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## **Human Reproduction, Pregnancy and Development of Human Embryo: A Research Analysis in the Light of Islam**

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### **Abstract**

Man is the best of all the creatures created by Allah Al-Mighty and Allah looks after all the affairs directly or indirectly related to human beings. The holy Quran is the last of all the revelations revealed to the last Prophet and is enriched in all types of sciences. The miraculous nature of the Qur'ān is evident from its marvellous descriptions of the biological phenomena of human life, especially reproduction, pregnancy, and embryo development. It appeals to its readers with the consistency between the details of the biological processes it provides in the seventh century and the scientific knowledge that man has attained in this era of embryological research and technology. This research article seeks to interpret relevant Qur'ānic verses with a dimension of anatomical and physiological explanations. It tries to synchronize exegetical references with current information about reproduction and pregnancy and human embryos.

**Keywords:** reproduction, pregnancy, Embryo, *Arḥām*, *Nutfah*, *'Alaqah*

### **Introduction:**

The advancement in the field of reproductive medicine and technology has been made possible due to a profound understanding of human reproduction. Obstetrical and gynaecological research has allowed a better management of mothers during pregnancy and childbirth. However, this progress did not thrive in a secular environment to follow the path of scientific miracles and technological marvels according to whimsical desires. Morality, ethics, conscience, family, society, law and religion all come into play to preserve the harmony and integrity of mankind.

One of the marvels of the Holy Qur'ān is the description of human reproduction, pregnancy and development of human embryos in a womb

provided by it at a time when modern facilities of research were not available. It informs its readers about the major physiological processes of reproduction and developmental stages of pregnancy. Compared with what we know today, the Qur'anic explanation is best in concordance with modern biological research. This claim would be verified by the analysis of Qur'anic verses given below:

### **Islamic Perspective of Human Reproduction:**

Dr Maurice Bucaille (1920-1998) laments the myths and superstitions about human reproduction that existed in the Middle Ages and lauds the accuracy of reproductive information contained in the Qur'ān. According to him, it outlines well-defined stages in reproduction and makes numerous references to exact mechanisms without offering a single assertion that is inaccurate. Everything that is explained in it is done so in simple terms that are easily understandable and strictly in conformity with what would be found much later.<sup>1</sup>

Numerous Qur'ānic verses deal with human reproduction. It provides a multitude of statements about reproductive structures and their role in reproductive processes. Some of them are clear; hence, their explanations and commentaries may be easily comprehended from the Arabic exegeses of the Qur'ān. Others are complex regarding the employment of words or phrases, or the statements made; hence, their traditional explanations become a challenge to a faithful reader. There is a need to re-read the reproductive system mentioned in the Qur'ān to highlight its compatibility with the knowledge of human biology.

#### **(i) *Arḥām* (Wombs):**

A number of verses mention the uterus and describe physiological processes and embryonic developments that happen within its cavity. Allāh the Almighty says in *Sūrah Luqmān*:

"وَيَعْلَمُ مَا فِي الْأَرْحَامِ"

“And He knows that which is in the wombs.”<sup>2</sup>

Most commentators of the Qur'ān take foetus within the cavity of the uterus to denote *mā fi 'l-arḥām* and they usually refer to the knowledge of Allāh about its gender, race, physique, psyche, age, count and developmental stage of the foetus.<sup>3</sup> But in the author's view, the verse is more generalized,

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<sup>1</sup> Maurice Bucaille, *The Bible, the Qur'an and Science* (Lahore: Kazi Publications, 1977), 198

<sup>2</sup> *Luqmān*, 31:34

<sup>3</sup> Muḥammad b. Jaḥīr al-Ṭabarī, *Jāmi' al-Bayān 'an Ta'wīl āyah al-Qur'ān* (Bayrūt: Mū'sasah al-Risālah, 1420/2000), 20:160. Also see commentaries on this verse by Al-Māwardī, Al-Qushayrī, Al-Bayḍāwī, Ibn Kathīr, Al-Khatīb al-Sharḥīnī, Al-Sha'rāwī.

meaning that He knows all (anatomical structures and physiological processes) that are in the wombs (the uterine walls and their cavities). Now, the verse says that He knows the structure of the uterus and the monthly changes through which it undergoes. He knows the various stages of embryonic development within the uterus. He knows his physical composition and genetic constitution. He knows whether it is a male or female, white or black, healthy or sick, perfect or defective, beautiful or ugly, living or dead, single or multiple. He knows whether he is going to be a believer or non-believer, blessed or wretched, modest or furious, wise or moron. Similarly, the following verse of *Sūrah al-Ra‘d* gives a reference to the embryo in a pregnant woman:

"اللَّهُ يَعْلَمُ مَا تَحْمِلُ كُلُّ أُنْثَىٰ وَ مَا تَعْبِضُ الْأَرْحَامُ وَ مَا تَزْدَادُ"

“Allah is aware of what each woman bears and the extent to which her wombs either surpass or fall short (in terms of time or quantity).”<sup>4</sup>

Al-Ṭabarī (d. 310/923) explains that Allah knows whatever a woman carries (*mā taḥmilu*) as a foetus within her abdominal cavity. And He knows how the wombs fall short of their period of gestation (*taghīdu*) or exceed nine months (*tazdād*); or how the foetus is miscarried or reach the full term; or how the body of the foetus becomes deficient of limbs or exceeds in number; or how bleeding may occur during pregnancy leading to early termination or blood stops leading to full term.<sup>5</sup>

In author’s view, *mā taḥmilu* refers to all that a woman carries within the abdominal cavity, including the reproductive organs: the ovaries, uterine tubes, uterus, and vagina. And *taghīdu* and *tazdād* may also refer to changes of the uterine lining in the monthly female cycle. The uterine layers diminish during menstruation as a result of desquamation of the endometrium and increase in size during the proliferative and secretory phases under the effect of oestrogen and progesterone respectively.

Early commentators of the Qur’ān, including al-Ṭabarī (d. 310/923), al-Baghawī (d. 516/1122) and others, were of the opinion that the foetus is fed by menstrual blood. They said that if some bleeding had occurred during pregnancy, the foetus would become weak and would be born premature.<sup>6</sup> However, their viewpoint is faulty because today we know that foetus gets

<sup>4</sup> *Al-Ra‘d* 13:8

<sup>5</sup> Al-Ṭabarī, *Jāmi‘ al-Bayān*, 16:358. Also see commentary on this verse by Ibn Jawzī, Al-Qurtubī, Al-Khāzin, and Al-Tha‘ālabī.

<sup>6</sup> Ḥusayn b. Mas‘ūd al-Baghawī, *Ma‘ālam al-Tanzīl fī Tafsīr al-Qur’ān* (Bayrūt: Dār Ihyā al-Turāth al-‘Arabī, 1420/1999), 3: 8. Al-Ṭabarī, *Jāmi‘ al-Bayān*, 16:362

nutrition from the maternal blood through placenta, not from the blood that is shed during menses. In fact, vaginal bleeding during pregnancy may occur in 1-22% of pregnant women and is harmless in 50% of cases. Now, the verse 13:8 can be explained: Allāh knows that some pregnant uteruses are subjected to bleeding due to which abortions, or premature deliveries, or preterm rupture of membranes may occur (*taghīdu*). He also knows those who bleed only slightly, then go on to a full term, or those who do not bleed at all in nearly 80% of women (*tazdād*).

