

The Ontogenetic Origin of Human Beings in the Scientific-Ethics Perspective and its Implications on Abortion

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Abstract

Abortion implies legacy, ethics, moral, religious, theological and political considerations and consequences. Abortion implies two main actions: 1) interruption of pregnancy with fetus nonviable ex-uterus or 2) killing the embryo or fetus. The intention to kill the human conception is a necessary condition for being an abortion. However, at what stage the zygote, embryo or fetus is an individual of the *Homo sapiens* species as to decide that action was an abortion? We have two contradictory positions: 1) the scientific or ontic position establishing that endogenous processes and conditions determine humans; 2) the conventional or gnostic position believing that this determination is an exogenous deliberation from religious, ideological or legal assumptions. Scientific Ethics (Sc-Et, a new form of Ethics) assumes the ontic position. For Sc-Et humans and any living being begin its individual existence due to specific endogenous matter-energy processes regardless human conventions. We, humans should study these processes and allow them to convince us on their specificities. Sc-Et accepts the process of cosmic and organic evolution and uses all kinds of demonstrations to establish its notions and definitions. For Sc-Et the process of evolution generated humans and their ethics and culture; it is not the human thinking that generates evolution. For Sc-Et, humans are individuals of *Homo sapiens* species that begin as an individual as any living being begins as an individual of their respective species. The phylo-ontogenetic process auto-define endogenously (from within) the beginning of *H sapiens* at the zygote stage. This viewpoint disagrees with most conventional religious, ethical and law positions which may lack of reality. Several conventional propositions on the ontogenetic origin of *H sapiens* are refuted showing that the present ethical, bioethical, law, religious or ideological approaches to this subject are often contradictory and show rather a picture of cultural schizophrenia.

Keywords: Abortion; Humans; Ontic-gnostic approaches; Ontogenetic origin; Philosophical-scientific debate; Scientific-Ethics

Introduction

Abortion has etymologically, in a wide sense, two nuclear meanings: 1) interruption or arrest of the development of a process, in this case non-arrived-to-birth or born (or delivery) before (normal) birth [1]; 2) the destruction of a process, in this case, the death of the fetus or embryo or the action of killing it. Any interruption of development (with or without delivery, with or without fetal death) since conception to birth is included in this wide meaning; also, it includes the killing of the embryo or the fetus. Two different conditions are possible: spontaneous abortion or miscarriage and induced or voluntary abortion. From medical, legal, theological, moral or ethical practices, voluntary abortion needs specific definitions [2]. In a medical context abortion means the interruption of pregnancy when the embryo or fetus is unviable out of the mother body (uterus is not the unique place for pregnancy). Since pregnancy is currently (but not for everybody) accepted after implantation, most of medical guidelines do not consider abortion the interruption of development before implantation. For an ethical, theological moral or legal (particularly penal) definition it is needed the intention to kill the fetus to constitute abortion. An action that leads to the interruption of pregnancy but without the intention to kill the fetus is not considered as an abortion for those disciplines [3, 4]. It is important to remark that to kill intentionally the fetus is legally an abortion even though the pregnancy is not interrupted. In addition, pregnancy needs to carry a human being fetus for its interruption to be an abortion; nobody considers abortion the interruption of pregnancy with a hydatidiform mole [5]. We proposed that the same applies to human triploids [3] and anencephalic fetuses [4].

Scope

Thus, for moral, legal, ideological and religious viewpoints, values

and consequences of an abortion, the ontogenetic stage at which humans are an individual of the *Homo sapiens* species (human) is crucial to decide whether a voluntary interruption of pregnancy or killing a zygote, embryo or fetus is or is not an abortion (according to the assumed viewpoint). This article refers to this transcendental decision or definition.

However, the ontogenetic stage, moment and conditions for a biotic process to be a human being is and endless debate. From Philosophical Ethics or Moral, Bioethics or Medical Ethics no consistent and conclusive solution has been proposed [6-7]. It is time for us to ask whether this subject can be solved by these disciplines founded in the human rationality, intellectuality or beliefs. We see that the problem is politically, religiously or ideologically laden, because the moment or condition to be human is defined mostly by an a priori belief. One of the most serious problems in this debate is the confusion between the factual reality (ontic plane) and the interpretation (that is always biased) of that reality (gnostic plane). The scope of this article includes a differentiation of both planes and a presentation of a new vision of Ethics (Scientific Ethics) that help to solve these problems.

