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Research Article

An Exposition Of At-Tabari's View On Embryology In His Jāmicu'l-Bayān

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Abstract. The perpetual researching about Allāh's works and His signs through the entire phenomenon on earth would continue to make man realize the divine nature of the Qur'ān, as the greatest sign of Allāh on earth. Nothing has been left unexplained in it pertaining to living and non-living things which made some Muslim exegetes dabbled in to the interpretation of some verses of the Qur'ān relating to scientific issues including embryology which is the focal point of this paper. Thus, an exposition of Aṭ-Ṭabarī on embryogenesis in Tafsīr Jāmicu-l-Bayān is the aim of this paper with a view to juxtaposing Tafsīr with scientific discussion. In achieving this, historical, descriptive and analytical methods of research are adopted. Historical method assists in accounting for the biography of Imām Aṭ-Ṭabarī and his Tafsīr. Descriptive method is helpful in explaining the scientific discussion on embryology. The analytical method is useful in analyzing the views of Aṭ-Ṭabarī in relation to scientific views. It is however expatiated the journey of human's germination in the womb, and also

elaborates fetus development and its metamorphosis in the position of conception, that covered the stages of pregnancy. The findings of this paper reveal that the Tafsīr work of Aṭ-Ṭabarī contains some scientific views which can be studied in juxtaposition with modern sciences. The study concluded by encouraging more research through the verses of the Qur'ān to further technology discoveries in the contemporary life. Therefore, the Tafsīr work is suggested for further research on biological matters.

Keywords: Embryology, Metamorphosis, Conception, Fetus, Exposition, Qur'ān, Science

INTRODUCTION

The Qur'ān is a divine book of Allāh that guides and enables man to live a righteous life, makes possible for him to enjoy eternal happiness in the next world (Arberry, 1964). Undoubtedly, it is the key source of Islāmic beliefs, laws and practices. It provides norms and customs to Muslims which should be followed in all aspects of their lives. There were Muslim scholars who made an indelible ink in the history of Qur'ānic exegesis for better understanding of the divine message in the Qur'ān. Thus, Scholars came up with different interpretation of Qur'ānic verses covering various field of knowledge in both Islāmic science and modern science.

The differences in the exegesis brought about three major divisions of *Tafsīr* which are:*At-Tafsīrbir-Riwāyah, at-Tafsīr bid-Dirāyah* and *at-Tafsīr bi'l-Ishārah*. One of the maiden works of *Tafsīr*that belongs to *At-Tafsīr bir-Riwāyah,* was (*Jāmiᶜu-l-Bayān*) of Ibn Jarīr Aṭ-Ṭabarī *(*As-Sabuni ,n.d). Aṭ-Ṭabarī was among the earliest prominent scholars of exegesis whose work is researchable for distinct aspects of knowledge such as theology, ethics, and sciences and other. At this point, there are exegetes like: Ibn Kathīr, Ar-Rāzī, whose work of *Tafsīr* is also full of scientific studies for researcher in exegetical-science and other aspects in Islāmic studies.

Aṭ-Ṭabarī's work of *Tafsīr* (*Jāmiᶜu-l-Bayān*) is a compendium of exegesis because the ample traditions of the Prophet were quoted to interpret the verses of the Qur'ān and the author used the verse of the Qur'ān to give meaning to another verse as well as the view of the *Ṣaḥābah* in his work of *Tafsīr* to back up his comments. Its significance and uniqueness can be manifested from the exaltation given by scholars such as *Tafsīr* authored by Ibn Jarīr Aṭ-Ṭabarī is a significant work in Islamic scholarship, known by various titles such as "J*āmi' al-Bayān 'an Taʾwīl Āyi al-Qurʾān*," (Aṭ-Ṭabarī, 2001) or *Jāmi' al-Bayān fi Tafsīr al-Qurʾān*," or simply as "*at-Tafsīr*."(Adh-Dhahabī,1977)

It has garnered widespread acclaim within the Islāmic community, with Al-Imām al-Nawawī asserting its unparalleled perfection as documented by Al-Ḥarbī, (1429), a sentiment echoed by Al-Imām Ibn Khuzaymah, who regarded Ibn Jarīr al-Ṭabarī as exceptionally knowledgeable (Thābit,2001). At-Tabari's *Tafsīr* was classified as *at-Tafsīr al-Maʾthūr* (Adh-Dhahabī, 1977). This comprehensive commentary of At-Tabari spans twenty-five volumes, completed over a period of forty years (Thābit, 2001) with at-Ṭabarī reportedly producing forty pages daily (Adh-Dhahbī, 1996). On this, Abū Muḥammad al-Farghāni has stated that if any scholar in-tended to publish ten books from the book of *at-Tafsīr*, each book would contain a distinctive field of knowledge that would be different from the other; they would be able to do so

because of how rich this book of *Tafsīr* actually is (Adh-Dhahabī,1977). It is against this background that this paper aims at discussing al-Ṭabarī's views on Embryology in his *Tafsīr Jāmiᶜi al-Bayān*.

Embryology: A Conceptual Definition

Literally, embryology is a branch of biology dealing with embryos and their development (Merriam-Webster, 1828). Technically, it is the development and formation of the human embryo. It is characterized by the processes of cell division and cellular differentiation of the embryo that occurs during the early stages of development (Biology Online, n.d). It can also be viewed as the study of animal development between the fertilization of the egg and the time when the animal is born (Munīr, 1995).

