuality in the first phases of development (some authors set a limit around the 14th-15th day). In either case there is the claim that personal human life does not begin with the formation of the biological organism, but only in a subsequent period of epigenesis, and so denying the coextensivity of the person with the entire phase of human prenatal development, before the implantation in the endometrium (endotubal period, for a natural site, or extracorporeal, for *in vitro* fertilization), and subsequently to the implantation (endouterine period).

The second "strong" concept of person is founded on an ontological-relational perspective. The person here is perceived as "intersubjectivity" or "consubjectivity." According to this "philosophy of constitutive relationship" it is the "relation of self-you" that constitutes the human being as a person. For the "self-in-itself," substantial individuality of rational nature, is now substituted the "self-with-you", subjectivity of relational nature. Personal life thus coincides with the organismic human life only when this begins a relationship with another personal life. The ontological relational conception thus looks for those biological or psychological "facts" that occur in the development of the fetal embryo and that indicate the beginning of a relationship between the embryonic or fetal organism and the maternal organism. Advocates of this thesis identify the earliest possible relationship of this kind in the "nesting" (implantation of the blastocyst in the uterine endometrium), that is thought to begin around the 6th-7th day after fertilization. If the organic life of the human being starts with fertilization, its relational life should then start with the nesting: it is from this moment that we can talk about the embryo as a human person in potency (cf. Malherbe, 1985 and 1988). The ontological relational perspective admits, however, of further reflection. If it is true that the ontological foundation of the human person is an "other from self," a truly metaphysical approach should recognize this otherness in the "totally Other" (that is, God, as first Cause of all Being and of the new human being), and in two "others from self" who are the biological parents that have given the gametes (as secondary causes of the new being). A constitutive relationship can thus be found within the order of radical ontological causation or "creation," and in the order of biological-personal causation or "pro-creation." Since the relationship "self-you" is not self subsistent, it needs to be founded too, thus referring the entire issue to the problem of a substantial ontology that sustains the "self."

We now turn to another metaphysical concept of "human person", the theological. Within a transcendental perspective open to divine Revelation and to the mystery of the Incarnate Word [6], the most profound notion of the human person is comprehended in the context of creation [7] and redemption, that is, in the context of what we call theological anthropology. According to Evangelium
vitae, the personal human life is "a manifestation of God in the world, a sign of his presence, a trace of his glory." Human life "shines forth a reflection of God himself"; "the life which God bestows upon man is much more than mere existence in time," for the human vocation is to share God's intimate life (cf. n. 34). This perspective can be found very well outlined and biblically documented throughout that document (cf. nn. 1-2, 34-38, 104). The "truth of life" is there understood within an anthropology that unfolds from the theology of imago Dei to that of caro Verbi, explicitly showing and emphasizing the Christological dimension of the "anthropology of the image" that the Second Vatican Council mentioned and partially developed (cf. Colombo, 1995).

A final understanding of the human person identifies it essentially as a "rational being," or an "ethical subject": it is the "moral" concept of person proposed by Kant in the Critique of Pure Reason. "Person" does not indicate here an ontological-substantial concept, but rather a concept of the rational and ethical order. According to the original Kantian-transcendental approach, which rigorously separates noumena from phenomena, there is no possible relationship between the "personal status" and the "biological status" of a human being. There is no empirical criterion that would enable us to trace a line of demarcation between "person" and "non person" or "thing." A few Neokantians authors such as H.T. Engelhardt, have disobeyed the metaphysical prohibition posed by the philosopher from Königsberg that impedes any relation between the noumenon and the phenomenon. Starting from empirical phenomena and biopsychological data, they have attempted to establish the presence of "conscience," and thus of the "person," during some stage of human development. Thus the person loses the exclusive moral character it had in Kantian philosophy, and instead becomes a bundle of "superior functions" or "states of consciousness" susceptible to verification, but that refer to a permanent "ontological nucleus" that constitutes the anthropological subject of these same functions.