In regard to the uterus, implantation of the embryo is mentioned in the following verse:

"وَنُقِرُّ فِي الْأَرْحَامِ مَا نَشَاءُ إِلَىٰ آجَلٍ مُّسَمًّى"

“And We establish in the wombs what We will, till a stated term.”<sup>7</sup>

Allāh the Almighty causes the foetus to remain in the womb and prevents it from being aborted before the end of the term as the commentators would explain it. Al-Sam‘ānī (d. 489/1095), however, translates the verb *nuqirru* as *nuthabbitu* which gives a more scientific connotation to it.<sup>8</sup> Lane (d. 1876) gives different meanings of the word *thabata*: remained fixed; stood, or rested; fixed, fast, settled are significant of them as they refer to the implantation of the blastocyst in the uterus.<sup>9</sup>

"هُوَ الَّذِي يُصَوِّرُكُمْ فِي الْأَرْحَامِ كَيْفَ يَشَاءُ"

“It is He Who fashions you in the wombs the way He wills.”<sup>10</sup>

The above verse says that Allāh shapes foetuses in the wombs. It refers to all stages of foetal development up to the formation of the face of a foetus. Moreover, the shaping in the uterus is done in accordance with a definite genetic plan decided by Him. This genetic programming is referred to as destiny (*al-Qaḍā’* or *al-Qismah*) by al-Qushayrī.<sup>11</sup> According to Abū Hayyan al-Andalūsī, the variations of colour, facial features, length, e.t.c. in the infant are due to genetic variations, which he calls *al-Ikhtilāfāt*. The apparent differences of the faces (*taṣwīr*) are linked to different random genetic combinations called *mashī’ah* by him and indicted by the phrase

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<sup>7</sup> *Al-Hajj* 22:5

<sup>8</sup> Maṣūf b. Muḥammad al-Sam‘ānī, *Tafsīr al-Qur‘ān* (Riyād: Dār al-Waṭn, 1418 /1997 ), 3:421

<sup>9</sup> Edward William Lane, *An Arabic – English Lexicon* (London: Willams & Norgate, 1863), 1: 328

<sup>10</sup> *Āli ‘Imrān*, 3:6

<sup>11</sup> Abd al-Karīm b. Hawāzin al-Qushayrī , *Laṭā’if al-Ishārāt* (Egypt: Al-Hay’iyah al-Miṣriyyah, n.d.), 1:220

*kayfa yashā'* in the verse.<sup>12</sup> The face (*ṣūrah*) by which one is distinguished from the other depends on a specific sequence of genes (*ta'lif khāṣ*) and their combinatorial patterns (*tarkīb mundabaṭ*) between the male and female chromosomes.<sup>13</sup> This sequencing and combination occurs according to the Will of Allāh the Almighty as He says in another place:

"فِي أَيِّ صُورَةٍ مَّا شَاءَ رَكَّبَكَ"

"In whatsoever shape He willed, He has put you together."<sup>14</sup>

The similarity between the faces of one species is due to specific genetic signals (*'alāmāt*) with which it becomes distinguished from other species. These signals may be visible (*maḥsūs*) which decide the phenotype of a species and the faces of a man, horse or others are discerned. These may be hidden (*ma'qūl*) by which one individual of a species gets characteristics like blood type, risk for a specific disease, e.t.c., different from others.<sup>15</sup>

## (ii) **Buṭūn Ummuhāt (Wombs of Mothers):**

The uteruses or wombs have also been referred to as *buṭūn* in the Qur'ān:

"يَخْلُقُكُمْ فِي بُطُونِ أُمَّهَاتِكُمْ خَلْقًا مِّنْ بَعْدِ خَلْقٍ فِي ظُلُمَاتٍ ثَلَاثٍ"

"He creates you in your mothers' wombs creation after creation in threefold darknesses."<sup>16</sup>

*Yakhlukukum* tells about the creation and *buṭūn ummuhāt* shows the place of it- uteruses or wombs. But *baṭn umm* can be used in a wider sense. It may include all reproductive structures which exist within the abdominal cavity. Ovaries, for instance, are not part of the uterus, but they exist in the abdomen. They contain the ova that are female gametes. So, in the author's view, the verse may imply that He has created you with the help of structures existing in the abdomen of your mothers.

*Khalqan min ba'd khalqan* hints to the stages of development of an embryo as mentioned in *Sūrah al-Mu'minūn: nutfah*, '*alaqah* (hanging mass of cells), *muḍghah* (mass of cells which appear as a chewed mass), '*izām*

<sup>12</sup> Abū Hayyan Muḥammad b. Yūsuf al-Andalūsī, *Al-Baḥr al-Muḥīt fī 'l-Tafsīr* (Bayrūt: Dār al-Fikr, 1420/1999), 3:19

<sup>13</sup> Aḥmad b. Yūsuf al-Samīn al-Ḥalbī, *Al-Durar al-Masūn fī 'ulūm al-Kitāb al-Maknūn* (Damascus: Dār al-Qalam, n.d.), 3:23

<sup>14</sup> *Al-Infītār* 82:8

<sup>15</sup> Muḥammad Thanā' Allāh Pānipatī al-Maḥzarī, *Tafsīr al-Maḥzarī* (Pākistān: Maktabah Rashīdiyyah, 1424/2003), 9:257

<sup>16</sup> *Al-Zumar* 39:6. *Buṭūn Ummuhāt* has also been mentioned in *Al-Qur'ān* 53:32 and 16:78 in connection with the foetuses and their birth.

(bones), *lahm* (muscles), *khalq ākhir* (new creation).<sup>17</sup> Ibn Kathīr (d. 774/1372) adds stages of nerves and veins; then the breathing of spirit occurs and the foetus becomes a new creation.<sup>18</sup> Al-Māwardī (d. 450/1058) gives another meaning: creation in the loin of father, then creation in the womb of the mother, then creation after birth.<sup>19</sup>

*Zulumāt thalāth* says that the process happens within three layers: abdomen, uterus and amnion.<sup>20</sup> Three veils of darkness might also refer to three layers of the uterus: perimetrium, myometrium and endometrium.<sup>21</sup> This term may also refer to three germ layers of an embryo: ectoderm, mesoderm and endoderm. This might also refer to the three stages of human development in a uterus: pre-embryonic (first two and a half weeks), embryonic (up to eighth week) and foetal (from eighth week to term).<sup>22</sup> In the author's view, this may refer to the 'darkness in the ovaries' where ova grow, 'darkness in the Fallopian tubes' where fertilisation and some early divisions occur, and 'darkness in the uterine cavity' where implantation and further developmental stages undergo.

### (iii) ***Mustaqarr* and *Mustawda*' (Place of Residing and Place of Storage)**

Two parts of the reproductive system have been named as *mustaqarr* and *mustawda*' in a verse of *Sūrah al-An'ām*:

وَهُوَ الَّذِي أَنْشَأَكُمْ مِنْ نَفْسٍ وَاحِدَةٍ فَمُسْتَقَرٌّ وَمُسْتَوْدَعٌ

“And it is He Who brought you into being from a single soul, then (He placed you in) a resting place and a storage place.”<sup>23</sup>

Several meanings have been assigned to *mustaqarr* (resting-place) and *mustawda*' (storage-place) by the commentators. *Mustaqarr* is closer to constancy, stability or immutability than *mustawda*'. Anything which acquires a place and is not meant for subsidence is called *mustaqarr* in that place. And a thing which acquires a place but gets subsided from that position is called *mustawda*' because a thing which is entrusted as a deposit

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<sup>17</sup> Al-Ṭabarī, *Jāmi' al-Bayān*, 21:257

<sup>18</sup> Abū al-Fadā', Ismā'il b. 'Umar ibn Kathīr, *Tafsīr al-Qur'ān al-'Azīm* (Bayrūt: Dār al-Kutub al-'Ilmiyyah, 1419/1998), 7:76

<sup>19</sup> Abū al-Ḥasan 'Alī b. Muḥammad Al-Māwardī, *Al-Nukat wa 'l-'Uyūn* (Bayrūt: Dār al-Kutub al-'Ilmiyyah, n.d.), 5:115

<sup>20</sup> Al-Ṭabarī, *Jāmi' al-Bayān*, 21:258

<sup>21</sup> Muhammad Tahir-ul-Qadri, *Creation of Man: A Review of the Qur'an and Modern Embryology* (Lahore: Minhaj-ul-Quran Publications, 2018), 65

