



[Int J Health Sci \(Qassim\)](#). 2009 Jan; 3(1): 103–109.

PMCID: PMC3068791

PMID: [21475518](#)

## Human Embryology and the Holy Quran: An Overview

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### Abstract

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Man's quest to know about his origin has led him to search his roots and the best source for him has been religious scriptures. The greatest miracle is the Holy Quraan. There is an elegant description of origin, development and step by step developmental stages of intra-uterine life in Quraan. Muslims had this knowledge in 7th century and the Prophet Muhammad's Ahadeeth (sayings, deeds, approvals narrated by authentic narrators) had explained almost everything about natal and even postnatal events. These findings once presented to experts in the field of Anatomy and Embryology surprised them and they believed that the knowledge given to the Prophet Muhammad was indeed divine. Who else would provide this knowledge to the Prophet Muhammad (PBUH) except the Creator Himself.

Modern embryology is a fairly recent development which has its beginning with the invention of microscope in the 17th century. However the concept of the human being developing in stages was not recognised until much later. But the scientists then and most Muslim and non-Muslim scholars do not even know that the holy Quran and Sunnah [words, deeds, approvals of Prophet Muhammad (PBUH) collected by authentic narrators] had provided a detailed description of the significant events in human development from the stages of gametes and conception until the full term pregnancy and delivery or even post partum. Actually information in the Quran and Hadith corrected many superstitious and vague ideas about human development that were prevalent before.

### Introduction

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Since eternity man has always wanted to understand and probe into secrets of Nature; how and when creation began and his purpose in this world. This inquisitive man sought the help of civilizations, nature, old manuscripts, sometimes even the prophesies of saints and above all religions

Aristotle thought that foetus was formed *in uterus* from a coagulum of blood and seed from menstrual blood. Greeks and Europeans thought that *foetus* was created from menstrual blood, or else they thought that foetus was fully created and was in a miniature form in sperm or in ovule. In 1604 Fabricus came out with excellent drawings of chick embryo. Malphigi in 1672 who is consid-

Feedback

ered father of modern embryology thought poultry eggs contained a miniature chick and others thought that human being was fully formed in sperm or an ovum. He came out with chick drawings showing clear somites. In 1673 Leeuwenhoek invented the first microscope. Hartsoeker's drawing of a human spermatozoon in 1694 clearly had this impression that a fully formed homo nucleus (human form) was formed in a spermatozoon or in ovum. In 1775 this controversy ended when Spallanzani showed the necessity of both ovum and sperm for the development of a new individual. It was in 19<sup>th</sup> century that the development cycle of mammalian ovum was discovered. The writings of Von Baer, Darwin and Haeckel introduced the phase of "experimental embryology". The second phase called the "stage of mechanisms" started in late 19th century and scientists found chemical mechanisms of development by Otto Warburg. Ross Harrison introduced the technique of in vitro cell culture. Frank Lillie investigated the mechanism by which the egg was fertilized by the spermatozoon and finally Hans Spermann gave us the mechanism of tissue interaction. The third or the most modern phase started from 1940 to the present day. The present stage may be aptly called the stage of "instrumentation". We had electron microscope, sophisticated imaging tools, ultracentrifuge, spectrophotometer and the list is very long. Thus, we could study role of nucleus, cytoplasm, cell hybridization, nuclear transplants, and gene cloning and other techniques.



*Homo nucleus*

Now we are at a stage when we can look at embryos with clarity unimaginable during Malpighi's time. We have Artificial Reproductive Technology (ART) and a choice of GIFT, ZIFT, ICSI and we have even a choice of designer babies! We have frozen embryos, a prospect of having minimum of five parents for a child conceived with ART technique. We can see in future a woman giving birth to, in essence, to herself, or to her sister, or even her mother! Thanks to cloning!! Yes, we have come a long way but with the help of modern sophisticated techniques. But my aim is to take the present day person to the Arabia of 7<sup>th</sup> century when prophethood was bestowed to the most loved person in Islam the Prophet Muhammad (PBUH).

Imagine Arabia in 7<sup>th</sup> century. Arabs living in deserts were wanderers and camel herders. They had no interest in inventions and discoveries except making gauntlets and sharpening swords to wage wars and only few affluent families were traders and in that surroundings we do not expect someone to have a high tech lab; Or for that matter study abortion specimens to inform mankind about the various stages of intra-uterine life.

Prophet Muhammad was illiterate, had no formal education and it was through him that Muslim scholars had the knowledge about conception, morphology, various phases of intrauterine life which modern day scientists came to know only few decades back.

In Quran there is reference of various stages of human development in many chapters and it is not possible here to mention and explain them all. I have selected two references for this brief

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(Quran: Surah Al-Mu'minun,23: Ayat 12-14).