3. The "Weak" Concepts of Person. A different anthropological approach to the concept of person is that defined as "functionalist," "procedural," or "operative" (cf. Botturi, 1992; Mordacci, 1992). Before going on, it is important to note that the adjective "strong" is used in its metaphysical-foundational aspect, not its logical or truthful connotations. Here, on the other hand, the term "weak" is used according to its logical and gnoseological value. Those who are engaged in the search for the "status" of the embryo and of the fetus, since it is less demanding from a philosophical point of view, tend to explore the logical rather then the ontological domain. However, the ontological question, though frequently ignored in the bioethical discussion, cannot easily be removed.

The "functionalist" approach, which is further specified by several operative concepts, considers the human person as a bundle of operations or as the sum of functional, though not continually active, capacities. A human being is a "person" if it behaves or can immediately behave as such. Whenever such a capacity cannot be empirically ascertained, it is a "non person," though still perhaps "beings" (organisms) of the human species. Depending on the "operations" that we identify as characteristic of the human person —the so called "indicators of humanity"—, we obtain a "sensorial," "psychological-conscious," "vital-autonomous," or "rational-willful" concept of person.

The first one is centred upon the outer-receptive and inner-receptive sensorial capacity, particularly the algic sensibility. In this view it becomes crucial to know from neurobiology whether the somatosensory nervous connections and the primary somatosensory region of the cerebral cortex of the embryo and of the fetus are functionally developed enough to permit a perception of the stimuli, especially the painful ones, at a peripheral or also central (encephalon) level. So the beginning of human "personal" life, from this perspective is fixed around 5-8 weeks from fertilization. The "psychological-conscious" or "psychic" concept defines a "person" as a human being capable of various levels of "conscious," "subconscious," "preconscious," and -according to some authors- even "non conscious" experience, provided it has an
effect on the conscious levels that subsequently manifest themselves. By "experience" these thinkers mean each psycho-physiological event capable of leaving some trace of influence in the psychological development and character of the individual's mental life. Such experiences assume a morphofunctional organization of the cerebral cortex much more advanced than that required for the perception of stimuli at the level of the central nervous system, a stage that would not be reached earlier than the second or third month of pregnancy. Thus we must turn to prenatal and perinatal neuropsychology and to neuropsychiatry to gain behavioral and cognitive information on endouterine life, in order to gather information about such experiences. The two remaining "functionalist" concepts of person both refer to the idea of autonomy of the individual human being. The first one conceives it in a biological sense as an "autonomous vitality," or as a capacity to live separately from the maternal organism, with or without medical assistance (at present considered from the 22nd-24th week of pregnancy). The second one conceives it in a mental sense as a "rational-willful" autonomy (the capacity to understand, to want, and the capacity of memory perception). This last thesis is the most radical one, since it shifts the concept of person to a "superior" stage of psychophysical development, necessary to carry on the mental activities that are able to satisfy the proposed functional concept.

III. Comparison between Ontological and Biological Perspectives

Contemporary biomedical research in the field of embryology as well as some of its most recent scientific results, if rigorously interpreted according to the experimental method applied to life sciences (cf. Serra, 1993, pp. 56-58 and Serra, 1995), permit us to define a biological status of the embryo and of the human fetus that is compatible with the ontological status of person -according to its "substantial" meaning and starting from the process of fertilization. This is true within the modern genetic-molecular (informational), organismic-physiological (homeostatic), and dynamic-epigenetic (diachronic) conception characteristic of the present biological understanding of the individual living being (see above, I).

For clear epistemological reasons, it is obvious that it cannot be directly inferred from any data or concept of the biomedical sciences that a human being is a "person" in the strong sense -that is, understood as possessing an ontological status, strictly speaking. As observed briefly by Angelini (1991), "in fact biology knows nothing regarding the person. This has been stated by many and in many ways" (p. 152). If we desire, however, to guard the "realism" of the empirical sciences, we must recognize the ontological value of biological knowledge regarding the "human person" in terms of "human organism," its formation and its organismic constitution. The considerations to develop should then consist of researching those points of coherence (or non contradiction) between the biological and ontological dimensions of the embryo and the fetus; between the "being in development" of the human species, with its own genetic, epigenetic and morphofunctional characteristics, and the "human person" in the beginning of its life, a person that does not yet fully and actually manifest its own "personality."