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Ontic and Gnostic approach to Knowledge

The situation is understood if we think in two sources from where notions, definitions or critical variables acquire decisive values. 1) The human thinking closed on itself. We called this position as the Gnostic-discriminative position (a difference with Gnostic position is made because this implies an ideology or religion); it proposes that the definition of the beginning of humans is a matter of convention within a specific religion, ideology or belief; this position implies exogenous (from without living beings; or from human beliefs or conventions) critical factors for (formal) definitions. This is the present situation where some Churches, Parliaments, Gnostic or Agnostic movements or other beliefs have defined particular moments, stages for the human beginning, or denied that the beginning could be determined. This position leads to an unsolvable situation because any specific faith or belief considers disagreements with it as erroneous definitions. 2) The scientific perspective where the human thinking is devoted to know nature as it is and leaves nature, in this case human processes, to self define when humans are humans; we call this position the Ontic-discriminative position. The ontic-position searches endogenous (from within living beings or from biotic matter-energy processes) critical factors to construct notions and definitions; it specifies a clear aim for science which is not mainly involved in explanations, theories, rational approaches or in general gnostic representations of the universe or nature, but on the whole concatenation and causes of universal processes. Ontic-science intends to understand the happening (the course of natural processes) its past, present and future; explanations, theories, hypothesis are transitory intellectual tools to achieve its goal. Scientific Ethics (Sc-Et) is based on the ontic position [3-4,8-13]; it accepts and is based on the cosmic and organic processes and conditions of evolution that we know by the direct perceptive and scientific knowledge that is always incomplete. However, this incompleteness does not invalidate the well established knowledge.

Ethics as the Sense or Meaning of Action or Motion

Ethics and moral have an ancient Indo-European meaning which core is behavior (remember ethology), conduct and character in the sense of disposition (or better, a predisposition to do something, or to do something with sense or meaning, in this case searching the goodness or evil, for whom performs the action). Thus, in ethics or moral the basic unit is a motion with its predisposition. We decided to move from A to B1, when we could do it B2, B3...because, for us, B1 was better. This movement may be within our mind (conative or intraminded, for example the case of religious conversion) or originate external actions. Thus, for Sc-Et, Ethics is sense of movement or motion-sense, or the semantic and hermeneutics of action, not only restricted to humans but to the whole universe. We move intra- or extra-mindedly, conscious, subconscious or in conscious, towards what we consider, think, feel or esteem our "Goodness" (or Well) is. Thus, for Sc-Et its first principle is the second law of thermodynamics (the motion-sense from non-random to random matter-energy distributions). Its second principle is cosmic and organic evolution (the sense to diverge specifically from the origin and never return to it; the universe is going to somewhere). Its third principle is related with the other two, it is a principle of the unrepeatable and irreversible (second law of thermodynamics) specificity and identity of any process; it is sometimes called the principle of historicity; history is determined by regularities (nomology or natural legacy) common (necessary) to any process, and by idiographic (contingent) irreducible components. Its fourth principle refers to the dichotomy that processes have of sharing characters (shareability or having similarities) and distinguishableness

(having differences). Thus, all the (ontic) distinguishable processes share with any process some similar and different elements, traits or relationships.