<sup>22</sup> Harun Yahya, *Allah's Miracles in the Qur'an* (New Delhi: Goodword Books, 2005), 161

<sup>23</sup> *Al-An'ām* 6:98

can be recovered or regained.<sup>24</sup> In short, *mustaqarr* contains the meaning of *qarār* i.e. a state of rest, fixedness, stability, settledness, persistence or continuity.<sup>25</sup> And *mustawda'* contains the meaning of *wadī'ah* i.e. a thing committed to the trust and care of a person; a trust; or a deposit.<sup>26</sup>

According to *mufassirīn*, the most common exposition of the verse is *mustaqarr* for uterus (*rahm*) and *mustawda'* for father's loin (*ṣulb*). This is because the embryo stays in the uterus longer than the *nutfah*'s stay in father's loin (as they presumed it to be). However, the converse is also possible; *mustaqarr* is father's loin and *mustawda'* is uterus because the embryo's stay in the uterus is after the deposition of sperm from the father, so it resembles a depository (*mustawda'*) while the sperm's stay in loin is of its own.<sup>27</sup> Ibn Jawzī quotes that even *mustaqarr* and *mustawda'* both may mean uterus because for *nutfah* the uterus is a depository and for embryo it is a resting place.<sup>28</sup>

*Mustaqarr* is *ism makān* or *ism maf'ūl*, and has also been read as *mustaqirr* (*ism fā'il*), while *mustawda'* can be *ism makān* or *ism maf'ūl*. Now, there are four possible combinations with their respective interpretations:

- a) Both are *ism makān*: *Mustaqarr* = *rahm*; *Mustawda'* = *ṣulb*
- b) *Mustaqarr* is *ism makān* and *mustawda'* is *ism maf'ūl* : *Mustaqarr*= *rahm*; *Mustawda'*= *nutfah* or *janīn*
- c) *Mustaqirr* is *ism fā'il* and *mustawda'* is *ism makān*: *Mustaqirr*= *janīn*; *Mustawda'* = *ṣulb*
- d) *Mustaqirr* is *ism fā'il* and *mustawda'* is *ism maf'ūl*: *Mustaqirr*= *janīn*; *Mustawda'* = *nutfah*

One interpretation may also refer to the ovary. *Mustaqarr* may be ovary where an ovum is produced of its own and *mustawda'* may be uterus (or Fallopian tubes to be specific) where the ovum is deposited. *Nafs wāhidah* in this case may refer to the ovum.

Ibn Manzūr (d. 711/1311) says that one meaning of *nafs* is *mā yakūnu bihā tamyīz* i.e. that with which discrimination or variation happens.<sup>29</sup> Now,

<sup>24</sup>Abū 'Abd Allāh Muḥammad b. 'Umar al-Rāzī, *Mafātīḥ al-Ghayb* (Bayrūt: Dār Iḥyā al-Turāth al-'Arabī, 1420/1999), 13:81

<sup>25</sup> Lane, *An Arabic – English Lexicon*, 7:2501

<sup>26</sup> *Ibid.*, 8: 3051

<sup>27</sup> Al-Rāzī, *Mafātīḥ al-Ghayb*, 13:81

<sup>28</sup>Jamāl al-dīn, 'Abd al-Raḥmān b. 'Alī Ibn Jawzī, *Zād al-Masīr fī 'Ilm al-Tafsīr* (Bayrūt: Dār al-Kutub al-'Arabī, 1422/2001 ), 2:59

<sup>29</sup>Abū al Faḍal Muḥammad b. Muḥarrām b. Manzūr al-Ifrīqī, *Lisān 'l - 'Arab* (Bayrūt: Dār Sādir, 1386 /1966), 6:234

the verse can be interpreted in terms of genetics. He created *nafs wāhidah* (genotype of Adam). From him, He created his mate (genotype of Eve). The resting place (*mustaqarr*) and depository (*mustawda*) of their gametes were different. After their marriage, their alleles were transmitted to next generations which appeared as variable phenotypic traits in them (*ṣiffāt mukhtalifah*). These variations were due to genes or alleles (*sabab mu'aththar*) which were not physical (*ghayr jasimah*) but genetic. That gene (*sabab*) is the executor of a particular phenotypic trait (*fā'il*) which is chosen or selected (*mukhtār*) and contains discreet information for a specific trait (*hakīm* and *khābīr*).<sup>30</sup>

**(iv) Qarār Makīn (Safe Lodging):**

The uterus has also been called a safe lodging in the following verse:

"ثُمَّ جَعَلْنَاهُ نُطْفَةً فِي قَرَارٍ مَّكِينٍ"

“Then We placed him as a sperm drop in a safe depository.”<sup>31</sup>

*Qarār* is a firmly fixed place, a place of rest, settledness, stability.<sup>32</sup> *Makīn* is translated as *harīz* that is a place fortified, strong or protected against attack.<sup>33</sup> The uterus is *qarār makīn* because it gives the embryo a place to settle in and protects it. In the author's view, if the *ja'ala* employed in the verse is taken as *khalaqa*, then the verse would imply that We made the *nutfah* in a safe lodging. In this sense, it is referring to the seminiferous tubules where sperms are made and to the epididymis where they are stored.

**(v) Al-Ṣulb and al-Tarā'ib (Backbone and Ribs):**

The following verse has been grossly misconstrued by commentators and has invited criticism from the secular spheres on the pretext of its incompatibility with the scientific knowledge about the creation of man. The classical Arabic exegeses fail to produce a satisfactory answer to a modern reader; rather they have misconceptions about the production sites of gametes. As before the age of scientific boom, the exact function of gametes was unknown, so any wrong interpretation on the part of the commentator does not render the text incompatible with the facts. When viewed in the

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<sup>30</sup>Al-Rāzī, *Mafātīh al-Ghayb*, 13:82. Nizām al-Dīn Al-Ḥasan b. Muḥammad al-Nishāpurī, *Gharā'ib al-Qur'ān wa Raghā'ib al-Furqān* (Bayrūt: Dār al-Kutub al-'Ilmiyyah, 1416/1995), 3:127-128

<sup>31</sup> *Al-Mu'minūn* 23:13

<sup>32</sup> Lane, *An Arabic – English Lexicon*, 7:2501

<sup>33</sup>Al-Māwardī, *Al-Nukat wa 'l-'Uyūn*, 6:178

light of current information, the verse still agrees with the science of man's creation as will be seen later.

"فَلْيَنْظُرِ الْإِنْسَانُ مِمَّ خُلِقَ خُلِقَ مِنْ مَّاءٍ دَافِقٍ يُخْرُجُ مِنْ بَيْنِ الصُّلْبِ وَالتَّرَائِبِ"

“So let man consider from what he is created! He is created from gushing water, emerging from between the backbone and the ribs.”<sup>34</sup>

According to the traditional commentators, *mā dāfiq* means *mā madfūq* and *yakhruju min bayna al-ṣulb wa al-tarā'ib* signifies *yakhruju min humā*.<sup>35</sup> This interpretation implies that *ṣulb* and *tarā'ib* are sites of production of gametes. The commentators say that man has been created from two kinds of fluids: the fluid of the father coming from *ṣulb* and the fluid of the mother coming from *tarā'ib*. The singular word is used for both fluids because of their intermingling in the creation of man. Regarding *ṣulb*, it is clear that it is backbone; but *tarā'ib* has been assigned various meanings. The fallacy lies in the fact that *mā dāfiq* is thought to be spermatozoa which are assumed to be proceeding from *ṣulb* and *tarā'ib*.