1. Applying the "Strong" Concepts of Person. From the Boethian definition of person (see above, II.1), it is evident that none of the scientific knowledge we possess can support with any reasonable certainty the objections of a biological nature advanced by several authors to the rational nature of the embryo and the human fetus or to the substantial individuality of the early embryo. In other words, the thesis according to which the new conceived human life is an individual substance of rational nature (rationalis naturae individua substantia), that is a person, has not yet been falsified (a benefit that in Karl Popper's epistemology would correspond to "truthfulness"). If we endorse instead the relational conception of person, it should not be difficult to show how the biological properties and phenomena recently discovered cannot exclude the embryo and the fetus from the status of person. If, finally, we assume that only the intersubjective or consubjective relationship is relevant to ontologically define the human person,
present obstetrical and biological knowledge of development is still unable to deny to the embryo, before its implantation in the uterine endometrium, the "personal status" in the sense adopted by the same perspective.

2. The Impossible Application of the "Weak" Concepts of Person. The "functionalist" approach to the concept of person eludes a real comparison between the empirical bio-psychological and the philosophic-anthropological dimensions, because it dissolves the difference between these two ways to knowing human nature, collapsing the second into the first. In this case, the foundation of the "operations" that indicate the presence of the human person do not postulate the existence of an "ontological nucleus" that gives consistency and unity to these functions and acts. Those operations simply refer to the manifestation of actual "properties" or "faculties" that ultimately coincide with, or can be reduced to, the biological and psychological substrate of the human being. In this way, recognizing which operations are actually "personal" is divorced from any interpretation of the living being that could phenomenologically emerge from the biological analysis of the reproductive, morphogenetic and homeostatic processes, and that would make it intelligible in its own specific nature. Paradoxically, in order to define the status of person, this weak conception of person renders irrelevant the "biological nature" of the organism (species), or even the presence of an actual biological organism. Can "person" be attributed also to any animal able to experience pain, manifest fear, express desires or interests, or even to a physical entity that does not belong to living nature, such as a computer capable of performing rational operations, interacting with other systems, and communicating with the operator? The reference to specific biological knowledge ends up superfluous or only instrumental.

IV. Contemporary Debate on the Usage of Stem Cells from Human Embryos and from Adult Human Beings

1. Introduction. In the field of tissue grafts in patients affected by serious diseases of metabolic, muscular, cardiovascular, neoplastic nature and others, researchers have the possibility to grow in the laboratory the necessary biological material (differentiated cells and tissues) from isolated lines of "multipotent cells" cultivated on proper physiological substrates (stem cells; see above, I.4). Such non-specialized cells have the property to self-renew in culture (conserving their power of replication and epigenetic potentiality) and to differentiate under certain conditions, giving origin to cellular types that compose tissues and organs. There is hope to obtain in this way, for example, neurons (cells of the nervous system) to substitute or integrate those degenerated and no longer functional in patients struck by Parkinson's disease, Alzheimer's disease, multiple sclerosis, ischemia or spinal lesions. It may also become possible to obtain b cells of the pancreatic isles of Langherans, able to secrete insulin once they are grafted in patients affected by diabetes mellitus of type I, as well as blood cells, muscle, cartilage, bone and skin cells, and cells for the liver and the retina. Applications could range from treating blood diseases to osteoarthritis, from osteoporosis to skin burns, from cirrhosis of the liver to macular degeneration of the eye. These and other tantalizing goals in the field of graft surgery give new hope to patients and their families, especially in the case of diseases that cannot be cured today.

