Mini Review

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2024.57.008993

The Zygote as the Theory of Essence "first perfection" According to Ibn Sina. A new preliminary philosophical and Genetic approach

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ARTICLE INFO

Received: June 24, 2024

Published: July 03, 2024

Citation: Zaabal Magdy Mohamed and Wahid Mohamed Ahmed**.** The Zygote as the Theory of Essence "first perfection" According to Ibn Sina. A new preliminary philosophical and Genetic approach. Biomed J Sci & Tech Res 57(3)-2024. BJSTR. MS.ID.008993.

ABSTRACT

The current review is concerned with a peak of peaks of Ibn Sina's sober scientific intuition, who eight centuries ago formulated the firstborn scientific conception of the theory of the early embryonic development. Where he was the first to understand and deduce the presence of female semen (ovum) as akin to male semen. Ibn Sina's theory of (Al-Akhlate) in Arabic which means (mixtures/chromosomes) in English is one of pioneering theories, on the basis of which he formulated the notions of zygote (as a drop of blood) and the temperament (as the genotype). This modest review includes six interconnected, solidarity-based and complementary approaches that attempt to give a reasonable vision of the necessity connection between the origins of science in its distant roots with its advanced modern ears.

Keywords: Ibn Sina; Zygote; Essence; First perfection; Soul

Essence

The word essence (Lat. *essentia*) is related to the Latin term ens (being), which itself implies a relationship to esse (to be). Essence is what is, what exists. In this sense, it designates a concrete, singular reality in the act of existence. Essence is, moreover, a substantial reality. Essence exists in and of itself; it exists without the aid of a substratum that receives and supports it [1]. In other words, the essence is the cause of itself; it is the origin of all other things and the source of all beings. The ancient Greek sages were the first to research this essence but their research was limited to the physical essence specifically [2]. The theory of the essence is one of the guiding theories in the philosophical thought of Ibn Sina because it reflects and summarizes his vision of existence and essence as a Muslim philosopher. Ibn Sina divided the essence into five categories, which can be summarized as follows: *The first can be described as the essence of latent power* (germ cells) *and creative transformation* (fertilization/zygote/cell divisions). *The second is the "compound essence"* (may be the eternal unity between the soul and zygote), *the third is the primary essence* (cytoplasm), *and the fourth is the "human soul". The fifth essence is the "mind" [3].*

Ibn Sina's Preliminary Perception of the Zygote

Ibn Sina is one of the first who deduced and explained the substantial changes in the embryonic development process as follows: *The embryonic development process is divided into three stages. The first stage is the churning of semen, which is male semen. The second stage is manifestation of a drop of blood,* (which may apply to our current concept of a zygote). *The third stage is the alteration of semen into a blood clot,* (which may apply to our current concept of a blastocyst) *and then into an embryo*. (The Book of Animals, 1X, 5,172.3-8) [4]. It is noteworthy and interesting that Ibn Sina – in contrast to Aristotle – believed that females do produce akin to semen, which may apply

to our new concept of the ovum; however, he stated that, the female semen (ovum) does not possess a generative power as the male semen does. Accordingly, Ibn Sina seems to contradict himself, because he initially acknowledged his confidence in the existence of female semen (ovum), but he denied its generative role in the reproductive cycle. This contradiction may, of course, be due to the clear influence of Geek thought, especially Aristotle at that time.