Embryology is a branch of biology which is interpreted as a study of embryo in the womb of mother. It has to do with the duration of that study in the womb for actual period of its observation. It studies the formation and early development of living organisms. In another hand, it is a branch of biology that deals with the topics concerning gamete formation (gametogenesis), a fusion of gametes (fertilization), and embryo formation (embryogenesis). (De Graaff and Fox, 1995), while embryogenesis is the processes leading to the development of an embryo from egg to completion of the embryonic stage. Conceptually, embryology is interpreted as the study of the transfiguration and metamorphosis of fetus in the womb once it has been formed till the baby will be delivered.

Brief Biography of Aṭ-Ṭabarī

Abū Jaᶜfar Muhammad Ibn Jarīr Aṭ-Ṭabarī was born in a town called Āmul as said earlier, Tabaristan, Iran in 224 A.H./ 839 C.E. He was brought up in a well-off family and his father was keen to teach him. He memorized the Qur'ān at the age of seven years old and in progress he began to write down Prophetic Hadith when he was only nine years old. He had an enthusiastic longing for knowledge when he was a child. In his early years, he realized that he could not achieve his scientific ambitions in his hometown that led him to leave his town for seeking knowledge at age of twelve years old. In the cause of that, he traveled to Ray, modern day Iran, and visited some of its cities where he met scholars and acquired religious knowledge from Ahmad Ibn Hammaad Ad-Dulaabi and Ibn Humayd Ar-Rāzī, who were great *Ḥadīth* scholars (Cambridge Dictionary, n.d).

During the ninth century, Islamic learning was certainly at its peak. Most Muslim scholars and scientists excelled in their learning and achievements in diverse fields of knowledge. In fact, Abū Jaᶜfar Muhammad ibn Jarīr Aṭ-Ṭabarī surpassed them all. He was erudite in *hadith* literature, also studied different subjects of Islāmic studies to further his knowledge of the Qur'ān and the religion of Islām. At the end of his days, he was recognized as a commentator on the Qur'ān, an expert in Islāmic Jurisprudence (*Fiqh*), and as a famous historian, he was proficiently known in those fields among others. He was also the author of many books; the most famous of them were his *Tafsīr* of the Qur'ān and his encyclopedia on Islāmic history, and others that written on jurisprudence, theology, and ethics (Idealmuslimah.com).

Aṭ-Ṭabarī received his education at Ray, Baghdād, Wasit, Baṣrah, Kūfa and Fustat (old Cairo). With passion he has for education, he also made extensive study tours to Persia, Syria, Palestine and Egypt in quest for collecting information for his immense historical works. Among his teachers were Muhammad bin Abdulmalik bin Abis-Shawaribin Ahmad bin Hamid al-Qazi, Abu Hamman al-Walid bin Shujai and Muhammad bin Al-Ala'i. He learnt the Qur'an by heart at the age of seven (The History of al-Ṭabarī, 1989).

It was reported by Yaᶜqūt Rumi that Aṭ-Ṭabarī as having confirmed by him, to have learnt how to read the Qur'ān from Sulaiman bin AbdulRahman bin Hamid together with legal aspect of it. Ibn Jarīr acquired the knowledge of Prophetic traditions and knew how to make a distinction between authentic and no authentic ones. His rank in the knowledge of traditions of the Prophet was so high till he has become an authority in the science of *Ḥadīth*, *Mustalah al-Ḥadīth*. Also his impact as a scholar was extensively perceived in every part of the World. Among his students was Ahmad bin Kamil, the person to whom Mishkawayh owed his guidance in history (The History of al-Ṭabarī, 1989). People used to learn *Tafsīr* from Al-Tabari's dictations.

Aṭ-Ṭabarī was one of the rare scholars who studied without the help of a patron to finance his studies. He did not depend on others to help him out during the course of his studies. He studied and lived on what he earned and spent it on traveling and studying. He accepted only those gifts from his friends, which he was able to match and throughout his life, he was proud of this fact. It is said that Aṭ-Ṭabarī once refused a gift of 10,000 dirhams from a minister in the King's court. He returned the gift with a letter of thanks. The servant returned with the gift with a message from the minister saying that if he did not want it for himself; he could give it to the poor. Aṭ-Ṭabarī refused to accept it and replied that the minister should know the poor people in the land better than he did. He wished that the minister distributed the money himself. He did not want anybody to say that he accepted money from a minister even to distribute it to the poor (The History of al-Ṭabarī, 1989). It is also said that one day some of his students presented him with a carpet. He accepted the carpet from the student but insisted on paying its cost (Adh-Dhahabī, 1996 & Al-Ḥarbī, 1429).

Al-Imām Ibn Jarīr Aṭ-Ṭabarī died on Sunday the 27th of the month of Shawwāl in the year 310 A.H. in the city of Baghdād where he settled down at the end of his life. He was buried in his house (Shrek, 2013). His commentary on the Qur'an known as *Tafsīr* Aṭ-Ṭabarī in Arabic, mirrored the thoroughness seen in his Annals. According to Abul-Qaasim Ibn 'Aqil Al-Warraq, Imam Ibn Jarir once proposed teaching his students the commentary of the entire Holy Quran, estimating it to span 30,000 pages. Recognizing the impracticality of such length, he condensed it to 3,000 pages, considering the limitations of the materials used in his time. This monumental task took him seven years to complete, from 283 to 290. Regarded as the most extensive Athari *Tafsīr*, rooted in hadith rather than personal interpretation, it garnered immense popularity among the Ummah and remains widely circulated today. Notably, scholars like Baghawi (433 AH or 436 AH)and Suyuti, (1445–1505), extensively referenced it, and it served as a key source for compiling *Tafsīr* Ibn Kathir, often referred to as *Mukhtasar Tafsīr Aṭ-Ṭabarī* (Musallam, 1983). The distinguishing

Tafsīr's work of Aṭ-Ṭabarī made him and his work prominently unique among others and his *Tafsīr* covers many aspects of knowledge be it Art, education or science and others.