After a series of preliminary investigations on laboratory animals, biomedical research needs now to work with an adequate quantity of human stem cells in order to cultivate them, to analyze the profile of gene expression and cell biochemistry, and to stimulate under a range of environmental conditions and growth factors, molecules capable of inducing a differentiation along the programmed or desired epigenetic direction toward that particular cell phenotype for a graft on the patient and perhaps, one day, also for a partial or total organogenesis. The sources of human stem cells hitherto identified are: a) the inner cell mass of the embryo at the blastocyst stage (around 5 days after fertilization, when the number of cells in
the embryo is around 150-200, and we can already distinguish embryoblast and trophoblast); b) embryonic tissues, after the implantation of the endometrium (from the fourth week of development; primordial germ cells of the yolk sac), and fetal cells, including cells of the liver, the bone marrow and the brain, that are rich in stem cells; c) the blood contained in the umbilical cord, that maintains the portal circulation of the new-born tied to the placenta during birth; and d) certain tissues of the adult body, including peripheral blood. This is why interdisciplinary reflection on the human embryo recently involved the emergence of a new debate, regarding the use of embryonic cells for therapeutic aims, realized in the first and the second among the four sources just mentioned.

One research possibility concerns "natural" human stem cells, that is, cells obtained not from genetically manipulated organisms or organisms subjected to modifications of a genomic type, but simply taken and cultivated in vitro. A second possibility is obtaining stem cells with a pre-ordered genetic inheritance (for example, identical to that of the patient who will receive the graft, when those cells are not obtained from his own body), or with a modified genetic inheritance (repressing in such a way possible rejection reactions or the emergence of uncontrolled cell proliferation of a neoplastic type). In the case of a pre-ordered genetic inheritance -obtainable only through embryonic stem cells- the use of cloning by nuclear substitution (a similar methodology to that of the Scottish experiment on the sheep Dolly, applied also to bovines, goats, pigs and mice) has been proposed that could generate an embryo from a donor enucleated oocyte and from the nucleus of a somatic cell of the same patient. Simple genetic modifications can also be applied to stem cells of non-embryonic origin, like those obtained from the blood of the umbilical cord or from tissues of adult organisms, since this procedure not involve the substitution of the entire nuclear genetic inheritance and its epigenetic reprogramming (which only the factors contained in the maternal oocyte seem able to promote), but limits itself to a genomic intervention, quite modest and with a specific aim, similar to that of somatic gene therapy.

2. Scientific and Clinical Aspects. The theme was the object of a speech John Paul II gave on the August, 29, 2000, at the XVIII International Congress of the Transplantation Society. On that occasion he said that «science itself points to other forms of therapeutic intervention which would not involve cloning or the use of embryonic cells, but rather would make use of stem cells from adults. This is the direction that research must follow if it wishes to respect the dignity of each and every human being, even at the embryonic stage» (ORWE, August 30, 2000, p. 2). The assertion not only recalls the high individual dignity that each human being enjoys from its very conception, along with the consequent moral demand of respect and care for the embryonic life, avoiding any instrumental use of it. John Paul II also indicates a positive research line in the field of stem cells and their use in graft therapy: the possibility to use stem cells from adult organisms instead of embryonic. The same scientific and ethical perspective can be found expressed in the Declaration of the Pontifical Academy for Life on The Production and the Therapeutic Use of Human Embryonic Stem Cells (cf. ORWE, September 13, 2000, pp. 7-8) and in an address recently delivered by John Paul II to the Pontifical Academy of Sciences on the occasion of a working group on "Stem Cell Technology and Other Innovative Therapies": "I have on other occasions stated that stem cells for purposes of experimentation or treatment cannot come from human embryo tissue. I have instead encouraged research on adult human tissue or tissue superfluous to normal fetal development. Any treatment which claims to save human lives, yet is based upon the destruction of human life in its embryonic state, is logically and morally contradictory, as is any production of human embryos for the direct or indirect purpose of experimentation or eventual destruction" (John Paul II, Discourse to the Pontifical Academy of Sciences, November 10, 2003, OR, November 10-11, 2003, p. 5).

