



Mini Review Article

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When the Human Being Gains Personal Identity: Synthesis of Scientific Data and Biblical Exegesis from Christian Viewpoint

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Received Date: October 13, 2025

Published Date: October 23, 2025

Abstract

This paper tackles the question of when the human being is endowed with his/her individual personal identity (ensoulment) from the viewpoint of a believing Christian and confronting pertinent scientific findings with biblical exegesis and faith. According to the Bible, the ensoulment is a punctual moment rather than a process. Biologically, there is only one single time point to which it can be applied, namely the union of the genetic materials (genomes) originating from both parents, taking place about 22-24 hours after fertilization. Ethical and medical considerations thereof are exposed subsequently, suggesting that, from this stage onwards, embryos resulting from assisted reproductive technologies should be given the same respect and protection as any other human person. This point includes a discussion of potential mother versus embryo conflict of vital interests that ought to be taken into consideration in any parents' and medical decision.

Keyword: Embryo individual personhood; Bible; Exegesis; Fertilization; Embryo development; Origin of genome; Initiation of gene activity; Medical considerations; Ethical considerations

Introduction

The time at which the human embryo is endowed with individual personal identity is one of the most controversial events that mark the beginning of human life. Differences as to the exact timing of this event, and thus the establishment of personhood, exist among the major religious beliefs and doctrines, namely Christianity [1] Judaism [2] Islam [3] Hinduism [4] and Buddhism [5]. Yet, the position vis-à-vis this question has significant implications in law, ethics, politics, life sciences and medicine. In the latter two fields, the moral status of the human embryo was mainly evoked in relation to voluntary abortions [6] and disposal of embryos created

in the context of infertility treatment by in-vitro fertilization (IVF) [7]. Recently, it has taken on new importance with the evolution of the latest biomedical advances, such as gene editing [8] and stem cell research [9].

In the present article, this subject is exposed from the Christian perspective and regarded from different viewpoints, including the biblical, the scientific, the medical and the ethical ones. Finally, recommendations for ethically correct behaviour in cases of mother-versus-embryo vital conflict of interest have to be resolved.

Individual Personhood, Soul and Ensoulment

Even though not always called as such, the soul, a spiritual entity animating the material body, is believed to mark the difference between humans and animals [10]. In addition to acting as the animating force which, according to some religious interpretations, is also attributable to animals, plants and even non-living entities [11] the soul may also be considered to be the essence of human personal identity [12]. Ensoulment, in religion and philosophy, is the moment at which a human being gains a soul.

Ensoulment from the biblical perspective

The concept of ensoulment has undergone substantial changes during the history of christianity. The book of Genesis explains that man is made in the image of God - we all bear the *imago Dei*, which makes us special and makes us distinct from the rest of the created order and from each other [13].

Early Christian Church Perspective

Exegesis of several biblical texts leads to the conclusion that human soul becomes associated with the embryo before birth, in the mother's womb, and suggests that this event occurs in a short time period (e.g. a single day or night) as opposed to the pregnancy which has a much longer duration. For instance, when Job is lamenting his existence, he says: "Let the day perish on which I was born, and the night that said 'A man is conceived'" [14]. Conception, then, is understood as an event occurring during a short time period, similar to birth. Moreover, in this biblical passage, Job refers to himself at the moment of conception as "a man" (i.e. a person), not a "future" or "potential" man. Similarly, King David confesses: "Surely I was sinful at birth, sinful from the time my mother conceived me" [15]. It is evident that David could not be sinful (in the sense of the original sin) at the time of conception if his soul were not already present in him at that moment. Other similar biblical passages relative to the origin of human individual soul at conception have been pointed out [16].

Obviously, the biblical writers could not understand the word "conception" in the sense we do because they did not have our knowledge of the biological events taking place at the beginning of human life. Nevertheless, they were aware of the fact that a woman needs to receive man's semen in order to get pregnant (see the notorious story of Onan in the book of Genesis) [17]. Extrapolation of these teachings to today's life needs some scientific knowledge about what exactly the term "conception" means at the biological level (see below).