Stages of Human Embryology in Islām

In Islām, the stages of human embryology can be explained in details as follows based on Q22:5 where Allāh says:

We have created you from dust, then from a *Nutfah*, then from a clot then from a little lump of flesh some formed and some unformed that We may make (it) clear to you. (Q22:5).

Stage One: Sperm *'Nutfah* stage

The first term, '*Nutfah*', of the verse, is in Arabic word which means "very little water" or "a drop of water". It is also male sex cell found in semen, and clear, distilled water. (Aṭ-Ṭabarī,). This coincides with man's water which contains sperms as part of its components. The sperm or (spermatozoa) is reproduced from the detested lowly water (*nutfa*) and looks like a long-tailed fish (Fakharud-Dīn, 1999). This is one of the meanings of *Sulalah* (IbnMājah,2007) as contained in Q32:7-8, where Allāh the Almighty says:

ٱلَّذِىٓ أَحۡسَنَ كُلَّ شَىۡءٍ خَلَقَهُۥۖ وَبَدَأَ خَلۡقَ ٱلۡإِنسَٰنِ مِن طِينٍ ٧ ثُمَّ جَعَلَ نَسۡلَهُۥ مِن سُلَٰلَةٖ مِّن مَّآءٖ مَّهِينٖ ٨

He is Who created all things in the best way and began the creation of man from clay, and made his progeny from an extract of despised fluid (*Sulalah*)(Q32: 7-8)

It also refers to the gametes (male and female) and the zygote. The second stage of man's creation, as mentioned in the verse above, is the development of the little quantity *nutfah*. Then, the Qur'ān mentioned the formation of a child coming from the semen of both the male and the female. This can be found in *sūrah al-Insān*, verse 2, Allāh says: *Verily, we have created man from a drop of mingled liquids (nutfat amshāj).* The commentators of the Glorious Qur'ān stated that the word *nutfat amshāj* is the fluid of male and female that intermingled and undergoes many stages of evolution. And then, contemporary researchers interpret *nutfah* as zygote formed by the union of a mixture of the sperm and ovum (Ibn Kathir, 2003). Meanwhile, Abū Jaᶜfar Aṭ-Ṭabarī comments on this verse as follows:

وقوله: (وَبَدأ خَلْقَ الإنْسانِ مِنْ طِين) يقول تعالى ذكره: وبدأ خلق آدم من طين (ثُمَّ جَعَلَ نَسْلَهُ) يعني: ذريته (من سلالة) ، يقول: من الماء الذي انسل فخرج منه. وإنما يعني من إراقة من مائه

Allāh says: "*Verily, We have created man from a drop of mingled liquids (nutfatamshāj)*, interpreted; We have created the children of Ādam from sperm, which means: man's sperm and woman's ovum, and the sperm is a every little water in the vessel. (Aṭ-Ṭabarī)

While Ar-Rāzī (1999) in his own comment upholds the view of mingled liquid that is male's sperm and female's ovum because Allāh describes the sperm as mingled

liquid. In his further assertion, Ar-Rāzī(1999) quoted a *hadīth* on the authority of Ibn ᶜAbbās (may Allāh be pleased with him) thus:

The import of Allah's word:" from a drop of mingled sperm" is a mixture of man's sperm which is white and thick and woman's ovum which is yellow and light. When the two fluids mingled together (in the womb), a baby is created from them. All nerves, bones and muscles are formed from man's sperm while flesh and blood are formed from woman's ovum.

However, from the perspective of exegetes and the *Ḥadīth* of the Prophet we realize that the genetic reproduction begins immediately after the mixture of semen that mingled together in the womb. The Prophet has said this ever before discovery of scientific knowledge of gene and chromosome. It thus meant that male and female discharges that make production of semen which contained many cells of organism to reform other organism (creature). Islām is the source of all aspect of knowledge and the best way to explain embryologic study and any other related scientific aspects. This has manifested in the obvious manner that the Prophet employed to explain the context of genetic uniqueness in the above *Ḥadīth* which also can be found in the verse below:

إِنَّا خَلَقْنَا ٱلْإِنسَٰنَ مِن نُّطْفَةٍ أَمْشَاجٍ

Verily, We have created man from a drop of mingled liquids (*nutfat amshāj*).Q76:2

The meaning of '*mingled liquid* in the aforementioned verse is the combination of cells from both parts (male and female). Nevertheless, the Prophet a pioneer and great scientist has explored the traces of human cell which resulted through the combination of chromosome from the male and female as a couple ever before the knowledge of science surfaced. This means that combination of 'X' and 'Y' as X stands for 23 chromosome produced by male while Y also is 23 chromosomes from female together it will form 46 chromosomes which must be complete for incoming child in other to have sound health and reveal the similitude emerged from the parents or their lineages. This was asserted in the statement of the Prophet as follows:

It was narrated that Abu Hurairah said: "A Manfrom BanuFazārah came to the Messenger of Allāh and said: 'o Messenger of Allāh, my wife has given birth to a black boy. The Messenger of Allāh said: 'Do you have camels? He said: 'Yes.' He said: 'What color are they? He said: 'Red.' He said: 'Are there any grey ones among them?' He said: 'Yes, there are some grey ones among them.' He said: Where does that come from?' He said: Perhaps it is hereditary.' He said: 'Likewise, perhaps this is hereditary (H2002) (Moore, et al, n.d)