The unity of any action with sense is the decision (human or non-human) specified by a vector with origin and end (from A to B1). The universe being in an eternal becoming does not allow not deciding. If someone offers you tea and milk, you can decide for tea, milk, tea-and-milk and non-tea-and-non-milk. Is any decision completely determined or free? This is an un-decidable problem (as the Gödel's problem, the demonstration is out of the scope of this article, OSA); in short we cannot determine whether any determination is determinable because we use the use of a tool to demonstrate that the tool can be used as a tool to obtain a valid result of its use (recursive epistemic circularity). Any decision has a proportion of determined elements, but the totality of its determination shall always remain incomplete (irreducible idiography) [14-16]. Thus, Sc-Et deals with the Ontic Well that is independent of and before humans. Does the Ontic-Well exist? Our answer is yes, not from rationality (which is powerless to answer that) but from factual existentiality. As in Hamlet's To-Be or Not-to-be which is an ontic question for which insufficient rational or gnostic answers could be given, we realize existentially that To-Be is better than Not-to-Be, otherwise nothing could be. However, Existence is the only reality that we can accept as an Ontic-Well (this is not philosophy but factual science); the Well of other realities is culturally influenced and biased. Religions and Ideologies are proposed programs for the eternal possession of the complete Well (happiness, the heaven, the paradise, the society without classes, etc.). Sc-Et accepts these proposals as human cultural realities merged along with human evolution; for Sc-Et all of them are equally valid; the only ethical fault is inconsistency, incoherence or inconsequence between actions and those respective proposals. Thus Sc-Et takes Ethics away from philosophy and constitutes itself as an independent and autonomous discipline in search of the Goodness or Well (regardless rationality); so Sc-Et is closer to technology, ideology, politics or religion. Human Sc-Et is then the theory and practice of human (conscious, subconscious or unconscious) decisions to search and live (practice) the Well.

Tools of Scientific Ethics

Sc-Et uses scientific and logical demonstrations for solving dilemmas, even in the field of mental actions (neuroscience, based on evidence ethics); Sc-Et works with all the sciences and reflexive disciplines. For Sc-Et the so called Fallacy of Naturalism is a forced incompletely proposed pseudo-problem. In summary, this fallacy (a version of it) proposes that a (moral or ethical) prescription cannot proceed from a (scientific) description, because there is a mental assignment of values that cannot come from a simple scientific knowledge. Sc-Et studies scientifically prescriptions (mental matter-energy processes) as a particular kind of decisions, thus considering them as describable actions, and doing so Sc-Et accepts all the researches in Psychology, Ethology and Neurosciences of decisions. Prescriptions do not come from an inaccessible dimension, but from specific cognitive (included religious or ideological fields), emotive, affective and moral valuation as neuro-psychic mental elements and other non-specific mental functions. We use these demonstrations for solving the stages at which humans begin.

Philosophical Remark

Two philosophical theories should be minded. 1) The Aristotle-Thomas Aquinas Hylomorphism [17] that proposes that any body is composed by "matter" and form; this "matter" is not the physical

matter we know at present, it is near the term substance (unfortunately, some English treatises take substance as composed of matter and form) we use in Spanish and English with a meaning closer to the constitutive general element or material substance; precisions are OSA; we use the present meaning given by The Oxford Dictionary of Modern Greek (1982) [18]: substance s. (material) ὕλη. Thus, Hylomorphism is rather the theory that any entity, body or corps is constituted by substance and form [19]. In this context we can accept that humans are constituted by “living (biotic) matter (or simply matter)” and “human form”. We see an unsolvable problem, not with living matter that we accept as cells and intercellular elements, but with development; the human form, at what stage? Is an individual *Homo sapiens* human as a zygote, embryo, infant, and child, adolescent, adult or senescent human? Hylomorphism is untenable according to our knowledge of developmental biology and genetics, because all the mentioned stages are produced without solution of continuity and have differences in form that cannot be assimilated to only one. Neo-hylomorphists have intended to save the theory, but without satisfactory results [19]. The disciplinary matrix of biology has demonstrated that at all the stages living beings (humans) are only one integrated process dynamically produced by the interaction of their genomes and environments in a specific form. We do not need the help of substance and form, because the substance is the genome-environment interaction and the form is produced by this interaction. Hylomorphists [20] then used the Aristotle-Thomas Aquinas distinction in “Act or Actuality” and “Potency or Potentiality” [21]. Actuality is the factum that happens now; potentiality is what is possible to occur, in the future, from what occurs now. Greeks and Scholastics knew the dynamic condition of nature: beings, things or processes (in a present version) have something that is and is maintained, but they inexorably change. In a more present version we can say that processes present at any moment an organization or structure that partly remains and partly changes in diverse degrees according to the process. But, this presentation is not the Actuality-Potentiality of Aristotle-Thomas Aquinas idea, because processes are never static (the static act and the dynamic change are gnostic conceptions), they neither are nor are-not, they are always happening, their being is to happen (an uninterrupted succession of a matter-energy distributions of their elements), then it is to change; any actuality is a transition of the happening and cannot be separated from it. The nuclear idea of this conception was elaborated by Heraclitus [22]. For the present developmental biology a zygote is as a complete human and actuality as an adult human; no potentiality is present at any developmental stage. Any living being is, at any moment, full expressing its genome-environment interaction and does not need to continue its development to be a complete individual. Heraclitus proposed (fragment 41) “Into the same river you could not step twice, for other <and still other> waters are flowing” [23]. Cratilo (his disciple) went farther and changed twice by once. Does the river exist as a fact? Is the river a human mind creation? (This discussion is OSA). However, in particular the Heraclitus’ position and in general philosophy are weak because they miss the precision of specificity, distinguishableness (of processes), identity, genesis and development of beings. It is crucial to determine whether a human is the same from zygote to senescence in spite of all his or her matter-energy elements and relationships are in a continuous turnover. What does remain? Biology answers: with few changes the genome and the relationships among the elements determined directly or indirectly by the genome remain. As the nervous system develops the self-consciousness and center of individual decisions is taken by the brain that gives to the individual the feeling that he or she is he or she, respectively, leading to the self-gnosia of individual identity. So we can accept that in living