Later Evolution of the Christian Church Perspective

In the early christianity (patristic era), people of God were fully persuaded of the continuity of human life and made no distinction between the pre-birth and post-birth life. While the Bible does not directly mention "embryo expulsion" or "abortion", the apostle Paul disapproved "witchcraft" [18] which, in his time, also included medical practices aiming at the expulsion of human embryo from

the womb. In fact, the Greek original text uses the expression "*pharmakeia* (φαρμακεία)" for witchcraft, which is related to the English word "pharmacy". A similar view was held by Clement of Alexandria (150-215 AD), one of the most important theologians of the patristic era [19]. However, things changed as the teaching of Aristotle (384-322 BC) started to be still more influential in the scholastic era (about 1100 to 1700). Aristotle attributed a soul (psyche) to any living creature (including animals and plants) and made a distinction between the nutritive soul (giving an organism its characteristic form and present in early human embryos), the sensitive soul (present in later human embryos) and the rational or intellectual soul (present in humans beginning with the foetal period). During development, the more primitive souls would be gradually replaced by the more advanced ones [20]. Consequently, according to this doctrine, the early human embryo would be no different from animals as far as its ensoulment is concerned. Logically, with such a presumption, Aristotle did not condemn the destruction of the very early human life. The outstanding scholastic philosopher and theologian Thomas Aquinas (1225-1274) substantially adopted Aristotle's views which progressively became predominant in medieval Christianity [21].

Curiously, Aristotle's belief about progressive ensoulment of the human being perdures, in a way, in the contemporary lay society, while it has been eradicated from the Christian church. In fact, many important non-Christian official documents relative to ethics and law are based on this thinking. Specific events occurring at different time points after fertilization, including implantation (about 1-2 weeks), the appearance of the primitive streak (about 2 weeks), the appearance of blood (about 3 weeks), the beginning of brainwaves (about 6 weeks), quickening (about 16 weeks), and birth (about 40 weeks), were used as milestones to value the early human life across development. The most recent and most binding document thereof is the report by the Warnock Committee, [22] whose recommendations were later incorporated into the British 1990 Human Fertilisation and Embryology Act (HFEA) as the 14-day rule. It says that human embryo deserves a special respect and protection from the time at which the primitive streak appears [23].

Current Position of the Christian Church

The contemporary Christian church returned to the original view, held by theologians of the patristic era, that the human life is untouchable from the very moment of conception. This was specifically stated in the document "Instruction on Respect for Human Life in Its Origin and on the Dignity of Procreation Replies to Certain Questions of the Day", issued by the Congregation for the Doctrine of the Faith on 22 February 1987 and commonly known as *Donum Vitae*, which claims that "the human being must be respected - as a person - from the very first instance of his existence" [24].

Science

Since the 14-day rule, explained above, is generally respected even in lay societies, the following section on science is limited to the explanation of the biological processes taking place during fer-

tilization and early embryo development. The expression “the very first instance” of human being’s existence, used in *Donum Vitae*, [24] can only be understood as a point in time before which the human being, as a person, does not exist and after which it does. From the biological point of view, this moment must occur at some time during or after fertilization which is currently considered as a process at the outset of which an embryo is formed. To understand the biological meaning of fertilization, it is necessary to recall that each somatic cell is diploid, which means that it contains two copies of each of the 23 different human chromosomes, whereas the paternal (spermatozoon) and maternal (ovum) gametes carry a haploid (reduced to a half) set of chromosomes. The process of fertilization involves, first, interactions of the fertilizing spermatozoon with the outer layers surrounding the ovulated ovum (cumulus oophorus, corona radiata and zona pellucida), followed by sperm penetration through these layers and sperm-ovum fusion (syngamy). Subsequently, the genetic information carried by the fertilizing spermatozoon and that belonging to the ovum remain separated in the resulting zygote until short before the first embryonic cell division.