In the author's view, *mā dāfiq* (fluid gushing forth) is semen, not the sperm. Sperms are formed in the seminiferous tubules in the testes, stored in the epididymis and carried out by vas deferens to the ejaculatory duct at the base of the prostate in the pelvis. The semen consists of spermatozoa (2-5%) present in a fluid (98-95%) which is contributed by secretions of glands present in the pelvis. 75% of it comes from the seminal vesicles that drain into the ejaculatory ducts which in turn opens into the prostatic urethra.<sup>36</sup> It can be seen that *mā dāfiq* (water gushing forth) has also been referred to as *maniyyi yumnā* (semen emitted) in another verse:

"أَلَمْ يَكُ نُطْفَةً مِّن مَّنِيٍّ يُمْنَى"

“Was he not a sperm-drop from semen that is emitted?”<sup>37</sup>

*Yakhruju min* (proceeds from or comes out from) does not refer to the site where sperm is produced. It refers to the glandular structures and their ducts from where the semen comes. *Ṣulb* and *tarā'ib* (backbone and ribs) are mentioned to delineate the boundaries of abdominopelvic cavity. This cavity is limited above by the diaphragm of the rib cage and below by the muscles of the pelvic floor. *Yakhruju min bayn al-ṣulb wa al-tarā'ib* means that the semen is coming from the abdomino-pelvic cavity which

<sup>34</sup> *Al-Tāriq* 86:5-7

<sup>35</sup> *Al-Ṭabarī, Jāmi' al-Bayān*, 24:354

<sup>36</sup> Surabhi Gupta and Anand Kumar, “Human Semen,” in *Basics of Human Andrology*, ed. Anand Kumar and Mona Sharma (Singapore: Springer, 2017), 163-170.

<sup>37</sup> *Al-Qiyāmah* 75:37

contains the glands that produce semen. In this case, both *ṣulb* and *tarā'ib* of the male are under discussion. This explanation is compatible with the physiology of male gamete production.

In another interpretation, if the pronoun in *yakhruju* refers to *al-insān* and *ṣulb* and *tarā'ib* belong to the female, the verse would mean that the man is created from water gushing forth and he comes out from the abdomino-pelvic cavity of female in which a pregnant uterus is present. This explanation also complies with the physiology of human birth.

### 1. Phases of Human Development in the Qur'ān:

The classical verses on embryology belong to the *Sūrah Mu'minūn* (23:12-14) and provide a connection between the origin of man and its developmental embryology. The verses begin with the verb *khalāqnā* (We created) and end at *fa-tabāraka Allāhu aḥsanu 'l-khāliqīn* (So blessed be Allāh, the Best of creators) giving a creationist cloth to the process of embryology. The verse 12 tells that man was created from *sulālatin min tīn* (an extract of clay) and the stages of embryo begin from the verses 13 and 14. This explains the difference between the religious and secular interpretations of human embryology. The secular tend to omit the Origin-and-Creator message and object the role of *sulālatin min tīn* in the physiology of embryology. Coming to the verses:

"وَلَقَدْ خَلَقْنَا الْإِنْسَانَ مِنْ سُلَّةٍ مِنْ طِينٍ ﴿١٢﴾ ثُمَّ جَعَلْنَاهُ نُطْفَةً فِي قَرَارٍ مَكِينٍ ﴿١٣﴾  
ثُمَّ خَلَقْنَا النَّطْفَةَ عَلَقَةً فَخَلَقْنَا الْعَلَقَةَ مُضْغَةً فَخَلَقْنَا الْمُضْغَةَ عِظْمًا فَكَسَوْنَا الْعِظْمَ لَحْمًا ثُمَّ أَنْشَأْنَاهُ خَلْقًا  
آخَرَ فَتَبَارَكَ اللَّهُ أَحْسَنُ الْخَالِقِينَ ﴿١٤﴾"

“And certainly We created man from an extract of clay. Then, We placed him as a drop in a safe lodging. Then, We made that drop into an a hanging mass of cells, then We made the hanging mass into a little lump of tissue (which appeared chewed), then We made bones from that little lump, then We clothed the bones with flesh, and then We caused it to grow into another creation (foetus). So blessed be Allāh, the Best of creators.”<sup>38</sup>

The above verse points to the creative material of man. *Sulālah*, by definition, is anything which is drawn forth from a thing and extracted from it. *Sulālah min tīn* has been translated as an extract or quintessence of clay; or a product of wet earth; or elements of earth. The body of Adam was made

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<sup>38</sup> *Al-Mu'minūn* 23:12-14

from clay which contained elements from all over the earth. The bodily structure of his progeny is also made of wet earth.<sup>39</sup>

The verses 13 and 14 describe three stages of human embryo marked by the use of the word *thumma* at places of change from one stage to another:

**Stage 1:** Begins with formation of *nutfah* (gametogenesis) and ends at its placement in uterus (implantation)

**Stage 2:** Formation of ‘*alaqah* and *mudghah* and further development of ‘*izām* (bones) and *lahm* (muscles)

**Stage 3:** Growth of another creation (*khalq ākhar*)

### Stage 1: *Nutfah fī Qarār Makīn*

*Nutfah* literally means clear liquid, a little or a lot.<sup>40</sup> This has been used in varied senses in the Qur’ānic text- the reason why secular interpreters get it wrong at most places and question the clarity of embryology verses. When used without an epithet, this refers to the drop of liquid either of a male or a female. *Nutfah* usually mean the drop of semen that contains spermatozoa (male gamete), but it may also indicate the viscous fluid released by the ovaries during ovulation that contains the oocyte (female gamete). Used with epithet, *nutfah min maniyyī yumnā* (75:37) and *nutfah idhā tumnā* (53:46), it refers to the male gamete specifically. The agent of reproduction is also mentioned as *mā’ dāfiq* (86:6), *mā’ mahīn* (77:20) and *sulālah min mā’ mahīn* (32:8)

*Dufiq al-mā’* signifies the water poured out or forth with vehemence and at once.<sup>41</sup> So, *dafq* contains the meaning of emission, discharge, ejection at once with force. This is exactly what happens when semen is discharged. Moore (d. 2019) describes ovulation as the release of viscous fluid with rupture of the follicle.<sup>42</sup> The words ‘fluid’ and ‘rupture’ imply that *mā’ dāfiq* may also be the fluid released during ovulation that contains the female gamete.

*Mahīn* is often translated as despised (*haqīr*) while al-Zabīdī (d. 1205/1790) mentions *haqīr* as *ṣaghīr* (small). Other significations given by

<sup>39</sup> Muhammad Sultan Shah, “Stages of Human In Vivo Development as Revealed by the Qur’an”, *Al-Aḍwā’* 11, no.16 (December, 2001): 3

<sup>40</sup> Abū ‘Abd al-Raḥmān Al-Khalīl b. Aḥmad Al-Farāhīdī, *Kitāb al-‘Ayn* (Qum: Mū’sasah Dār al-Ḥijrah, 1405 / 1984), 7:436.

<sup>41</sup> Lane, *An Arabic – English Lexicon*, 3:892

<sup>42</sup> Keith L. Moore, T.V.N. Persaud, and Mark G. Torchia, *The Developing Human: Clinically Oriented Embryology* (Philadelphia: Elsevier, 2016), 22

him are *ḍa'if* (weak) and *qalīl* (a little).<sup>43</sup> So, *mā' mahīn* would signify a little, small quantity of fluid. This applies to the quantity of fluid surrounding the spermatozoon employed in fertilisation and to the quantity of fluid surrounding the secondary oocyte. *Sulālah min mā' mahīn* more specifically refer to the extract of this fluid that is the spermatozoon from the male fluid and secondary oocyte from the female fluid.

Not only the male and female gametes, but their fusion has also been mentioned in the following verse:

" إِنَّا خَلَقْنَا الْإِنْسَانَ مِنْ نُطْفَةٍ آمِشَاجٍ نَبَّبَلِيهِ فَجَعَلْنَاهُ سَمِيعًا بَصِيرًا ﴿٢﴾ "

"Indeed, We created man from a drop of mixed fluid, that We may try him: So, We made him hearing, seeing."<sup>44</sup>

*Amshāj* is mixing up to two things (*akhlāt*). Al-Azharī (d. 370/980) says *amshāj* are yarns whose parts are twisted with one another.<sup>45</sup> Ibn Manzūr holds that this intermingling of *nutfah* is of varied kinds due to which men are born with different dispositions.<sup>46</sup> Hence, *amshāj* is referring to the fusion of male and female pronuclei with intermingling of their chromosomes (fertilisation) in a way that the haploid chromosomes unite like yarns as their arms are 'crossed over' with one another exchanging genetic material in the process. The zygote thus formed has a diploid number of chromosomes, half of which come from the mother and half from the father.