beings individual-identity remains in spite of matter-energy turn over if their genome allow that; but not necessarily for ever (mutations may transform cells into cancer). Potentiality is inconsistent when the destiny of any living being is considered. Their inexorable destiny is death, so potentiality implies that we are always potentially dead; this changes the sense of any ethics and put a hard difficulty to the Actuality-Potentiality position. For present science and Sc-Et the Hylomorphism or the Actuality-Potentiality, positions are unnecessary; they rather blur the problem.

Individuality, individuation, identity and identification

Etymologically, individuality means that it is not possible (act-potency position) for this being to be divided (or separated) in parts; also, it has been proposed that it is an undivided (indiviso in Latin) being constituted by an integrated whole inseparable into partialities. This is an old and obsolete meaning, that was refuted when natural cloning, division or fission were discovered in most if not all living beings, even in humans (monozygote or Siamese twins), or when some invertebrates (worms) are cut in parts and any part regenerates a whole individual (but the original individual disappears). Identity is in the biotic world, to remain the same, as we saw. Integration, as a need for identity-individuality, is also refuted, as for example when a fundamental organ with its function is performed out of the individual body as in renal dialysis, or by a not-own organ as in organ transplantation. Now, individual means –a process with an autonomous (separate and ontically distinguishable) program of biotic development and auto-specification (auto-identification), included the facultative program of its extinction by reproductive division (as for example unicellular fission)-. Individuation is the process of generation and maintenance of individuality. With this precision, we realize that individuation has not been interrupted since the emergence of cells until now. Cells generated cells, which originated multicellular organisms, included humans that produce gametes (cells) whose fusion yields zygotes (cells). Spermatozooids are not autonomous so they are not individual cells, but ova (oocytes) are autonomous individuals (they may originate multicellular processes as haploid teratomas). Both human gametes are not human individuals because their functional genomes are not human genomes; their genome specificity is not human. The problem of the origin of the human individuation is a pseudo problem. What we should determine is the conditions and moment or stage when the individuated oocyte is transformed into an individuated human [9-12]. We gave the solution: a human begins when the complete functional human genome is integrally incorporated and activated in an embryonic activated oocyte environment; this is valid also for transferotes that are individuals obtained by nuclear transfer as Dolly the sheep [12,24]. Individuation is interrupted in transferotes; the obtainment of cadaveric cell rests (nucleus of mammary cells without cytoplasm and cytoplasm of oocytes without nucleus), which are not individuated, is before the fusion of these rests in search of a living (individuated) transferote. We saw how cadaveric (nonliving) rests constituted a living being as in the story of Frankenstein. Thus, a generalized failure of the fusion was expected and Dolly was the only alive at birth among near 300 transferotes and resulted aged, with arthritis and was euthanized before a pulmonary viral tumor killed her by suffocation [25].