It is a genealogical study from the Prophet which established the traces of gene on the newborn baby that may come from grandfather, uncle or any of the family of the new baby's father through resemblance as the same lineage. And then, it denotes that after meeting of cell chromosomes the genetic of embryo will form which produced from the couple's semen or gamete then the embryo will dwell in the safe and calm place by Allāh's leave. He said: *"Thereafter We made him a Nutfah (sperm) in a safe lodging"* (Q23:13)

Aṭ-Ṭabarī said on this verse thus:

We (Allāh) made human being whom created from the clay as a sperm to be in a safe and comfortable place. The place where the sperm resides in the womb of woman, it describes as safe place because it is where he dwells safely and prepared for him in order to reside till its destination that Allāh decreed for its dwelling therein (Moore, et al, n.d)

Ibn Kathīr (2003) opined that*:* meaning, `

then We made the *Nutfah*, which is the water gushing forth that comes from the loins of man, i.e., his back, and the ribs of woman, i.e., the bones of her chest, between the clavicle and the breast. Then it becomes a red clot, like an elongated clot (Moore, et al, n.d) (Q23:13)

The aforementioned substantive evidences denote the word of Allāh *Nutfah (sperm)* and *Nutfah amshāj* (*a drop of mingled liquids)* as male's sperm and female's ovum which is the first stage of development of fetus in embryology, after that, the transformation will make into clot with the leave of Allāh. However, Aṭ-Ṭabarī asserts that the human created from the sperm that formed embryo from the semen of man and woman and that embryo will be residing in the womb of mother till the time that fixed for him by Allāh. In other hand, Ibn Kathīr (2003), comments on the verse that the sperm comes from the loin of man and ribs of woman to form embryo. Therefore the both comments reveal the genesis of human embryo and its fertilization in the womb.

Stage Two: Clot ᶜ*Alaqah*stage

The second term in the verse is ᶜ*Alaqah* which has three meanings: (1) leech, (2) suspended thing, and (3) blood clot. It is the second stage in embryology as contained in (Q23:13). This means that the development of human in early stage in the womb transfigures from *Nutfah*(sperm) to ᶜ*Alaqah* (leech or clot). Aṭ-Ṭabarī describes this term as (وهي القطعة من الدم) *a piece of rigid or inflexible blood* (Moore, et al, n.d), coupled with Ar-Rāzī's interpretation who also depicts that it is *a piece of inflexible blood which is not being doubted that there is as* chemically *analysis between water and blood* (Moore, et al, n.d). In this view, the two prominent scholars confirmed the ᶜ*Alaqah* as *inflexible blood* and also as certained in the work of Allāh which mysteriously happens in the fertilization of fetus in the womb because transfiguring water (semen) to clot or solid blood is a miraculous sign of Allāh for those that reflect.

Thereupon, it is stated earlier the three meanings of ᶜ*alaqah* and to compare a leech to an embryo in the ᶜ*alaqah* stage, it will make us discover similarity between the two; human embryo and leech. Then, the embryo at this stage obtains nourishment from the blood of the mother, similar to the leech, which feeds on the blood of others (Syed & Mohammed Ali Albar, 1992). This illustrates the similarities between human embryo and leech as discussed therein.

The second meaning of the word ᶜ*alaqah* is "suspended thing." It is what we can comprehend as the suspension of the embryo, occurs during the ᶜ*alaqah* stage, in the womb of the mother (The Developing Human). Another one is what we can pick also as the suspension of an embryo during the ᶜ*alaqah* stage (about 15 days old) in the womb of the mother. The actual size of the embryo at that period is about 0.6 mm.

(Merriam Webster, 1828). The third meaning of the word ᶜ*alaqah* is 'blood clot'. It is observed that the external appearance of the embryo and its sacs during the ᶜ*alaqah* stage is similar to that of a blood clot. This is due to the presence of relatively large amounts of blood present in the embryo during this stage. (Shrek)

Moreover, during this stage, the blood in the embryo does not circulate until the end of the third week. Thus, the embryo at this stage is like a clot of blood. So the three meanings of the word ᶜ*alaqah* correspond accurately to the descriptions of the embryo at the ᶜ*alaqah* stage. (Gilbert, 2000). This can be traced from the word of Allāh says:

حَمَلَتْهُ أُمُّهُۥ كُرْهًا وَوَضَعَتْهُ كُرْهًا

His mother bears him with hardship. And she delivers him with hardship.(Q46:15)

Undergoing all that distresses by the woman that conceived the embryo shows her encountering of hardship upon hardship and many plights passed through before her delivery. If not because of enjoyment emanates from the sexual intercourse such a woman could have said after she had one delivery that she would not conceive again because of dire pain and hardship in conception.

Stage Three: Little lump of flesh *Mudghah* stage

The next stage mentioned in the verse is the *Mudghah* stage. The Arabic word *Mudghah* means "chewed-like substance." If one were to take a piece of gum and chew it and then compare it with an embryo at the *mudghah* stage, it would be concluded that the embryo at the *mudghah* stage acquires the appearance of a chewed-like substance. This is because of the shape at the back of the embryo that "somewhat resemble teeth marks in a chewed substance."The actual size of the embryo at time is 4mm (Aṭ-Ṭabarī).

As contained in the verse that: *then transformed from the blood to the piece of meat (chewed-like substance)*, Aṭ-Ṭabarī said:

ثم تصريفناكم أحوالا حالا بعد حال، من نطفة إلى علقة، ثم من علقة إلى مضغة، لكم معتبرا ومتعظا تعتبرون به، فتعلمون أن من قدر على ذلك فغير متعذّر عليه إعادتكم بعد فنائكم كما كنتم أحياء قبل الفناء.

you have to perceive sensitively and caution with this transformation which occurs during the metamorphosis of embryo in the womb, thus you would realize that the controller and manipulator (Allāh) of that has power to resurrect you after death (Developmental Stages in Human Embryos,2024).