The Theory of Mixtures (Akhlat in Arabic) According to Ibn Sina

Ibn Sina Stated: Just as the mixtures, when mixed together, produce organs with special structure (admixture-genotype)*, this admixture prepares to accept the conditions that have not benefited from simple material* (in the sense that they consist only of compound structures/" chromosomes"/DNA). *Likewise, the soul is formed up of the finest of mixtures, due to the mixing between its four types, which results in a special structure* (admixture-genotype), *by means of which the soul is prepared to accept the psychic faculties that have not benefited from simple stuff* (in the sense that they consist only of compound structures/"chromosomes"/DNA), *and its origin is of divine emanation. This divine flow alone is capable of transforming power* (germ cells) *into action* (fertilization/zygote/cell divisions), *provided that it is prepared for its perfection without apathy or miserliness* [5]. (Text in italics is the original words of Ibn Sina; between brackets is the author's interpretation). From the previous scientific data, we can suggest that the mixtures (Akhlat). that Ibn Sina talked about are Chromosomes Female gamete (egg) and male gamete (spermatozoa), the genetic material of the sperm and egg then combine to form the single cell zygote. Once the single sperm fuses with the oocyte, the latter completes the division of the second meiosis forming a haploid daughter with only 23 chromosomes, almost all of the cytoplasm, and the male pronucleus. The other product of meiosis is the second polar body with only chromosomes but not ability to replicate or survive. In the fertilized daughter, DNA is then replicated in the two separate pronuclei derived from the sperm and ovum, making the zygote's chromosome number temporarily 4n diploid. After approximately 30 hours from the time of fertilization, a fusion of the pronuclei and immediate mitotic division produce two 2n diploid daughter cells called blastomeres [6]. Between the stages of fertilization and implantation the developing embryo is sometimes termed as a pre-implantation-conceptus. This stage has been referred to as the pre-embryo in legal discourses including relevance to the use of embryonic stem cells [7].

Moreover, another piece of evidence that confirms the possibility of the correctness of Ibn Sina's mixtures theory was recorded by Macas E, et al. [8] who reported that "In humans, the embryo stage is the first eight weeks post- fertilization. At week one post fertilization, the cells undergo extensive and rapid growth.

The aforementioned modern scientific data match what Ibn Sina envisioned 800 years ago, who stated: *"This divine flow that alone is capable of transforming power* (germ cells) *into action* (fertilization/zygote/cell division)*, provided that it is prepared for its perfection without apathy or miserliness."* (In the sense of: extensive and rapid growth/multiple rapid divisions). It is worth noting that Ibn Sina's expression: "without apathy or miserliness" in Arabic is considered the most accurate and finest expression that reflects his deep scientific intuition in his distant era.

Zygote as the First Perfection

With regard to the concept of perfection mentioned by Ibn Sina, the science of embryology has proven the correctness of Ibn Sina's perception of this concept, as (Fernando, et al. [9]) reported that blastomere size within the embryo is dependent not only on the stage of cleavage but also on the regularity of cleavage among the cells. On the other hand, the process of arranging blastomeres takes place under precise genetic control [10,11]. Furthermore, Bruce Carlson [12] reported that "One of the early manifestations of embryonic gene expression is the polarization of the blastomeres of 8- and 16- cell embryo, and this process is also considered one of the developmental events that sets the stage for the specification of blastomeres to become either trophoblast or inner cell mass. These are scientific facts of embryology and genetics that may coincide with Ibn Sina's perfectionism theory specifically (first perfection) [13].

Since the current study discusses the issue of creation as described by Ibn Sina, then the concept of essence must be precisely related to the process of creation. Therefore, the essence is the place in which the processes of creation take place. At this crucial and bright moment, cell division multiplies, and specialized cells begin to work consciously, efficiently, and quickly to integrate the expression of functional genes. All these complicated, integrated, and highly organized processes reflect an active and energetic core. For this reason, the term zygote, or "human genetic core" can only be considered Ibn Sina's theory of "essence". For more detail, we must acknowledge the fact that, the zygote contains all the essential factors for the development and growth of the embryo, and these factors exist solely as an encoded set of instructions localized in the genes/ chromosomes. The genes of the new zygote that are responsible for protein production remain inactive until several cell divisions into cleavage occur. During cleavage, the relatively large zygote directly subdivides into many smaller cells of conventional size through the process of mitosis. These smaller cells called blastomeres are suitable as early building units for the future organism" [14]. This very essence is the result of a wise process of divine creation. This is the essence of which the soul is born at the moment of cleavage, and all the organs and features of the new creature (organism) are formed. This comprehensive definition of essence includes all the categories presented by Ibn Sina except "cytoplasm" which is the primary essence according to Ibn Sina [15].