The most recent biological literature and the current debate among researchers underlines with more and more evidence that some stem cells, once isolated from differentiated tissues in the fetus and the adult, can be cultivated in vitro, expanded into a stable cell line that can self renovate, and differentiated into
cellular phenotypes different from that of the original tissue. The surprising flexibility that these cells show, renders the perspective of John Paul II not only in accord with the anthropological and moral needs of biomedical research, but also achievable as an empirical research procedure. This approach seems to promise results possibly equivalent to those expected in the alternative choice, which makes use of cells obtained directly from embryos.

In a report known as Donaldson Document, several British experts have already advanced the possibility that, in the long term, the possibilities offered by stem cells derived from adult tissues will be equal or even superior to that of the embryonic stem cells (cf. Stem Cell Research: Medical Progress with responsibility, London 2000, p. 19). Moreover, multipotent stem cells obtained from the bone marrow or peripheral blood of adult donors, have already found a clinical use in the treatment of acute and chronic leukemia, lymphomas, myelomas and myelodysplasias, and of some monogenic metabolic diseases (hemoglobinopathies, congenital immunodeficiencies, lysosomal diseases, Fanconi's anaemia). The above cited declaration of the Pontifical Academy for Life and the Donaldson Document mention the most recent researches on laboratory animals which indicate that an adult neural stem cell possesses an ample capacity to develop and can potentially be used to generate a variety of cell types suitable for transplantation in the case of different diseases (cf. Clarke et al., 2000, p. 1660). These studies not only suggest that stem cells in adult tissues are much more similar to embryonic stem cells than was previously thought, but that they might even possess an epigenetic repertory close to that of embryonic stem cells (cf. ibidem, p. 1663). These studies also seem to overcome a strictly deterministic concept of developmental biology that tends to see in some tissues and organs (for example, those of the nervous system) the endpoint of a rigid and irreversible process of segregation of multipotent embryonic cells. Evan Y. Snyder and Angelo L. Vescovi have emphasized that "intra-germinal plasticity, through which the stem cells give origin to derivatives of the same germinal layer (for example, the mesenchymal stem cells generate the cartilage, bone and adipocytes; the cells of the bone marrow go towards a myogenetic differentiation, and viceversa) is certainly important. Even more impressing is however the possibility of an inter-germinal differentiation (for example, neural stem cells, that derive from the ectoderm, to yield ematopoietic cells, which are of mesodermal origin, to produce hepatocytes, of endodermal origin, and glial cells, of neuroectodermal origin)" (Nature Biotechnology (August 2000), n. 18, p. 827). These philosophical considerations of developmental biology, which apparently are relevant only on a theoretical scale, "will have a practical relapse that concerns the tissue engineering of stem cells, since the organs could be "re-created" [in the laboratory] through natural processes of development" (ibidem).

Although the two authors do not believe that, at this time, adult stem cells can substitute embryonic in basic and applied research, they do believe that "the recent flow of studies suggests non suspectable levels of plasticity, certainly able to stimulate experiments that were unthinkable up to three years ago" (ibidem, p. 828).

Researchers from the United States who have elaborated on the report of the National Bioethics Advisory Commission have underlined the potential of replication and differentiation of adult stem cells, if exposed to a favorable external environment (cf. Issues in Human Stem Cells, Rockville (MD) 1999, vol. I, p. 13). The research is focused on identifying the conditions in which the stem cells isolated from adult tissues can grow numerically and can be induced to differentiate. Among the conditions that are able to induce differentiation appear to be: a sub optimal in vitro culture environment that limits the renovation of the stem cells (once they reach the desired expansion of their line) without however provoking their death; the addition of growth factors, such as proteins from the TGF-β and Wnt families, the cytokines and chemochines; some hormones (for example insulin) and other substances, like dexamethasone and indometacin; and the induced expression of a few genes, like c-myc.