This is because whenever Allāh accounts for the creation of human being, the doubting of the Day of Resurrection would be a reason and facilitation for the account to remind ungrateful humankind about his beginning. Nonetheless, we consider scientific study in embryonic development as the following biological terms can be explained below:

Scientific Discussion of Embryology

There are stages of embryology according to Raul Artal-Mittelmark who is one of biologist has classified the stages in to the fertilization, development of blastocyst, development of embryo, and development of fetus and placental. These are explained as follow;

Stage One: Fertilization Stage

During a typical menstrual cycle, an egg is usually released from one of the ovaries around 14 days after the last menstrual period, a process known as ovulation. This egg then travels into one of the fallopian tubes. At ovulation, the cervical mucus becomes more fluid and elastic, allowing sperm to swiftly enter the uterus and potentially reach the fallopian tube for fertilization. If fertilization doesn't occur, the egg disintegrates as it moves through the uterus during the next menstrual period. Should sperm successfully fertilize the egg, the resulting zygote moves through the fallopian tube towards the uterus, aided by tiny hair-like structures called cilia. The zygote undergoes repeated cell divisions during this journey, arriving in the uterus within 3 to 5 days. Once in the uterus, the cells continue to divide, forming a hollow ball known as a blastocyst, which then implants into the uterine wall approximately 6 days after fertilization (Florence, n.d).

If multiple eggs are released and fertilized, it can lead to a pregnancy with more than one fetus, commonly twins. Fraternal twins result from separate fertilized eggs, each with unique genetic material, while identical twins occur when a single fertilized egg divides into two embryos, sharing the same genetic material (Raul Artal-Mittelmark, 2021).

Stage Two: Development of Blastocyst

Around six days following fertilization, the blastocyst attaches to the lining of the uterus, typically towards its upper part, a process called implantation, usually completed by day 9 or 10. The blastocyst's wall is mainly one cell thick, except for a thickened region of three or four cells. The inner cells in this thickened area form the embryo, while the outer cells penetrate the uterine wall and become the placenta. The placenta produces essential hormones like human chorionic gonadotropin, which suppresses ovulation and stimulates ongoing production of estrogen and progesterone by the ovaries. Furthermore, the placenta facilitates the transfer of oxygen, nutrients, and waste products between the mother and fetus.

Some cells in the placenta form an outer layer called the chorion around the developing blastocyst, while others produce an inner layer known as the amnion, which forms the amniotic sac. By around day 10 to 12, the amniotic sac is completely formed, signaling the blastocyst's transformation into an embryo. Filled with clear amniotic fluid, the sac expands to surround the growing embryo, providing a floating environment.(Raul Artal-Mittelmark, 2021).

Stage Three: Development of the Embryo

After implantation, the embryo grows within the amniotic sac, positioned beneath the uterine lining on one side. This period is characterized by the formation

of most internal organs and external body structures. Organogenesis typically begins around three weeks after fertilization, which corresponds to five weeks of pregnancy calculated from the first day of the woman's last menstrual period, which usually occurs two weeks before fertilization. During this phase, the embryo elongates, showing initial signs of a human form. Subsequently, the neural tube, responsible for the development of the brain and spinal cord, starts to take shape. The formation of the heart and major blood vessels precedes this, starting around day 16. By day 20, the heart begins pumping fluid through developing blood vessels, with the emergence of the first red blood cells the following day. Blood vessel formation continues in both the embryo and the placenta.

Around 10 weeks after fertilization (equivalent to 12 weeks of pregnancy), almost all organs have developed, except for the ongoing development of the brain and spinal cord, which continues throughout the remainder of pregnancy. This phase of organ formation is crucial, as most birth defects arise during this period. As a result, the embryo is highly vulnerable to the impacts of drugs, radiation, and viruses during this time. Therefore, it's advisable for pregnant women to refrain from live-virus vaccinations and unnecessary medications during this critical developmental stage unless they are essential for maternal well-being (Raul Artal-Mittelmark, 2021).

By the 8th week of pregnancy, both the placenta and fetus have undergone about 6 weeks of development. The placenta creates small, hair like structures called villi, which project into the uterine wall. Blood vessels from the embryo travel through the umbilical cord to the placenta, where they mature within the villi. A delicate membrane separates the embryo's blood within the villi from the mother's blood circulating in the intervillous space surrounding them. This arrangement serves two main purposes:

(i) Facilitates the exchange of materials between the mother's blood and the embryo's blood.
(ii) Prevents the mother's immune system from attacking the embryo, as the membrane prevents the passage of the mother's antibodies, which are too large to cross.

The embryo is surrounded by amniotic fluid, contained within the amniotic sac. The amniotic fluid serves several purposes among which are:

(i) Provides a protective environment where the embryo can grow and move freely.
(ii) Acts as a cushion to protect the embryo from potential injury.

The amniotic sac itself is robust and resilient, offering additional protection to the developing (Shrek).

Stage Four: Development of Fetus and Placenta

By the conclusion of the 8th week after fertilization (which corresponds to 10 weeks of pregnancy), the embryo progresses into the fetal stage. During this period, the structures that have already formed undergo growth and further maturation. Several significant milestones take place throughout pregnancy which are:

(i) By 12 weeks of pregnancy: The fetus occupies the entire uterus.
(ii) Around 14 weeks: The sex of the fetus can typically be identified.