The zygote then undergoes mitotic divisions leading to increase in the number of cells. When there are 12 or more cells, it enters the uterus on the third day after fertilisation. Further divisions form a hollow ball of cells in which a fluid filled cavity appears on the fourth day after fertilisation. Now, it looks like a drop, hence, called *nutfah* in the embryology verse (23:13). Then, some of these cells digest the adjacent cells of endometrium and it gets attached to the uterine wall by the end of the first week. Hence, *nutfah fī qarār makīn* refers to the implantation of embryo in the uterus.<sup>47</sup>

## Stage 2: *Khalq of 'Alaqah, Muḍghah, Izām and Lahm*

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<sup>43</sup>Muḥammad Murtaḍā al-Ḥusaynī al-Zabīdī, *Tāj al-'Urūs min Jawāhir al-Qāmūs* (Kuwayt: Al-Turāth al-'Arabīyyī, 1422 / 2001), 36:219

<sup>44</sup> *Al-Dahr* 76:2

<sup>45</sup> Abū Manṣūr Muḥammad b. Aḥmad al-Azharī, *Tahdhīb al-Lughah* (Bayrūt: Dār Iḥyā al-Turāth al-'Arabī, 1422/2001), 10:292

<sup>46</sup> Ibn Manzūr, *Lisān 'l - 'Arab*, 2:367

<sup>47</sup> Moore et al., *The Developing Human*, 30-34

*Khalaqnā* points to a number of cell divisions, cell migrations, and differentiations which occur as the *nutfah* (one week embryo) changes into *'alaqah* (three week embryo). A misunderstanding exists here about the meaning of the term *'alaqah*. One of its meanings mentioned in traditional Arabic commentaries of the Qur'ān is congealed, coagulated blood before it dries.<sup>48</sup> This interpretation alarmed those who knew modern embryology because no stage of congealed blood comes in the development of a foetus.

### **'Alaqah:**

Ibn Farīs (d. 395/1004) says the actual meaning of *'alaq* is a thing suspended from a higher position.<sup>49</sup> At this stage the embryo is called *'alaqah* because it is suspended in the womb by the connecting stalk.<sup>50</sup>

Al-Jawharī (d.393/1002) mentions that *'alaqah* is also a segmented aquatic worm (leech) which sucks blood.<sup>51</sup> At this stage the embryo is called *'alaqah* because it resembles a leech. Its shape starts becoming a flattened cylindrical body.<sup>52</sup> Paired bodies (*somites*) appear as elevations on the embryo resembling with the segmentation of a leech. As the anterior sucker of a leech clings to the host-skin and pierces it to suck blood, the embryo at this stage also erodes the maternal sinusoids to allow the blood flow freely in the lacunar network.<sup>53</sup>

Ibn Sīdah (d. 458/1065) remarks that some say *'alaq* is the blood whose redness is increased.<sup>54</sup> So, the embryo at this stage is called *'alaqah* because of redness which appears in it due to the beginning of the utero-placental circulation at the end of the second week.<sup>55</sup> Then, at the beginning of the third week, embryonic blood vessels and heart tube begin

<sup>48</sup> Al-Ṭabarī, *Jāmi' al-Bayān*, 19:16

<sup>49</sup> Abū 'l-Ḥusayn, Aḥmad b. Fāris, *Mujmal al-Lughah* (Bayrūt: Mū'sasah al-Risālah, 1404 / 1984), 1:626

<sup>50</sup> Moore et al., *The Developing Human*, 41-44

<sup>51</sup> Ismā'il b. Ḥammād al-Jawharī, *Al-Ṣiḥāḥ: Tāj al-Lughah wa Ṣiḥāḥ al-'Arabiyyah* (Bayrūt: Dār al-'Ilm li al-Mullayīn, 1407/ 1987), 4:1529

<sup>52</sup> Moore et al., *The Developing Human*, 52-58

<sup>53</sup> Ibid. 61-62

<sup>54</sup> Abū 'l-Ḥasan 'Alī b. Ismā'il ibn Sīdah, *Al-Muḥkam wa al-Muḥīṭ al-'A'zam* (Bayrūt: Dār al-Kutub al-'Ilmiyyah, 1421 / 2000), 1:212

<sup>55</sup> Moore et al., *The Developing Human*, 39-41

to develop from specialized cells. The heart tube joins with blood vessels and it starts pumping blood by the end of the third week.<sup>56</sup>

### **Mudghah:**

Another use of the verb *khalaqnā* shows several developmental changes which occur from the third week to the sixth week as the *'alaqah* changes into *mudghah*. By definition, *mudghah* is a piece or a bit of flesh; or a small amount of flesh that a man puts in his mouth; or a small amount of it as much as is chewed at once.<sup>57</sup> But this meaning is problematic since the embryo at this stage does not contain flesh. Al-Azharī states that sometimes *mudghahh* can be used for a small amount of a thing other than flesh as it is said: *Aṭyabu mudghahtin akalaha 'l-nāsu Ṣayhāniyyatun muṣallabatun or maṣliyyatun* (the best morsel that people have eaten is *Ṣayhāniyyah* dates dried under the sun).<sup>58</sup> Here, a date has been called *mudghah* due to its small amount equal to a morsel or quid. Similarly, a six week embryo looks like a morsel as it has a small size (about 12 mm). Looking at its size, the use of the term *mudghah* is appropriate for it.

*Mudghah* has been derived from the verb *maḍagha al-ṭa'āma*, which means he chewed the food.<sup>59</sup> So, *mudghah* is a lump which is chewed. The embryo also looks like a chewed lump due to the rapid appearance of somites from the start of the fourth week to the end of fifth week, which show a series of elevations with depressions between them. The embryo becomes curved and irregular prominences and variable depressions appear on its body. The heart and brain prominences are visible. The pharyngeal arches are seen. The upper limb and lower limb buds appear. The caudal prominence is also visible.<sup>60</sup>

Another feature of 4-6 weeks embryo is that it is undergoing a process of differentiation. Some undifferentiated and differentiated tissues are present at the same time. The Qur'ān describes this process as *mukhallaqah* and *ghayr mukhallaqah*:

"فَأَنَّا خَلَقْنَاكُمْ مِنْ تُرَابٍ ثُمَّ مِنْ نُطْفَةٍ ثُمَّ مِنْ عَلَقَةٍ ثُمَّ مِنْ مُضْغَةٍ مُخَلَّقَةٍ وَعَيْرِ مُخَلَّقَةٍ لِنَبِّئَنَّ لَكُمْ

“Then, Indeed! We have created you from dust, then from a sperm-drop, then from a hanging mass of cells, then from a little lump of tissue, some formed and some unformed, that We may make (it) clear to you.”<sup>61</sup>

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<sup>56</sup> Ibid., 62

<sup>57</sup> Lane, An Arabic-English Lexicon, 8:3021

<sup>58</sup> Al-Azharī, *Tahdhīb al-Lughah*, 8:57

<sup>59</sup> Al-Jawharī, *Al-Ṣiḥāh*, 4: 1326

<sup>60</sup> Moore et al., *The Developing Human*, 74-78

<sup>61</sup> *Al-Ḥajj* 22:5

The verse says that *mudghah* consists of differentiated (*mukhallaqah*) and undifferentiated (*ghayr mukhallaqah*) parts. The otic vesicle, optic vesicle, lens placode and nasal placode are undergoing differentiation in the fourth week to become eyes, auricle hillocks and external acoustic meatus at the end of sixth week. The upper limb buds, elbows and hand plate are seen in the sixth week. The digital rays (primordia of the fingers) are visible in the hand plate. The lower limb develops four to five days after the upper limbs. The mesonephric ridges appear in the fifth week, which indicate the site of the developing kidneys. Rudiments of the cardiovascular system are established which is the first organ system to reach a functional state in the embryo.<sup>62</sup>

Also, the formed embryo (*mudghah mukhallaqah*) refers to an embryo that has survived six weeks of development and proceeds further to full term to be delivered with complete formation of body. And, the unformed embryo (*mudghah ghayr mukhallaqah*) refers to an embryo that will not complete the term and follow 'early clinical miscarriage' which is common between 6-11 weeks of gestation.