Under the experimental and clinical profiles, adult stem cells present not a few advantages. The
haematologist Catherine Verfaillie, who has recently isolated from the bone marrow of children and adults stem cells "almost identical to the embryonic ones" in their capacity to give origin to different cellular types, has remarked that the stem cells from adult tissues are easier to manipulate and graft since they do not tend to differentiate spontaneously and uncontrollably like the embryonic ones, which could develop in vivo teratomas (tumoral foci constituted by heterogeneous cells). The adult cells do not behave this way, since they differentiate only when induced to do so. On the other hand, they appear to lose their capacity to differentiate after a certain period of time in culture, and this could represent a limit to the production of lasting stem cell lines, the only ones suitable to be commercialized on a large scale for research and applied purposes. This problem, however, is not so relevant in the case of autologous and single to single transplants, in which case it requires proceeding each time to an isolation and specifically aimed and contained in vitro differentiation of the cells.

3. Anthropological and Moral Aspects. In the anthropological realm, there are three main matters of debate regarding the extension to the human beings of the studies on stem cells and their therapeutic potentiality. The first and most radical concerns the question on human beings as subjects (diseased) to be cured, but also and at the same time, as objects (biological) of scientific research, diagnosis and therapy. It represents a particular case of the anthropological question par excellence, that echoes synthetically and persuasively in the words of the Psalmist: "What are humans that you are mindful of them, mere mortals that you care for them?» (Ps 8:5). As John Paul II has remarked, in order to care for man «we should first of all begin from an integral vision of his being, that is, from an anthropology in which he is considered as he really is, as God's creature, made in his image and likeness, like a being capable of knowing the invisible, oriented towards the absolute of God, made to love, called to an eternal destiny» (Discourse to the Participants to a Conference organized by the "Nova Spes" International Foundation, November 9, 1987, Insegnamenti, X,3 [1987], p. 1051). In the dramatic tension between their own finiteness -that in disease, particularly that degenerative and mortal disease which is so acute- and their own constitutive vocation towards total perfection (cf. Evangelium vitae, 34-37), all human beings spend their earthly existence crying out for salvation, a cry that in some circumstances of life is answered by medicine in the offer of health. But the demand for health can never be separated from the invocation for salvation.

However, health and salvation are not the same. Whether the pathological situation that causes the physical and spiritual suffering of the patient comes to a solution or it is not technically possible or morally acceptable, the salvation of the entire human being (corpore et anima unus, as stated by Gaudium et spes, n. 14) does not coincide with the newly found health, and the persistence of the disease or even the unexpected coming of death are not a sign of human perdition. In view of the biological possibility of having so-called "immortal" cell lines, that one day could represent an almost inexhaustible autologous or heterologous source of "replacement tissues" for the human body, it should be reminded that the eternal dimension of human life (corresponding to our supernatural vocation by God the Creator) is not reducible to the possibility of an indefinite auto replication of our cells (or of those of a donor); personal salvation is not the mere attainment of health. In this light, the eventual perspective of a limitation on the availability of human stem cells as a consequence of the respect due to the life and dignity of the human embryo, or, more likely, of a longer wait for the attainment of the same therapeutic objective through alternative approaches that involve adult stem cells, does not contradict and indeed is fully compatible with the human transcendental destiny (cf. Evangelium vitae, n. 38). Such a "supernatural" realism helps doctors and patients avoid a utopian drift to a biological perfection that would eliminate the finiteness of human beings, and so disease and death. It encourages doctors to research therapeutic strategies that are more adequate, corresponding to the integral richness of the person of the patient, and enables the latter, in his or her fight against the disease, to search for a meaning also for suffering and to maintain a hope for one's own life that does not exclude the quest for salvation contained in the legitimate search for health.
The steps of science that more directly regard human life, particularly those of biology and medicine, are
 guided by an aim and according to a method that should be carefully considered and evaluated. The claim
 for an unlimited freedom of research and for an absolute autonomy [9] of the methods employed to reach
 specific objectives in biology or medicine, assumes a notion of science that is confined in itself,
 understood as an ideal exercise of theoretical (or practical) self-referential knowledge, an instrument of
 technological advancement incapable of questioning itself on the meaning of the authentic human
 progress. On the contrary, «science in general, and medical science in particular, is justified and becomes
 an instrument of progress, liberation and happiness only insofar as it serves man's integral well-being»
 (John Paul II, Discourse to the Participants of a Congress of Neuropsychiatry, April 12, 1986;
 Insegnamenti, IX,1 [1986], p. 995). The moral duty of this task, which makes science noble and elevates
 those who work in scientific research, begins with the consciousness of setting a limit, certainly not to the
 creativity of the work or to the horizon of investigation, but rather to the empirical instruments that must
 be adopted in each realm of research and to the choice of the proper methods to follow. The integral
 well-being of the human being requires the acknowledgement of a specific anthropology, the idea of a
 "humanity" that cannot be harmed or instrumentalized during the actual course of any research or in the
 eventual applications of the results obtained. Within scientific knowledge, no less than in ordinary
 knowledge, the method is dictated by the object of the investigation, and thus it is not correct to use the
 same method in each case. This "objective" limit to the path of knowledge suggests that the study of
 human stem cells cannot be conducted with same procedures adopted for the stem cells of other animals,
 for example, by isolating them from living embryos developed in the laboratory. The adjective "human"
 means something substantial and not accidental. It imposes an unavoidable change of method in any
 scientific approach to the object/subject "human being," to every single person and to all human beings
 from the beginning of their existence.