(iii) Between approximately 16 to 20 weeks: Pregnant women often start feeling movements of the fetus. Those who have had previous pregnancies tend to perceive these movements about two weeks earlier than first-time mothers.
(iv) Around 24 weeks: The fetus reaches a stage where there's a chance of survival outside the uterus.

Throughout pregnancy, the lungs continue to mature, nearing readiness for functioning independently near the time of delivery. Additionally, the brain continues to accumulate new cells throughout pregnancy and into the first year of life after birth (Gilbert, n.d).

Human Formation

Human embryogenesis is the development and formation of the human embryo (Grosse, n.d). It is described by the processes of cell division and cellular differentiation of the embryo that occurs during the early stages of development. In biological terms, the development of the human body entails growth from a one-celled zygote to an adult human being. Fertilization occurs when the sperm cell successfully enters and fuses with an egg cell (ovum). The genetic material of the sperm and egg then combine to form the single cell zygote and the germinal stage of development commences (Developmental Stages in Human Embryos, n.d). After the egg cell fertilized by a sperm cell (spermatozoa) the ovum becomes a single diploid cell not more egg cell, this known as a zygote that undergoes mitotic division known as cell division in which the nucleus divides into nuclei containing the same number of chromosomes, with no significant growth (a process known as cleavage) and cellular differentiation, it leads to development of multi cellular embryo, (Florence,n.d), occurs after passing an organizational checkpoint during mid-embryogenesis[61]The term refers to early stages of prenatal development in mammals. Embryonic development in the human covers the first eight weeks of development at the beginning of the ninth week the embryo is termed a fetus. The eight weeks has 23 stages. The normal period of gestation (pregnancy) is about nine months or 40 weeks (Musallam, n.d).

The germinal stage refers to the time from fertilization through the development of the early embryo until implantation is completed in the uterus. The germinal stage takes around 10 days. During this stage, the zygote begins to divide, in a process called cleavage.

Imām Ibn Jarīr Aṭ-Ṭabarī's view on Embryology

In Arabic, the word embryology means: علم الاجنة which means the study of embryology (Al-Ḥusayni, 1966). The subsequent creation of humankind after Ādam being created from dust is from disreputable fluid. Thus, Allāh says:

يَٰٓأَيُّهَا ٱلنَّاسُ إِن كُنتُمْ فِى رَيْبٍ مِّنَ ٱلْبَعْثِ فَإِنَّا خَلَقْنَٰكُم مِّن تُرَابٍ ثُمَّ مِن نُّطْفَةٍ ثُمَّ مِنْ عَلَقَةٍ ثُمَّ مِن مُّضْغَةٍ مُّخَلَّقَةٍ وَغَيْرِ مُخَلَّقَةٍ لِّنُبَيِّنَ لَكُمْ ۚ

We have created you from dust, then from a *Nutfah*, then from a clot then from a little lump of flesh some formed and some unformed that We may make (it) clear to you. (Q22:5).

From the above verse, it can be viewed that there are three stages of embryology; *'Nutfah ᶜAlaqah*', and '*Mudghah*'. After mentioning dust that was used to create the humans' forefather (Ādam) the subsequent words are the three that apply in embryological terms which were explored in the above verse of the Qur'ān for early human development in the womb with other substantiative reference from the Qur'ān, *sunnah* and scientific viewpoints.

The prenatal development of humans is an interesting and amazing occurrence. It begins with a single fertilized egg and culminates some 38 weeks later with a complex organization composed of billions of cells (Musallam, n.d). The discussion of human development as described in the Qur'an underscores the humility of human origins and the miraculous nature of creation. The emphasis on the creation from a "humble fluid" resonates with the scientific understanding of human reproduction, highlighting the intricate process from conception to birth. Allah says:

أَلَمْ نَخْلُقكُّم مِّن مَّآءٍ مَّهِينٍۢ ٢٠ فَجَعَلْنَٰهُ فِى قَرَارٍ مَّكِينٍ ٢١

Did We not create you out of a humble fluid, which We then let remain in (the womb's) firm keeping for a term pre-ordained(Q77:20-22)

With that, it has been found the clear proof from Aṭ-Ṭabarī's comments on the some verses of the Glorious Quran concerned the embryologic aspect. He made his comment on Q32: 7-8, based on the study of human embryology as follows:

ٱلَّذِىٓ أَحْسَنَ كُلَّ شَىْءٍ خَلَقَهُۥ ۖ وَبَدَأَ خَلْقَ ٱلْإِنسَٰنِ مِن طِينٍ ٧ ثُمَّ جَعَلَ نَسْلَهُۥ مِن سُلَٰلَةٍ مِّن مَّآءٍ مَّهِينٍ ٨

He It is Who created all things in the best way and began the creation of man from clay, and made his progeny from an extract of despised fluid (*Sulalah*) (Musallam, 1977).

Aṭ-Ṭabarī comments on this verse as follows: Allāh says: "*Verily, We have created man from a drop of mingled liquids (nutfatamshāj)*, interprets; We have created the children of Ādam from sperm, which means: man's sperm and woman's ovum, and the sperm is a every little water in the vessel (Aṭ-Ṭabarī, 2000).