The interactions between tissues during the *mudghah* stage alter the course of development of other tissues also. This mechanism is called "*inductive tissue interactions*". The tissue induction ensures formation of structures in an order referred to as *mukhallaqah* in the verse. And, failure of these inductions can lead to drastic developmental consequences referred to as *ghayr mukhallaqah*. For example, the optic vesicle induces the development of eye lens. If the optic vesicle is absent, the eye lens would not develop.<sup>63</sup>

### ***Izām and Lahm:***

The order of stages mentioned in the embryology verse is from *mudghah* to 'izām clothed with *lahm*. Moore describes that somites initially emerge in the embryo's future occipital region. They soon undergo craniocaudal development (in *mudghah*), giving rise to the axial skeleton, related muscle, and skin's dermis.<sup>64</sup> 'Izām denotes the skeletal structure of the embryo. Its axial skeleton begins to develop from the fourth week, whereas the appendicular skeleton develops from the fifth week.

Special cells surrounding the neural tube and notochord give rise to the embryonic tissue that develops into vertebrae. The embryonic tissue around the brain gives rise to bones of the base of the cranium and the skull

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<sup>62</sup> Moore et al., The Developing Human, 78

<sup>63</sup> Ibid., 72-74

<sup>64</sup> Ibid., 62

cap. The embryonic tissue in the maxillary prominence gives rise to the mandible (jaw bone).<sup>65</sup> The embryonic tissue in the limb buds forms cartilage bones in the sixth week. Their ossification occurs by the eighth week, and primary ossification centres have appeared in most of the bones from the seventh to twelfth weeks.<sup>66</sup>

As the bones develop the musculature of the embryo is also developing, so the *'izām-and-laḥm* stage is not described with the word *khalaqnā*, but with the verb *kasawnā* which signifies the assembling of muscles tissue around the bones. In fact, the muscular system develops from embryonic muscle cells (*myoblasts*). These cells align with each other and become fused to form elongated structures (*myotubes*) which give rise to muscle fibres in the seventh week of gestation.<sup>67</sup> When the assembling of muscle tissue around the bones is seen in a transverse section of a seven week embryo, it looks like clothing of bones with muscle tissue as told in the verse as *fa kasawnā 'l-'izāma laḥman*. In the eighth week, purposeful limb movements occur that indicate the functioning of the musculoskeletal system.<sup>68</sup>

### **Stage 3: *Nash'ah of Khalq Ākhar***

The embryonic phase ends at the conclusion of the eighth week, and the time from the ninth week to delivery is known as foetal phase. This period is characterized by rapid growth and differentiation of tissues, organs and systems. This stage is denoted with the verb *ansha'nā* due to the rapidness of growth. Compare it with previous verbs *khalaqnā* (when creative processes are dominant) and *kasawnā* (when assembling of muscles is a prominent feature).

The embryo is only 29 mm long at the end of the eighth week and exhibits clear human traits; the head, however, is excessively long. The ears are low placed, the face is broad, and the eyes are far apart. The eyelids are visible and shutting, and the neck is well-established. The legs are short and the thighs are relatively small.<sup>69</sup> From now onwards to the birth of the foetus, there is proportionate development of organs and human features become obvious as mentioned in the *Sūrah Al-Infīṭār* as *fa sawwāka fa 'adalak*:

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<sup>65</sup>Moore et al., *The Developing Human*, 342-346

<sup>66</sup> *Ibid.*, 349-350

<sup>67</sup> *Ibid.*, 355-356

<sup>68</sup> *Ibid.*, 84

<sup>69</sup> *Ibid.*, 84-85

"يَا أَيُّهَا الْإِنْسَانُ مَا غَرَّبَكَ رَبِّكَ الْأَكْرَمِ ۖ الَّذِي الَّذِي خَلَقَكَ فَسَوَّاكَ فَعَدَلَكَ ﴿٧﴾ فَمَنْ آتَىٰ صُورَةَ مَا شَاءَ رَبُّكَ ﴿٨﴾"

“O man! What has deceived you concerning your Lord, the Most Generous? Who created you, fashioned you perfectly, and gave you due proportion; In whatever form He willed, He put you together.”<sup>70</sup>

### Growth in the Foetal Period:

**9-12 weeks:** The body grows at an accelerated rate, doubling in length. The skeleton contains the primary ossification centres, which are mostly found in the cranium and long bones. The lower limbs remain shorter while the upper limbs attain their ultimate relative length. The external genitalia, which were not distinguishable in the ninth week, has now become distinguishable externally.<sup>71</sup>

**13-16 weeks:** The eyes are positioned toward the anterior rather than antrolateral. The external ears are close to their definite positions on the sides of the head. Growth is rapid and the foetus and lower limbs increase in length. Ossification of the fetal skeleton is active and limb movements are coordinated. Slow eye movements occur. The scalp hair pattern is seen. The external genitalia can be clearly recognized.<sup>72</sup>

**17-20 weeks:** Growth becomes less rapid. The mother feels the movements of the foetus. The skin of the foetus is coated in a greasy material called *vernix caseosa*, and it possesses fine, downy hair called *lanugo*. Head hair and eyebrows are apparent. The testicles and ovaries remain on the posterior abdominal wall after the foetal uterus has developed.<sup>73</sup>

**21-25 weeks:** A foetus is better proportionate and gains weight. Rapid eye movements begin. The skin is pink to red and fingernails are present. A 22-25 week foetus born prematurely may survive if intensive care is given, though chances of death are high because the respiratory system is still immature.<sup>74</sup>

**26-29 week:** At this stage, the eyelids are open. Head hair and lanugo are fully grown. You can see toenails. The pulmonary vasculature and lungs have grown, so the foetus at this stage may survive if intensive care is given.

<sup>70</sup> *Al-Infītār* 82:7-8

<sup>71</sup> Moore et al., *The Developing Human*, 94

<sup>72</sup> *Ibid.*, 95

<sup>73</sup> *Ibid.*, 96

<sup>74</sup> *Ibid.*

The fetal spleen has been forming red blood cells. By 28 weeks, this function is taken up by the bone marrow.<sup>75</sup>

**30-34 weeks:** the pupillary reflex may be elicited. The skin is pink and smooth. The upper and lower limbs have a chubby appearance. The 32 week foetuses usually survive if born prematurely.<sup>76</sup>

**35-38 weeks:** The foetus has a firm grasp and exhibit a spontaneous orientation to light. The nervous system is sufficiently mature. The circumference of the head and the abdomen are approximately equal. The foot length is slightly larger than the femoral length. The testes are usually in the scrotum. Most foetuses attain a CRL of 360 mm and weigh around 3400g at full maturity (38 weeks). Male foetuses often weigh more at birth than female ones and are lengthier.<sup>77</sup>

## 2. Sex Determination of the Foetus:

The sex of the foetus is determined at the time of fertilisation of oocyte with spermatozoon. The primary oocyte present in the ovary has 46 chromosomes in pairs of 23 including one pair of sex chromosomes (XX). Shortly before ovulation, the primary oocyte completes the first meiotic division to give rise to a secondary oocyte and the first polar body. The secondary oocyte contains 23 chromosomes including one X chromosome. At ovulation, the secondary oocyte begins the second meiotic division up to the metaphase stage and is released into the Fallopian tube.