The Ontogenetic Human Origin

Turning to the problem of the ontogenetic origin of humans, Sc-Et as an ontic-discriminative discipline searches for the matter-energy processes that define an individual as a member of the *Homo*

sapiens species, from within and not as a conventional definition given by humans or human organizations or institutions. Sc-Et proposes that humans with their ethics, philosophy, science and culture are the product of the evolutionary process and not that evolution is the product of human culture as some constructionist theories propose. The moments or matter-energy conditions to be a *H sapiens* individual are not different from the moments or conditions to be any multicellular organism, more precisely an animal, vertebrate, mammal, primate, hominoid and hominine. No biologists, embryologist, or scientific researcher working in developmental biology has any doubt that any multicellular organism that develops from a zygote is a full individual of the respective species since it is a zygote [26]. Two very different problems that have been confounded hinder the solution to this analysis: 1) the identity or the process of self-identification as a member of the species or quality of living being; and 2) the moment or condition to be such a qualitatively specific being. To specify unambiguously both situations we must remember the core of the biology disciplinary matrix. This well established core shows that any matter-energy character of a living being and the living being itself is produced, directly or indirectly, by its genome-environment-interaction. Thus, at present any problem related to living beings should be understood within this interaction. For understanding, the basic features of development see elementary textbooks on this subject [27-30].

The Positive Proposition on a Living being

A living being is a complete member of the species if it has a specific functional genome of this species interacting dynamically with its environment and constituting a complete autonomous net of sub-developmental processes coordinated in the integral ontogenetic process of this species. Some features should be emphasized. 1) The Genome as the core of a living being. Living beings are organized processes whose organization is given and maintained by their genomes through a genome-regulated-coordinated matter-energy interchange with the environment. 2) The functional genome gives the specificity of an individual. For doing so, it is not sufficient the genome base sequence, it is necessary the genome with all its genetic, epigenetic and functional modifications that produce a specific operative genome. 3) Integrality as a necessary condition. A biotic individual is a process, which includes several sub-processes; these sub-processes are integrally coordinated in a dynamic changing net of processes or developmental program. 4) Autonomy: Perhaps the most important feature is autonomy; the net of sub-processes behaves in such a way that the developmental process proceeds fully and specifically from within (self-proceeding, endoparagotic), adaptively associated with variations of the environment; the contingent changes of the environment or the genome (mutations) are resiliently handled in homeostasis within living margins, out of whom life is impossible. 5) The specificity of genome-environment interactions; The functional genome needs to be in a specific environment (here environment is those processes which are not the genome, it includes the karyoplasm and the cytoplasm) to elicit the specific process of the developmental program; an embryonizing environment or an environment that allows for the development of all the cells, tissue and organs. To develop a zygote (or transferote) or an embryo, a functional genome should be in a specific zygote or embryo generating environment. In summary, an individual is an autonomous, integrally coordinated net of sub-processes within a developmental program that is produced and specified by the interaction of a functional genome with its environment. Any zygote of a multicellular living being fits these conditions, so it is a complete individual of the species.