وقوله: (وَبَدأ خَلْقَ الإنْسانِ مِنْ طِين) يقول تعالى ذكره: وبدأ خلق آدم من طين (ثُمَّ جَعَلَ نَسْلَهُ) يعني: ذريته (من سلالة) ، يقول: من الماء الذي انسل فخرج منه. وإنما يعني من إراقة من مائه

And then, it denotes that after the mixture of cell chromosomes the genetic of embryo will form which produced from the couple's semen or gamete then the embryo will dwell in the safe and calm place by Allāh's leave. He said: *Thereafter We made him a Nutfah (sperm)*in a safe lodging (Q23:13) Aṭ-Ṭabarī said this verse means:

يعني تعالى ذكره بقوله: (ثُمَّ جَعَلْنَاهُ نُطْفَةً فِي قَرَارٍ مَكِينٍ) ثم جعلنا الإنسان الذي جعلناه من سلالة من طين نطفة في قرار مكين، وهو حيث استقرّت فيه نطفة الرجل من رحم المرأة، ووصفه بأنه مكين؛ لأنه مكن لذلك، وهيأ له ليستقرّ فيه إلى بلوغ أمره الذي جعله له قرارا.

We (Allāh) made human being whom created from the clay as a sperm to be in a safe and comfortable place. The place where the sperm resides in the womb of woman, it describes as safe place because it is where dwells safely and prepared for him in order to reside till its destination that Allāh decreed for its dwelling therein (Aṭ-Ṭabarī).

The second term in the verse is ᶜ*Alaqah* which means 'leech or clot'. It is the second stage in the studying embryology as contained in (Q23:13), that means the development of human in early stage in the womb transfigures from *Nutfah* (sperm) to ᶜ*Alaqah* (leech or clot). This term was described as *a piece of rigid or inflexible blood* (Aṭ-Ṭabarī).

The next stage mentioned in the verse is the *mudghah* stage. The Arabic word *mudghah* means "chewed-like substance." If one were to take a piece of gum and chew it in his or her mouth and then compare it with an embryo at the *mudghah* stage, we would conclude that the embryo at the *mudghah* stage acquires the appearance of a chewed-like substance. As contained in the verse that: *then transformed from the blood to the piece of meat (chewed-like substance)*, which can be grasped as follows:

you have to perceive sensitively and caution with this transformation which occurs during the metamorphosis of embryo in the womb, thus you would realize that the controller and manipulator (Allāh) of that has power to resurrect you after death (Aṭ-Ṭabarī).

From the above biological exploration which denotes the mixture of the mingled fluid of the male's sperm and female's ovum as materialized to form fetus, it shows scientifically the work of Allāh Who said:

أَفَرَءَيْتُم مَّا تُمْنُونَ ٥٨ ءَأَنتُمْ تَخْلُقُونَهُۥٓ أَمْ نَحْنُ ٱلْخَٰلِقُونَ ٥٩

Do you not see the semen you emit? Is it you who create it, or are We the Creator? (Q56:58-59)

From the other verse He says:

أَلَمْ يَكُ نُطْفَةً مِّن مَّنِيٍّ يُمْنَىٰ ٣٧ ثُمَّ كَانَ عَلَقَةً فَخَلَقَ فَسَوَّىٰ ٣٨

Was he not a *Nutfah* of semen emitted? Then he became an ᶜ*Alaqah*; then shaped and fashioned in due proportion (Q75:37-38).

The above verses can be comprehended through the following point of view:

concerning these verses of the Glorious Qur'ān that Allāh called attention of humankind to his beginning because he was created from the fluid that came from the loin into the womb and after He fashioned him in a good and reasonable structure, He gives him ear, sigh and mouth to talk (Aṭ-Ṭabarī).

On this, it is established in the Glorious Qur'ān (Q22:5) that before all the embryonic stages pass, immediately sperm (semen) entered the womb the Angel in charge of the womb will ask Allāh 'is it formed or unformed?. The angel will be replied and then the next step will follow it. This was fully manifested in the content of *Hadīth* narrated by Abdullah in the *Tafsīr* Aṭ-Ṭabarī who quoted it as reference to this assertion said:

قالوا: فأما المخلقة فما كان خلقا سَوِيّا وأما غير مخلقة، فما دفعته الأرحام، من النطف، وألقته قبل أن يكون خلقا.ذكر من قال ذلك: حدثنا أبو كريب، قال: ثنا أبو معاوية، عن داود بن أبي هند، عن عامر، عن علقمة، عن عبد الله، قال: إذا وقعت النطفة في الرحم، بعث الله ملَكا فقال: يا ربّ مخلقة، أو غير مخلقة؟ فإن قال: غير مخلَّقة، مجّتها الأرحام دما، وإن قال: مخلقة، قال: يا ربّ فما صفة هذه النطفة، أذكر أم أنثى؟ ما رزقها ما أجلها؟ أشقيّ أو سعيد؟ قال: فيقال له: انطلق إلى أمّ الكتاب فاستنسخ منه صفة هذه النطفة! قال: فينطلق الملك فينسخها فلا تزال معه حتى يأتي على آخر صفتها.

ᶜAbdullāh said: once the sperm entered the womb Allāh will send an angel and that angel asked Him; O my lord is it formed or unformed? If Allāh says it will not form the womb will turn it to blood, but if it will be formed the angel asked what is formation of this sperm is a male or female what is its sustenance and his time on earth, a wretched or fortune?, he said: then he will be told: go to the original scripture of destiny(mother of the Book)and extract the copy of this sperm then the angel will go to that scripture and take it, and he will not depart with that embryo until the completion of its formation

Aṭ-Ṭabarī said: the best view to uphold in this matter is that formed sperm it will form in a completion creation, but the one that will not form; it will drop out from the womb as blood. Indeed the formed one and unformed emanate from the leech, clot and the sperm, it will not remain in that potion until it will become a complete creation, that is the meaning of formed and unformed. Formed is a complete creation and unformed is the one that drops out from the woman's womb as a clot that is not formed and the spirit will not be breathed into it (Drost et al, 2017). These transfiguration and creating organs in the embryo are complexity beyond human comprehension and only few were explained by scientists in embryogenesis.