The embryonic genome remains silent after syngamy until the formation of the paternal and the maternal pronucleus. The paternal pronucleus originates from the sperm nucleus and contains the haploid paternal genome, while the maternal pronucleus is formed around the haploid set of ovum chromosomes, resulting from the reductional (meiotic) division. Only after the fusion of both pronuclei the resulting zygote will contain a diploid set of chromosomes (as normal in somatic cells).

Syngamy

The term syngamy is commonly used to denote the formation of a zygote, the earliest physical entity resulting from the union of a spermatozoon with an ovum at the end of the fertilization process. The zygote is a single cell (a big ovum having incorporated a small sperm head) in which the sperm-derived and the ovum-derived genomes are physically separated in the paternal pronucleus and the maternal pronucleus, respectively. Union of both genomes (pronuclear fusion or karyogamy) takes place no sooner than 23 hours after fertilization, only a short time before the first embryonic cell division [25] so that that it is reasonable to make a distinction between a zygote, where the embryonic genome as such still does not exist, and an embryo where the embryonic genome has already been individualized [26]. Before the formation of a unique embryonic genome, the future genetic identity is not yet stably established because it is relatively easy to interchange pronuclei between different zygotes by micromanipulation. Separation of the male and the female contributions to the embryonic genome is no more possible after karyogamy which can thus be considered as the event giving rise to the genetic individuality of the embryo. This individuality will remain unchanged during the whole subsequent prenatal and postnatal life.

Start of Embryonic Gene Activity

Even though the embryo becomes a genetically individualized

entity after karyogamy, the embryonic genome is becoming active progressively only some time thereafter. What does the term “gene activity” mean? In order to produce changes in the phenotype, information contained in a gene in the form of deoxyribonucleic acid (DNA) must be first transmitted into newly synthesized messenger ribonucleic acid (mRNA) which subsequently migrates from the cell nucleus to the cytoplasm where it serves as a template for synthesis of the specific protein encoded in the gene. The transmission of genetic information from DNA to mRNA and from mRNA to protein is called transcription and translation, respectively. The whole process by which the information encoded in a gene is turned into a function, consisting of transcription, translation and protein action on specific targets, is called gene expression.

Research has shown that very early human embryos (until day 3-4 after fertilization) do not fully express their own genes, and their development is controlled by mRNA pre-synthesized in the ovum before ovulation (maternal mRNA) and stored to be used after fertilization. The earliest signs of transcription and translation in human embryos can be detected 2-3 days (4-cell embryo) and 3-4 days (8-cell embryo) post fertilization, respectively [27]. It is also 3-4 days after fertilization when the first morphological [28] and biochemical [29] signs of embryonic gene expression appear and the functionality of the embryonic genome is thus fully established. It is of note that the process of embryonic gene expression activation is selective, and embryos that do not activate this process at the proper time in most of their cells cannot survive, [30] even though mechanisms of spontaneous reparation do exist in human embryos and may save them when only a few cells are affected [31]. In fact, an estimated 40% to 50% of fertilized ova fail to implant in the womb [32]. When this occurs to a woman, she will never know that new life was beginning in her body because such early pregnancies and embryo losses go undetectable.

Ethical Considerations

Based on the above scientific findings, it can be concluded that about 23 hours after fertilization, or a little later, the paternal and maternal genomes unite in karyogamy, resulting in a new genome, unique to the embryo, which will remain present in all cells of the new individual throughout his/her life. Even though the question of whether the ensoulment takes place at karyogamy is not within the reach of science and can only be addressed by faith, this is the only definable time point at the beginning of human life which the biblical terms “conception” and “fertilization” can be associated with, given that the Scriptures systematically refer to conception or fertilization as a short moment, not a prolonged process (see above). In scientific terms, “fertilization” is a process occurring in time rather than a punctual event, so that karyogamy can definitely be accepted as the beginning of the individual existence of a human being from which it should be protected accordingly.