As for other ethical considerations of scientific research and clinical medicine, including the study of
 stem cells and their applications in graft therapy "the fundamental criterion must be the defence and
 promotion of the integral good of the human person, in keeping with that unique dignity which is ours by
 virtue of our humanity. Consequently, it is evident that every medical procedure performed on the human
 person is subject to limits: not just the limits of what is technically possible, but also the limits determined
 by respect for human nature itself, understood in its fullness: what is technically possible is not for that
 reason alone morally admissible" (John Paul II, Discourse to the XVIII International Congress of the
 Transplantation Society, ORWE August 30, 2000, p. 1). Among the procedures that do not respect the
 dignity and the value of the human person, are those that entail the manipulation and the distribution of
 human embryos for research aims or for tissue grafts on patients, which are not morally acceptable even if
 used for an aim good in itself. The statement of the principle that protection is due equally to lives both
 conceived and already born, can be found extensively in the ordinary Magisterium of the Church and
 belongs to the tradition of Catholic moral theology (cf. Evangelium vitae, 57, 63).

As to the therapeutic application of stem cells obtained from human embryos generated in the laboratory
 through artificial fertilization and no longer destined for endouterine development because
cryo-conserved for a certain time in centers for the cure of female sterility, several Christian authors
 maintain that it is not necessary to impose an absolute prohibition on the use of those embryos for such
 experiments. Following ethical theological theories like proportionalism and consequentialism, some of
 them see in the research of the embryonic stem cells a mixture of good and bad effects, and do not
 acknowledge that respect for the life of the human embryo must be considered a fundamental moral
 value, at least until a certain stage of development of the embryo. The presence of both good and bad
 effects would then obliged us to judge the morality of experiments on human embryos in a differentiated
 way: its moral "goodness" should be evaluated on the basis of the positive intention of the researcher with
 respect to the possible therapy of certain diseases; its "unjustness" on the basis of the negative effects on
the life of the embryo (considered only as a "pre-moral" value of physical or ontological type). As a consequence, though admitting that in vitro fertilization or cloning, if performed to generate a human being, are "wrong," they do not consider as morally "bad" the will that permits, plans or performs the extraction of stem cells from human embryos conserved for a long time in liquid nitrogen, or even recently "given" for this purpose by couples that have undergone treatment with techniques of artificial procreation. This moral evaluation is based on the destiny otherwise reserved to these embryos (progressive wasting or destruction) and on the intention of the biologist or the doctor —and ultimately of the donor couple— that is oriented to a great moral good (the research of a therapy for patients), a good that is judged as decisive in that circumstance.