In Qur'ān 23:13-14, the stages of embryo were explained in another dimensional phases Allāh says:

Thereafter We made him a Nutfah in a safe lodging. Then We made the Nutfah into a clot, then We made the clot into a little lump of flesh, then We made out of

that little lump of flesh bones, then We clothed the bones with flesh, and then We brought it forth as another creation.

Concerning the above quoted verse, this view can elucidate the preceding matter as follows:

Because in all these stages: the sperm, then the clot, then the lump of flesh, then the bones and flesh, he was still subordinate to a mother, connected to her and nourished by her. Then when God willed for him to be born, he separated from his mother to begin his life on his own; and therefore we find the moment of the fetus's separation from his mother in the birth process is a difficult matter because it will receive a self-life that requires its systems to work for the first time, and the first of these systems is the respiratory system (Ash-Shaᶜrāwī,1997).

Indeed, from the aforementioned view held by the renowned and reputable Islāmic exegete known as Ash-Shaᶜrāwī among others denotes that five stages of embryogenesis were vividly explained in Q23:13-14, unlike the other verses of the Qur'ān where the only three stages were briefly explained the concept. He arranged the stages of embryology in order as contained in the verse below: the sperm (*Nutfah)*, clot (ᶜ*Alaqah*), little lump flesh (*Mudghah*), bone (ᶜ*Iẓāman*) and flesh (Flesh). In this explanatory verse of the Qur'ān the real discussion and details about embryology were established in Islāmic viewpoints.

Respiratory system was however explored in that particular verse by Ash-Shaᶜrāwī which manifested as a difficult affair where the fetus will be separated from the mother to begin his life in the birth process, because it will receive a self-life that requires its systems to work for the first time, and the first among which is respiratory system. He furthers in assertion on the matter below:

And from Allah's mercy to the fetus is that it descends with its head first so that it can breathe, then the rest of its body comes out after that. If the opposite happens and it descends with its feet, then it may die because it has been separated from its dependence on its mother, and it does not have the ability to breathe to maintain its new self-life. Therefore, in this case, the doctor resorts to performing a caesarean section to save the fetus from this situation, before it suffocates.

He also says:

Since the issue of the creation of man contains many lessons, signs, and evidence of power throughout these stages in which man fluctuates, it is appropriate to conclude the verse with the Almighty's saying: *So blessed be Allah, the best of creators* (Ash-Shaᶜrāwī, 1997).

The view of another prominent exegete on the Qur'ān 23:13-14, goes thus:

The first of the correct statements on this matter is the statement of the one who said: What he meant by that is the breathing of the spirit into him, and that is that by breathing the spirit into him he is transformed into another creation, a human being, and before that he was in the states that God described him to be in, from a drop of semen, a clot, a lump of flesh, and a bone, and by breathing the spirit into him he is transformed from all of those meanings into the meaning of humanity, just as his father Adam was transformed by breathing the spirit into the clay from which he was created into a human being, and another creation other than the clay from which he was created(Aṭ-Ṭabarī).

In comparing the views of A?-?abarī and Ash-Shaᶜrāwī on that particular verse in *Sūratu'l-Mu'minūn*: 14, it will be established that both of them were on the same rout but in the more explanation A?-?abarī asserts that the three stages from the sperm, clot and little lump flesh can be merged as one and the word *thumma ansha'nahu khalqan ākharan* can be interpreted to the breathing the spirit into the embryo.

CONCLUSION

Without having any doubt, Islām is an absolute way of life while the Qur'ān is a synopsis of knowledge and nothing could be difficult to be found in it. It has been discussed that, it contained information on the embryology of human creation and other related scientific themes. So far, this has discussed the conceptual definition of embryology as well as the stages of embryology. It discussed the scientific views on embryology which are similar to that of Islāmic perspective. An historical account of Aṭ-Ṭabarī was discussed along with his encyclopedic work of *Tafsīr* in this paper. The view of Aṭ-Ṭabarī on embryology was discussed based on Q22:5 to have been in three stages; *Nutifah*, *ᶜAlaqah* and *Mudghah*. So, each of these stages was presented along with Aṭ-Ṭabarī's views and some other *Mufassirūn* like Ar-Rāzī and Ibn Kathīr. The scientific discussion of embryology was also made to be of four stages; fertilization, development of blastocyst, development of the embryo and development of fetus and placenta.

The findings of this paper reveal that the *Tafsīr* work of Aṭ-Ṭabarī contains some scientific views which can be studied in juxtaposition with modern sciences. Thus, the *Tafsīr*work is suggested for further research on biological science.Thefindings in this research show that the encyclopedic work of *Tafsīr* of Aṭ-Ṭabarī is worthy of study as encompasses many fields of knowledge including science. It is thus good for researcher in Islāmic studies to use the work of *Tafsīr* of Aṭ-Ṭabarī for further research in academic arena.

The book *Jāmiᶜi al-Bayān ᶜan Ta'wīl Āy al-Qur'ān* authored by Abū Jaᶜfar Ibn Jarīr Aṭ-Ṭabarī is a great commentary of the Glorious Qur'ān known as *Tafsīr bil-Ma'thūr* among other and distinguished *Tafsīr* in the field of Qur'ānic commentaries. It is classic before the exegetes because Aṭ-Ṭabarī's contemporaries testified to the classical and uniqueness of his *Tafsīr*, and those scholars of the Qur'ānic commentaries that came after them, and even used his work to prepare their own. This regard, it is recommended for the contemporary scholars to make research through the work of Qur'ānic commentary of Aṭ-Ṭabarī' in order to widespread its prominence and distinguish ability.

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