Medical Considerations

In view of the above scientific data and ethical considerations, it is clear that human embryos resulting from karyogamy should not

be treated as mere things that do not deserve respect and consideration. As often in medicine, however, conflicts between particular interests of different subjects, arise and need to be dealt with. As far as embryos are concerned, the physician is sometimes confronted with a mother-versus-embryo conflict of interest. In the most extreme situations, the mother's life can be directly menaced if the embryo goes on growing in her womb, because of more or less unexpected pathological conditions or pregnancy complications. If, under such a threat, the embryo is sacrificed for the sake of maternal life preservation, this practice might be morally justified since, obviously, if the mother died, the embryo would inevitably die with her.

However, this is not the case of most of the current medical practices that lead to embryo death. Most of such practices, namely those employed in assisted reproduction, are somehow related to the treatment of infertility. The document *Donum vitae* [24] (see above), teaches that "if a given medical intervention helps or assists the marriage act to achieve pregnancy, it may be considered moral, while if the intervention replaces the marriage act in order to engender life, it is not moral". Most of the assisted reproduction interventions are realized for married couples and, in view of the above declaration, might thus be considered moral. However, the problem is not there. The problem is that voluntary embryo destruction sometimes occurs when assisted reproduction techniques are used. This is especially the case of in vitro fertilization which usually results in the development of more embryos than can be replaced to the mother's womb at once. Such "supernumerary" embryos can be cryopreserved (frozen) and replaced later, either if the previous embryo replacement did not lead to childbirth or if a child was born and the parents want to have another one. Embryos can be stored in the frozen state for many years. However, some couples change their mind as to their cryopreserved embryos and ask the clinic where the embryos are stored to get rid of them.

Moreover, embryos resulting from in vitro fertilization are easily available for different kinds of examinations, including genetic ones. Some genetic abnormalities detected in embryos are not compatible with their development to term, that is to say the plan of destruction is already inherently present in them, independently of the parents' or doctors' decisions. However, there are also cases in which the parents ask genetic tests to be performed on their embryos in order to select specific phenotypic traits, such as the sex. Evidently, voluntary destruction of an embryo just in response to this kind of request, can hardly be morally justified.

Current scientific progress has marked the opening of a new era (which is only in its beginnings) when it will be possible not only to diagnose embryonic abnormalities but also to treat them, thus recognizing and treating embryos as full-right persons and patients [33]. Hopefully, it will soon be possible to correct embryonic abnormalities so as to obtain normal children. Of course, the techniques intended to cure embryos from disease have also the potential of being abused for making babies "à la carte" by suppressing certain genetic traits and favouring others according to the parents' preference. Thus, it has to be made clear in this place that any intervention on embryos should be strictly limited to those with a

clearly defined pathology, which is ethically justifiable, and avoided in healthy embryos to "improve" them (eugenics), which is morally wrong. It will be a big challenge in the near future to include a thorough teaching of ethics in the formation of future physicians and biologists so as to be capable of refusing that kind of propositions.

Conclusion

Even though the "substance" of human soul and the "way how" it associates with the human body (ensoulment) will probably remain a mystery forever, a synthetic view of biblical texts, new scientific data, and faith teach us "when" ensoulment occurs. This short moment is probably linked to karyogamy (fusion of the individual parental genomes leading to the establishment of a new and unique genome of the embryo), taking place some 23 hours after syngamy, before the fertilized ovum (zygote) starts the first cell division. Consequently, karyogamy represents the time point from which the human embryo should be respected and protected. Assisted reproduction techniques, particularly in vitro fertilization, represent both a menace and a hope for these early embryos. The menace is related to voluntary destruction of healthy embryos which should be avoided as immoral. The hope is that the scientific progress will soon make it possible to consider all embryos with disease as full-right patients and provide them with adequate therapies to restore their health.

Funding

No funding was received in relation with this article.

Acknowledgement

None.

Conflicts of Interest

No conflict of interest.

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