Refutations of some instances proposed as the human origin

1. Fertilization is refuted because several zygotes and embryos are naturally or artificially obtained without this process. Male hymenoptera often develop without fertilization, and parthenogenesis is not rare in the biotic world. Nuclear transfer (transferotes) that replaced fertilization [24] has obtained dolly (the sheep) and other mammals (recently humans). In addition, it is possible that after fertilization the ovule reject the incorporated spermatozoid. Neither fertilization nor nuclear transfer warrant full integration, integrality or autonomy of the mixed cell composite.
2. Embryo stages where homologous or heterologous fission or fusion is still possible are refuted by the occurrence of these processes in nature or in labs without confusion on the quality of individuals resulting from these processes. The fusion of unicellular or multicellular organisms occurs in nature in prokaryotes or eukaryotes, plants, fungi and animals. Moreover, heterologous fusion of individuals from different species seems to be an important mechanism of evolution [31]. In fusion, there are two or more individuals before the fusion and only one individual appears after the fusion. In fission, a similar situation occurs, before fission there are one individual and after fission, there appear two or more individuals, and the original individual disappears. All the individuals who participate before and after these processes have the features to be complete members of the species. The case of fission of planarians is demonstrative; they can be cut in several parts and any part develops and recovers the complete form. Which is a planarian individual? The complete planarian individual before cutting it. Is any part after cutting it one individual? The solution from Sc-Et was already given [9-12]; there is one individual before cutting and several individuals after cutting; the original individual vanished when cutting, and individuation is present at all stages of this process, but with different specific individualities. Fusion has the same solution: there were several individuals before fusing, and all these individuals disappeared after fusion to give rise to a unique individual. In incomplete fission as in the case of Siamese twins the number of independent individuals is given by the necessary features to be an individual. There is a hierarchical scale where autonomy (and in adult humans brain or mental autonomy) is the most important and is the critical variable to decide (OSA).
3. In humans, the precursors of the central nervous system appear between the 13th and 19th days after fertilization (primitive streak, neural groove, notochord and neural folds). The emergence of these tissue organizations [32] has been proposed as the origin of a human individual, because of the importance that the brain has in adult humans. This position is refuted because I) multicellular plants (living beings) develop from zygote and do not have nervous system; II) several multicellular animals have nervous system and rudimentary brain but they are not absolutely necessary to be an individual, we mentioned the case of planarian where any fragment after cutting it is a new individual regardless the part of the nervous system it received after cutting; III) The argument is based in the adult or after the organogenesis is completed, where the brain is really the organ of identity, but in the embryo these tissues are not the organs

of identity and can be replaced (transplantation) by other tissue and will be induced to develop into brain which seems to occur by an interaction between notochord and mesoderm independently of the anatomical region where they are placed [33]; IV) Any tissue at this stage is as important (for autonomy, integrality, identity and the other features of individuality) as the nervous system for the whole embryo so, why not the primitive heart, the skin or the immune system? The argument III) and IV) are based in the critical function of the brain after organogenesis and specifically in the postnatal life. This critical function, in the post natal human is demonstrated by Sc-Et by a semi-imaginary experiment [4]. The identification function of the brain between the post-organogenesis stages and the birth has not been determined. The transplantation of a pig heart, lung, liver or any organ (less the brain) into a human person conserves that human person, but the transplantation of a pig brain into that person transform him or her into a pig with the human body of the person. This is possible because near or after birth the brain begins to take the identity of the human individuals and by and by becomes the center of decisions of the individual as a whole. This does not occur in the embryo where the brain is not the center and the most important organ for matter-energy decisions. We are here immersed in the principle of ontogenetic historicism. If we think in moral decisions that are responsible decisions, the situation is still more crucial.

4. Implantation in uterus is refuted because there are mammals whose reproduction does not need uterus (Monotremata as echidnas and platypus) or its need is for a very short period (Marsupials). Also, implantation may occur not in uterus (oviducts, peritoneum, etc.). What is implanted is not the embryo but the trophoblast. The gestational age at which a fetus may live out of uterus has decreased; sixty years ago, it was difficult to rear premature newborns with less than one kilogram; now, there is the case of a premature newborn with less than 0.3 kilogram that developed as a child. On the other extreme, in the beginning of mammals (included human) in vitro fertilization is possible leaving embryos to develop for one or two weeks out of uterus. It is not impossible to develop a human embryo out of uterus if nutrition, gaseous interchange and excretion are provided; perhaps this fetus would have severe relational impairment, but nobody will say he or she is not a human being.
5. The human specificity proposed as an ethical argument of the origin of humans. It is often said that humans originate when they acquired their species-specific traits as the Broca's brain region that allows humans an articulate language. This argument is valid in the phylo-ontogenetic foundation of the human specificity as an autapomorphic (species-specific) or pathognomonic character, but not in the comparison of several different species arguing that they are different because they have species-specific traits. If they have different specific traits, then they are equal, because all of them have the same distinction. They are equal because they are specifically different. As we mentioned, the demarcation by specificity has nothing to do with the condition of origin. A pig originated at the zygote stage equally as humans or human or pig hydatidiform moles.
6. It has been proposed the initiation of the quality of human by

the acquisition of social relationships or communication. In our clinical practice we have had children without the Broca's area; they did never speak, but they were human. Autistic children are humans, even though they have an extreme impairment of sociability or attachment.