It is understandable that such reasoning is persuasive, since it accords with the scientific and technical mentality of researchers and doctors, accustomed to evaluate pragmatically their scientific, diagnostic and therapeutic activities, on the basis of the relationship between results and resources and among different benefits. Such a mentality, without any warning, sometimes passes from the doctors to those who come to centers for sterility treatment, who are thereby led to consider the result of human procreation more a "product" of an effective biomedical intervention rather than "the personal object of God's loving and fatherly providence" (Evangelium vitae, n. 61). However, even the most scrupulous evaluation of the good and bad consequences of an action is not an adequate method to judge the moral quality of a choice, such as the choice to intervene in a human life. Neither is it sufficient to have a good intention in acting, since "the morality of the human act depends primarily and fundamentally on the 'object' rationally chosen by the deliberate will" (Veritatis splendor, n. 78), that is, whether this object can be ordered to the good and to the ultimate aim of God. "Reason attests that there are objects of the human act which are by their nature 'incapable of being ordered' to God, because they radically contradict the good of the person made in his image" (ibidem, n. 80). Among these disordered acts are any that militate against human life itself, such as suppressing, violating the integrity, and offending the dignity of a human being from the moment of conception to natural death. Thus, the generation by cloning of a human embryo with the aim of using it as a source of stem cells for culture and differentiation, and subsequently for grafting into the body of patients that have given a nucleus from their somatic cells for the cloning, remains an action contrary to the dignity of the human person. No particular circumstance, and no good intention, is capable of rendering such an act good, even though the act may be intended to safeguard or to promote an important individual good such as health.

The fascinating and providential human efforts in the biomedical research of metabolic, hereditary, degenerative and oncologic diseases -for which tissue grafts from stem cells may be beneficial- is not faulted by the teachings and clarifications offered by the Magisterium of the Catholic Church, here briefly summarized. Nor is the legitimate desire of the scholar to know reality, nor that of the doctor to discover and fight diseases, nor that of the patient to aspire to a better quality of life. The prescription not to use stem cells from human embryos, but rather to turn to those obtainable from different tissues, directs efforts towards solutions that fully correspond to the integral well-being of the human being and, at the same time, are scientifically and clinically viable. Many scholars and doctors have perceived this natural correspondence of conscience and professionalism, with the firm belief "the Gospel of life is not for believers alone: it is for everyone. The issue of life and its defence and promotion is not a concern of Christians alone. Although faith provides special light and strength, this question arises in every human conscience which seeks the truth and which cares about the future of humanity" (Evangelium vitae, n. 101).

Read also:  
Soul [5]
Bioethics [8]
Medicine [3]
Documents of the Catholic Church related to the subject:
*Abbreviations and complete titles of the documents* [10]

Innocent XI, DH 2135; *Mater et magistra, EE 7, 413-414* [11]; *Gaudium et spes, 51* [12]; *Humanae vitae, 14* [13]; CDF, *Declaration on Procured Abortion* [14], 18.11.1974, ORWE 5.12.1974, pp. 6-8; CDF, *Donum vitae* [15], EV 10, 1173-1196; *Evangelium vitae, 13-14, 43-45, 63* [16]; John Paul II: *Discourse to the participants to a Congress of the Pontifical Academy of Sciences, 23.10.1982* [17], Papal Addresses pp. 253-256; *Discourse to the participants to a Meeting of the Italian Association “Movimento per la vita”, 3.12.1982, Insegnamenti V,3 (1982), pp. 1509-1513; *Discourse to the XVIII International Congress of the Transplantation Society, Roma 29.8.2000* [18], OR 30.8.2000, pp. 4-5.

**Bibliography:**


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