Zygotic Genome Activation (ZGA)

Zygotic genome activation (ZGA) is of utmost importance in that it represents a crucial developmental milestone in early embryogenesis, marking the transition from maternal to embryonic control of development. This process, which varies in timing across species, involves the activation of the embryonic genome, paving the way for subsequent cell differentiation and organismal development [16,17]. The transfer from maternal to zygotic control, which happens during ZGA, is important to the cellular activities that begin with fertilization. Before this shift, maternal mRNA and proteins regulate the first cell divisions after fertilization. The zygote genome does not become transcriptionally active until ZGA occurs, enabling the embryo to grow according to its genetic profile. This stage development is critical because it determines the genetic blueprint of the particular organism [18]. These data, which explain the pivotal role of ZGA, actually represent support and reinforcement for Ibn Sina's theory of the essence, in the sense of the zygote is the (essence/ first perfection). On the other hand, these findings strongly reinforces our interpretation of the birth of the soul during the first division of zygote cell into cleavage, which embodies the eternal unity between them [13]. Finally, the core meaning of the concept/process of ZGA can be summarized as the ideal and the most accurate expression that embodies Ibn Sina's notion of the first perfection.

The Zygote and the Soul, the Inevitable Fusion; the Eternal Unity Between them

Ibn Sina said: "God Almighty created the left cavity of the two heart cavities to be a repository "chamber" for the soul and a source of its permanent validity". He is the Almighty who created the soul as a carrier of the physic faculties that flow through the bodily organs." These words mean that the soul is the blood in Ibn Sina's thought. The definition of the soul in Arabic language includes more than thirteen synonyms; one of them is the blood [19]. Blood is one of the first components that are created at the beginning of the early stage of embryonic development (seventh day of embryonic life) [20]. This is due to the paramount importance of the blood in providing life (oxygen and nutrients) to the organs that are generated successively through the multiple rapid divisions, and of course, the soul must be present at the top of this synthetic process, dominant, supervised, and inherent in the synthesis of the blood and enabling it to perform its sacred biological functions. In our interpretation of Ibn Sina's theory of soul creation [13] we have adopted the term "sacred pairing theory" for the first time to refer to the creative pairing between the soul, blood, and genes in the beginning stage of embryonic development. This pairing process in our opinion consists of two successive steps, the first is the pairing between the soul and zygote, and the second step is the pairing of the soul, blood and genes. Therefore, the soul is likely to have been born immediately before - or completely associated with - the first division of the zygote cell into cleavage. In this sense, can the soul be considered the divine code (order) that activates the genetic code inherent in the germ cells/zygote? Suppose this question is sufficiently accurate, which means that our interpretation is apply to which Ibn Sina stated 800 years ago: *"The rational soul comes into existence together with the body* (zygote)*, not before, and it maintains a certain association with it as long as a person is alive"* (inevitable fusion/eternal unity). *In other words, the soul must belong to the very subsistence of the body (Psychology, 1.1, 5.3-6) [4].*

Conclusion

1. In his classification of types of the essence, Ibn Sina assigned one of these categories by primary essence to "cytoplasm" but he never mentioned the secondary one, and we suggest that this secondary essential essence is the nucleus/ zygote/human genetic core/essence".

2. Homeobox genes, such as Hox and Sox genes, and other genes play a key role in determining cell identity during embryonic development. Now, a question arises: can this genetic fact indicate the possibility of these genes being related to Ibn Sina's concept of "delicate and fine mixtures" that are responsible for the creation of the soul? If this hypothesis becomes correct, then it would be a great reinforcement for the validity of the "pairing theory" between the soul, the blood and the homeobox genes during embryonic development.

3. The inevitable fusion (eternal unity) between soul and zygote reflects the core of first perfection theory of Ibn Sina; (*"The first perfection is that by which the species actually becomes a species"* (zygotic genome activation (ZGA) under the rule of the rational soul) while, the whole genome of the body is the second perfection (body activities).

4. Ibn Sina's theory of second perfection/ "body activities/genome" may be a reflection of or a completion of the theory of "first perfection/soul/zygote/ZGA".

That is why we can consider him the founder of the theory of "total perfectionism".

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2024.57.008993

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Submission Link: https://biomedres.us/submit-manuscript.php