The zygote is a complete human (or non human) living being

As we remarked zygotes of multicellular organisms fulfill all the requirements to be complete individuals of the species. They have the functional genome, autonomy, a full-integrated net of their sub-processes (integrality); they are a specific functional genome interacting with an embryonizing environment. We can illustrate this condition by considering zygotes that are generated as human zygotes, but not as human beings. Hydatidiform moles are mostly zygotes with paternally imprinted genomes produced (although biparental moles are also produced) [5,34,35] by the fecundation of an oocyte by two spermatozooids and the exclusion of the oocyte nucleus. As zygotes, they are not differentiated from a human zygote, excepting by the preferentially paternally imprinted genes. The origin is at the same stage: the zygote; but the genome is functionally molar or (exclusively) human, respectively. For triploids, the situation is similar; they are triploid from the zygote stage, although the condition of human or not human is debatable [36]. We have proposed that triploids are not humans [3]. This position introduces a very important problem on the critical functional genome to be a human being. To answer this question we must realize that "to be human" is a complex phenotype, and then we ask for the number of genetic interactions (models) that can yield this complex phenotype. This number has been calculated in relation to the number of loci and the number of alleles at each locus that can yield a complex phenotype [37]; for 3 loci, each one with 2 alleles, there are more than 34,000,000 of models (genetic combinations) to produce one phenotype. Thus, the problem to determine whether a functional genome could yield a human being, when it is integrally located in an embryonizing environment, is practically unsolvable. Which is the specific developmental stage where humans begin? It is not fertilization or nuclear-cytoplasm contact in nuclear-transfer experiments. The critical process, according to our criteria, is the nuclear-cytoplasm integration in a full genome-environment coordinated process that gives the embryonizing projection (zygotes or transferotes). This may be when the oocyte cytoplasm induces the chromatin decondensation and DNA begins to transcribe. It is critical that a mixed matter-energy (molecular) process be installed to judge the beginning of a new individual. Also, the duplication of the centriole could be considered the beginning of human, because the oocyte does not have centriole which is given by the spermatozoid; when duplicated it has molecules coming from both gametes. Several other integrated processes could be proposed [9-12, 35], however, it is not possible to deny the initiation of the DNA synthesis (integrative semi-conservative mixed process) as a full constitution of a new individual, because this process produces four copies of the human genome (two paternal and maternal or four somatic human genomes in transferotes), that is a quadruple auto-identification process in which all sub-processes of the new cells participate.

The scientific vs philosophic-theological dispute

We established that the human zygote is a complete human individual with demonstrated scientific facts, by assuming that *H sapiens* is a matter-energy-constituted species without any difference as a species with other species. If these assumptions are not accepted,

as the philosophical and religious or theological positions proposed, other conclusions are possible. If the assumption that *H sapiens* has only matter-energy-constitutive elements is considered false, that is there is a non-matter-energy-constitutive element that is not present in the other animals or living being, other conditions of initiation of human are possible. As for example, if the beginning of humans is at the moment of animation by the soul, there appears a theological origin of humans that depends of the particular faith in the soul and its nature. However, this position introduces an interdisciplinary contradiction where humans begin biotically at the zygote stage and theologically at the animation stage. Since theologians must accept biology, they should accept a kind of two stages for the constitution of humans as complete individuals. A theological consistent and coherent solution is to accept the animation at the stage of the zygote as we have defined here. However, there are not religious positions that propose this solution. The Catholic Church which is the nearest to this position has accepted the animation since the fertilization stage or the conception, and we saw both are very different processes and the fertilization is refuted as the origin of humans (and any multicellular organism), thus the conception has not been clearly homologated to the zygote state. We cannot deal with in detail this subject, because the nature of the soul is different according to the different religions. Hinduism accepts that animals have soul and they are persons and divinities. Some religions accept that the animation occurs after birth and even in the childhood.