On the other side, the primary oocyte present in the testes has 46 chromosomes in pairs of 23 including one pair of sex chromosomes (XY). The primary spermatocyte undergoes the first meiotic division to give rise to two secondary spermatocytes which undergo the second meiotic division to form four spermatids. These spermatids would form four mature spermatozoa. Two of them have 23 chromosomes including one X chromosome and the other two have 23 chromosomes including one Y chromosome. One of these mature spermatozoa would eventually reach the Fallopian tube to fertilise the secondary oocyte.

Now, if a mature spermatozoon containing X chromosome unites with the secondary oocyte, the zygote would have constitution of 46 chromosomes including one pair of XX chromosomes. The foetus would become a female. But if a mature spermatozoon containing Y chromosome unites with the secondary oocyte, the zygote would have constitution of 46

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<sup>75</sup> Ibid., 97

<sup>76</sup> Ibid.

<sup>77</sup> Moore et al., *The Developing Human*, 97-98

chromosomes including one pair of XY chromosomes. The foetus would become a male. Thus, the sex of an embryo is determined by the kind of spermatozoon (X or Y containing) that fertilises the oocyte.

The following verse of the Qur'ān refers to the sex determination in the embryo:

"وَأَنَّهُ خَلَقَ الذَّكَرَ وَالْأُنثَى ﴿٤٥﴾ مِنْ نُطْفَةٍ إِذَا تُمْنَى ﴿٤٦﴾"

“And that He (Allāh) creates the pairs, male and female, from *nutfah* when it is emitted.”<sup>78</sup>

The verse tells that sex differentiation into male or female depends on *nutfah* which is drop of semen that contains the spermatozoon containing Y chromosome. The Y chromosome possesses the sex-determining region known as SRY gene. If it is present, the SRY gene causes *gonadal cords* in the embryo to differentiate into *seminiferous cords* which give rise to the seminiferous tubules and rete testis in the seventh week. Sertoli cells in the wall of seminiferous tubules secrete anti-Mullerian hormone (AMH) and Leydig cells start producing testosterone by the eighth week. AMH causes the Mullerian ducts (primordial female genital ducts) to regress. The testosterone induces differentiation of gonads into testes; differentiation of the Wolffian ducts into male genital ducts; and differentiation of undifferentiated external genitalia into male genitalia.<sup>79</sup>

If the embryo has XX chromosomes, SRY-induced stimulation is absent and female sexual differentiation occurs in the twelfth week. Gonadal cords in a developing ovary degenerate and disappear. Instead, *cortical cords* appear which begin to break up in isolated clusters, known as *primordial follicles*. Each of primordial follicle contain an *oogonium* (primordial germ cell) and surrounded by a single layer of *follicular cells* derived from the surface epithelium.<sup>80</sup> The Wolffian ducts (primordial male genital ducts) regress due to the absence of testosterone and Mullerian ducts persist due to the absence of AMH. Unlike male embryos, female sexual differentiation does not depend on hormones. Later, maternal and placental oestrogens stimulate the development of the uterus, uterine tubes and superior part of vagina. Though sex organs are being formed at 12 weeks, the sex of a baby can be determined clinically using ultrasound not less than 15 weeks.

<sup>78</sup> *Al-Najm* 53: 45-46

<sup>79</sup> Moore et al., *The Developing Human*, 261-262

<sup>80</sup> *Ibid.*, 262

### **Breathing of Spirit into the Foetus:**

The discussion of breathing of the spirit (*naḥkh al-rūh*) into a foetus is more philosophical than medical as the existence of a spirit has been questioned by a number of scholars. Nevertheless, for medico-legal purposes, it is relevant when linked with the possibility of abortion which is a kind of homicide. The breathing of spirit into a foetus would signify that it has gained life, and now killing this foetus would be like killing a human life in the light of religious dicta. Therefore, voluntary termination of pregnancy would not be allowed. At this point, the time at which breathing of spirit occurs into a foetus becomes very important for a God fearing couple. The Qur'ān says about this event of foetal development:

" ثُمَّ سَوَّاهُ وَنَفَخَ فِيهِ مِنْ رُوحِهِ وَجَعَلَ لَكُمُ السَّمْعَ وَ الْأَبْصَارَ وَ الْأَفْئِدَةَ قَلِيلًا مَّا تَشْكُرُونَ ﴿٩﴾ "

"Then He proportioned him, and breathed into him the spirit, and He gave you hearing (ears), sight (eyes) and hearts. Little are you grateful!"<sup>81</sup>

Most traditional scholars maintain that the time at which this stage occurs is 120 days of gestation as mentioned in the following *ḥadīth*:

" إِنَّ أَحَدَكُمْ يُجْمَعُ فِي بَطْنِ أُمِّهِ أَرْبَعِينَ يَوْمًا، ثُمَّ يَكُونُ عَلَقَةً مِثْلَ ذَلِكَ، ثُمَّ يَكُونُ مُضْغَةً مِثْلَ ذَلِكَ، ثُمَّ يَبْعَثُ اللَّهُ إِلَيْهِ مَلَكًا بِأَرْبَعِ كَلِمَاتٍ، فَيَكْتُبُ عَمَلَهُ وَأَجَلَهُ وَرِزْقَهُ وَشَقِيٌّ أَوْ سَعِيدٌ، ثُمَّ يُنْفَخُ فِيهِ الرُّوحُ "

"For the first forty days, each of you is gathered in his mother's womb; after that, he transforms into a clinging mass for another forty days, then a chewed lump for an additional forty days. Then, Allah sends an angel to record four things for him: his acts, the moment of his death, his means of subsistence, and whether or not he will be blessed. Then, his body receives the breath of the soul."<sup>82</sup>

The problem lies in determining what is the clinical sign of breathing of the spirit? When can it be said that spirit has been given to the foetus? The heart begins to pump by the end of third week (22-23 days).<sup>83</sup> Spontaneous movements of the embryo, such as twitching of the trunk and developing limbs, occur in the sixth week (42 days).<sup>84</sup> Purposeful limb movements begin in the eighth week (56 days).<sup>85</sup> What would be the cut off sign that would indicate the breathing of spirit into a foetus?

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<sup>81</sup> *Al-Sajdah* 32:9

<sup>82</sup> Muḥammad b. Ismā'īl al-Bukhārī, *Al-Ṣaḥīḥ*, *Al-Ṣaḥīḥ* (Bayrūt: Dār Ṭawq al-Najah, 1422/2001), 4:133. Ḥadīth: 3332

<sup>83</sup> Moore et al., *The Developing Human*, 284

<sup>84</sup> *Ibid.*, 78

<sup>85</sup> *Ibid.*, 84

Another narration mentioned by *Imām* Muslim sets this issue right and reveals that the exact time of coming of angle is 42 days which coincides with the beginning of spontaneous movements. This sign indicates that the spirit has entered because the foetus has started to move. *Imām* Muslim narrates:

"إِذَا مَرَّ بِالنُّطْفَةِ ثِنْتَانِ وَأَرْبَعُونَ لَيْلَةً، بَعَثَ اللَّهُ إِلَيْهَا مَلَكًا، فَصَوَّرَهَا وَخَلَقَ سَمْعَهَا وَبَصَرَهَا وَجِلْدَهَا وَلَحْمَهَا وَعِظَامَهَا "

“When forty-two nights pass after the *nutfah* gets into the womb, Allāh sends the angel and gives him shape. Then, he creates his sense of hearing, sense of sight, his skin, his flesh, and his bones.”<sup>86</sup>

Hence, the life in a foetus should not be considered to begin at 120 days, rather it begins at 42 days when spirit is given to a foetus.