Philosophical approaches introduce some conceptualizations such as person, emergent psychosocial complexity, or sociability. Unfortunately, person is a poorly defined notion and concept and a polysemic word. It is more precisely defined after religious or ideological pre-conceptions. For Etruscans and Romans person was rather the mask in a theater representation, for scholastic theologians it was mainly the Persons of the Saint Trinity; for legal disciplines person is a subject of right; and so on. The existence of the emergent psychosocial complexity is under debate; some researchers say that emergent complexity is simple present ignorance and in the other extreme, they say it is an emergent trans-matter-energy element that it is originated at some level of matter-energy complexity but that it reaches non-matter-energy autonomy. It is difficult to differentiate this last position from the proposition of soul. An interesting problem arises with Gnostic and A-Gnostic ideologies or positions. Both are based on attributing complete sufficiency to the human thinking, reason or intellectuality to define the problem of the Well or human happiness. While the Gnostic position assures that certain knowledge is possible and faith in trans-material realities is accepted, the A-gnostic position does not accept transcendental realities as certain. The moderate A-gnostic position accepts reason as the human tool to solve ethical problems, but the extreme A-gnostic position believes that no certain knowledge is possible (and less of the Well). Doctrines based on human thinking or reason cannot demonstrate the validity of human thinking or reason by using the human thinking or reason; thus, the sufficiency of reason remains as an undemonstrated ideological belief, as religious as any religion has. The trust in reason is a dogma of faith as Hegel established in the initiation of his Life of Jesus "The pure reason going beyond any limit is the very divinity" (translation is mine) [38]. Other philosophers and sociologists think that the foundation of humanity is its sociability, but as we mentioned, autistic persons have their sociability severely impaired. Any theology, ideology or philosophical position that criticizes the scientific ontogenetic origin of humans should mind that the critics involved also the phylogenetic origin of humans. Does Neanderthal have soul? Was *H erectus* the first human? Our first ancestor was a unicellular organism as the zygote; this is

another proof of the zygote as the ontogenetic origin of humans. Are all humans person? The answer is controversial [39,40,41], however, it is clear that not all product of human fertilization is a human and a person [5,12] and "person" differs for ideologies, religions or the law [39-42]. Scientific Ethics has the advantage of considering ontogeny and phylogeny together in a coherent vision and of including religions, ideologies and political position as part of matter-energy cultural evolution. Unfortunately and it is a pity that philosophies and theologies have seldom incorporated cosmic evolution in the core of their meditations.

Conclusion: is it the Galileo's case again?

The situation is similar to that of Galileo-Copernicus versus the Catholic and Lutheran Churches controversy [13]. What is the method to establish the truth in the human nature and especially in the mind and psychosocial processes? Is it neuro-psycho-social-sciences? The truth found by Biology on *H sapiens*, is it going to be accepted by philosophers, theologians, Gnostics and Agnostics? Do they accept organic evolution? Do they accept the determination of any human character and the whole human nature by the genome-environment interaction? Dolly showed us that not only obtaining humans by nuclear transfer was possible, but the complete synthesis of humans (and out of uterus) was possible [43]. It is interesting to remark how the huge advances in Physics, Biology (evolution, genetics and genomics), Chemistry, Cybernetics, and other scientific disciplines are not full accepted and incorporated into philosophies, ethics and theologies. Now we know there are genes involved in sexual fidelity, polygamy and monogamy and others behavioral traits with ethical or moral transcendence in animal and humans [44-46]; the prenatal conditioning of sexual phenotypes such as trans-sexuality and homosexuality has been also established by studies on the influence of sibling birth order in sexual orientation and sexual identity [47-49] and in studies of human mutants for "sexual" hormones [50-53]; we also found a great sex dimorphism, at birth and the following years, in the serotonergic nuclei of the brain stem involved in sexual dimorphic behaviors [54, 55]. However, moral-theologians, ethicists, bioethicists and lawyers do not seem to have included these facts into their analyses. In 30 years, our conception of the human nature changed greatly, but philosophical and theological viewpoints continues to consider humans as rational animals, even though animals have been demonstrated to have rationality [56]. Do we wish to persist in this scientific-ethical-religious-ideological-legal schizophrasia?

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