### 3. Gestation and Childbirth:

All events of embryonic and foetal development mentioned above occur within the womb of a mother during her gestation. There are also present specific verses that indicate the physiological process of gestation:

"هُوَ الَّذِي خَلَقَكُمْ مِنْ نَفْسٍ وَاحِدَةٍ وَجَعَلَ مِنْهَا زَوْجَهَا لِيَسْكُنَ إِلَيْهَا فَلَمَّا تَعَاشَّهَا حَمَلَتْ حَمَلًا خَفِيفًا فَمَرَّتْ بِهِ فَلَمَّا أَثْقَلَتْ دَعَوَا اللَّهَ رَبَّهُمَا لَئِنْ ءَاتَيْتَنَا صَالِحًا لَنُكُونَنَّ مِنَ الشَّاكِرِينَ "

“It is He who created you from one soul and created from it its mate that he might dwell in security with her. And when he covers her, she carries a light burden and continues therein. And when it becomes heavy, they both invoke Allah, their Lord, If You should give us a good (child), we will surely be among the grateful.”<sup>87</sup>

In the above verse, a light burden (*ḥamal khafīf*) refers to the early period of pregnancy, the first and second trimesters of gestation. The heaviness (*thaqal*) refers to the third trimester when an average weight gain by a mother is about 25-35 pounds; her uterus increases in weight from about 50-1100 grams; and there are other marked changes in her body, such as increased respiration and cardiac output, oedema, acne, etc. The duration of gestation has been referred to in the following verse:

"اللَّهُ يَعْلَمُ مَا تَحْمِلُ كُلُّ أُنثَىٰ وَمَا تَغِيضُ الْأَرْحَامُ وَمَا تَزْدَادُ وَكُلُّ شَيْءٍ عِنْدَهُ بِمِقْدَارٍ "

<sup>86</sup> Muslim b. al-Ḥajjāj, *Al-Ṣaḥīḥ* (Bayrūt, Dār Ihyā’ al-Turāth al-‘Arabī, N.D.), 4: 2037. Ḥadīth: 2645

<sup>87</sup> *Al-A ‘rāf* 7:189

“Allah knows what every female carries and what the wombs lose (prematurely) or exceed. And everything with Him is by due measure.”<sup>88</sup>

*Taghīd al-arḥām* points to the minimum duration of gestation that can be computed with the help of following verses. The Qur’ān says that the total period of gestation and weaning is 30 months:

"وَوَصَّيْنَا الْإِنْسَانَ بِوَالِدَيْهِ إِحْسَانًا ۖ حَمَلَتْهُ أُمُّهُ كُرْهًا وَوَضَعَتْهُ كُرْهًا ۖ وَحَمَلُهُ وَفِصَالُهُ ثَلَاثُونَ شَهْرًا"

“And We have enjoined upon man, to his parents, good treatment. His mother carried him with hardship and gave birth to him with hardship, and his gestation and weaning (period) is thirty months.”<sup>89</sup>

At another place, it says that the total period of weaning is two years that is 24 months:

"وَوَصَّيْنَا الْإِنْسَانَ بِوَالِدَيْهِ حَمَلَتْهُ أُمُّهُ وَهْنًا عَلَىٰ وَهْنٍ وَفِصَالُهُ فِي عَامَيْنِ"

“And We have enjoined upon man (to be good) to his parents. His mother carried him, (increasing her) in weakness upon weakness, and his weaning is in two years.”<sup>90</sup>

Now, if the period of weaning (24 months) is subtracted from the total period of gestation and weaning (30 months), we can get the minimum period of gestation that is 6 months (24 weeks). Moore comments: “Although a 22-25 week foetus born prematurely may survive if given intensive care, there is also a chance that it may die because its respiratory system is still immature.”<sup>91</sup>

Moreover, “*His mother carried him, (increasing her) in weakness upon weakness*” includes all sufferings (*wahn*) that occur during a gestational period. “*His mother carried him with hardship and gave birth to him with hardship*” includes Braxton Hicks contractions experienced by the mother during gestation that become intense at the time of delivery and are known as labour contractions. At this time, she feels considerable labour pain (*kurh*). The labour pain (*al-makhād*) is so intense that it was nearly unbearable for Maryam, the mother of ‘Isa (peace be upon him):

"فَأَجَاءَهَا الْمَخَاضُ إِلَىٰ جِذْعِ النَّخْلَةِ قَالَتْ يَا لَيْتَنِي مِتُّ قَبْلَ هَذَا وَكُنْتُ نَسِيًّا مِّنْسِيًّا"

“And the pains of childbirth drove her to the trunk of a palm tree. She said, “Oh, I wish I had died before this and was in oblivion, forgotten.”<sup>92</sup>

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<sup>88</sup> Al-R ‘ad 13:8

<sup>89</sup> Al-Aḥqāf 46:15

<sup>90</sup> Luqmān 31: 14

<sup>91</sup> Moore et al., *The Developing Human*, 96

<sup>92</sup> Maryam 19: 23

*Tazdād al-arḥām* points to the maximum period of gestation. Its exact limit is controversial. The expected date of delivery of a foetus is 38 weeks or 266 days after fertilisation, that is equal to 40 weeks or 280 days after last menstrual period (LMP). A delay of 1-2 weeks may occur in 12% of foetuses. Muslim jurists have said that the maximum duration of gestation is 2 years.<sup>93</sup> However, the embryologists confirm that prolongation of pregnancy for more than 3 weeks of the expected date leads to post-maturity syndrome that is associated with foetal abnormalities and increased risk of mortality.<sup>94</sup> In fact, the opinion of jurists is based on a rare occasion, whereas the embryologist's view is more realistic.

## Conclusion:

The Holy Qur'ān is replete with references to human reproductive structures and functions. All of the descriptions are compatible with the current knowledge of human biology and embryology. The reproductive and developmental processes mentioned include all that is present in the wombs or happens therein during the physiological life of a woman or during the pregnancy (*mā fī 'l-arḥām*). The reproduction is mentioned with special reference to semen (*mā' mahīn, mā' dāfiq, maniyyī yumnā*), sperm (*sulālah min mā' mahīn, nutfah idhā tumnā, nutfah*), fertilisation (*nutfah amshāj*), and implantation (*taqrīr*). The role of *nutfah* in sex determination of the foetus is mentioned (*min nutfah idhā tumnā*).

The development of an embryo from one stage to another (*khalq ba'd khalq*) while in three layers (*zulumāt thalāth*) and its shaping in the womb (*taswīr*) in a sound fashion (*taswīyah*) and proportion (*ta'dīl*). Three stages of its development are mentioned. The pre-embryonic stage that begins with formation of *nutfah* (gametogenesis) and ends at its placement in a safe lodging (implantation); the embryonic stage that extends from the formation of *'alaqah* and *muḍghah* to the development of bones (*'iẓām*) and muscles (*laḥm*); and the foetal stage that involves the growth of another creation (*khalq ākhar*). A reference to the breathing of spirit (*nafkh al-ruh*) and the beginning of human life in a foetus has also been mentioned.

The Qur'ān highlights the role of the uterus of mothers (*buṭūn ummuhāt*) in reproduction and gestation. It is called a residing place (*mustaqarr*) and a storage place (*mustard*), a safe lodging (*qarār makīn*), which is placed in the abdomen between the ribs and backbone (*min bayna*

<sup>93</sup> Akmal al-Dīn Muḥammad b. Muḥammad al-Bābartī, *Al-'Anāyah Sharḥal-Hadāyah* (Bayrūt: Dāral-Fikr, N.D.), 4: 362

<sup>94</sup> Moore et al., *The Developing Human*, 99

*'l-ṣulb wa 'l-tarā'ib*). The gestation (*ḥamal*) has been divided into an early period (*ḥamal khafīf*) and a later period (*ḥamal thaqīl*). The variation in the period of gestation has been referred to as *taghīd* and *tazdād*. The hardship and pain felt by the mother during pregnancy has been called (*wahn* and *kurh*) along with the labour pain (*makhād*).



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