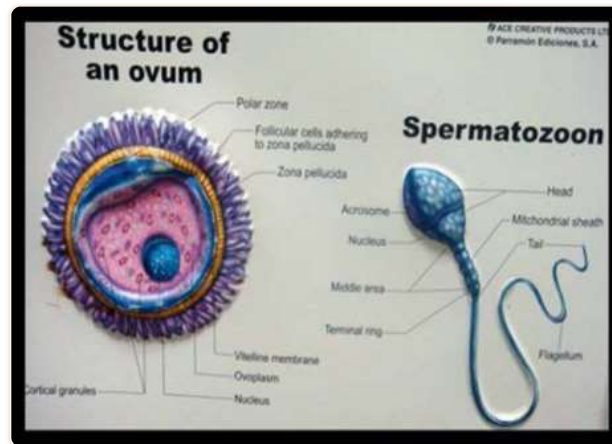
We (Allah) created man from a quintessence of clay. We then placed him as a *nutfah* (drop) in a place of settlement, firmly fixed, then We made the drop into an *alaqah* (leech like structure), and then We changed the *alaqah* into a *mudghah* (chewed like substance), then We made out of that *mudghah*, *izam* (skeleton, bones), then We clothed the bones with *lahm* (muscles, flesh) then We caused him to grow and come in being and attain the definitive (*human*) form. So, blessed be God, the best to create.

So if we arrange these stages chronologically we might come up with something like this

1. Nutfah amshaj (drop that is mixed) this stage covers the period from fertilization to implantation. This stage is further divided into: (present day germinal stage): Khalq, Taqdir, Harth.
2. Takhleeq (present day embryonic): this stage extends from the beginning of the 3<sup>rd</sup> week until the end of the 8<sup>th</sup> week and covers the developmental events. This stage is further divided into: Alaqah (leech-like), Mudghah (somites), IZAM (skeleton) and Laham (muscles).
3. Nash"ah: (Growth) [present day Foetal stage] During this period the shaping and modelling are active, the external appearance develops in such a way that foetus becomes recognizably human. It lasts till the completion of pregnancy. It is further divided into: An-nashaa-Khalaqakha (from 9-26 wks) and Al Hadana-al Rahamiya (from 26 wks to full term). This could be an apt way of classifying the various stages of human development. <sup>(3)</sup>

Explanation:





1. **Nutfa amshaj:** Nutfa means a drop and amshaj means mixtures. This term describes the mixture and convergence of male and female fluids in the uterine or the Fallopian tubes to form zygote. It has the form of a drop of fluid and consists of a mixture of male and female secretions. The nutfa amshaj can be subdivided into:-

1.1. **Khalk:** when the male and female secretions meet they may or may not form a coceptus or a zygote. If a zygote is formed with 46 chromosomes, a new being will be produced. This process of formation of a single individual by fusion of two secretions has been aptly termed Khalak.

1.2. **Taqdir:** The human creation begins with formation of a zygote but what are its characteristics, what it will inherit from father and what from mother? This process takes place a few hours after Khalak phase. The Holy Quran called it Taqdir phase and modern scientists call it genetic programming. The Taqdeer in Arabic means *planning, determining or programming*. Very similar indeed! The Quran indicates that these processes occur in immediate succession and we know that these processes are completed less than 30 hrs after fertilization. The process of sex determination takes place in this stage. The Quran states in sura An-Najam that:

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*“And He did create the two sexes, the male and the female from Nutfah when emitted or planned”Quran: (surah An-Najam,53: Ayat45-46). We know that if sperm with a “y” chromosome fertilizes ovum, it is a male child and if sperm bearing “X” chromosome fertilizes ovum it is a female child.*

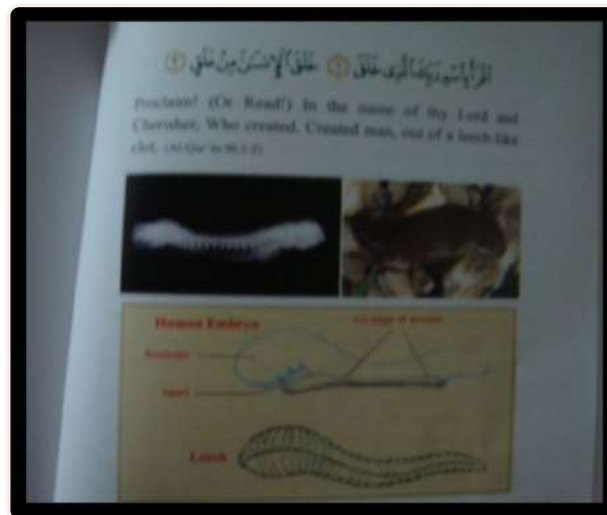


**1.3. Harth:** When the phases of Khalk and Taqdir are completed, the zygote migrates from from fallopian tube to the uterus where it implants itself similar to a seed planting in soil. It gets embedded in endometrium and receives its nourishment and develops a different shape and structure. It is mentioned in Quran that endometrial lining of the uterus is similar to the soil in which a seed is embedded. During this stage the real settlement begins, and is described In Prophet’s Hadith as:

“The Angel enters upon the conceptus (nutfah) after it rests in the uterus for forty or forty-five nights....(Narrated by Muslim).

### Creation (Takhliq)

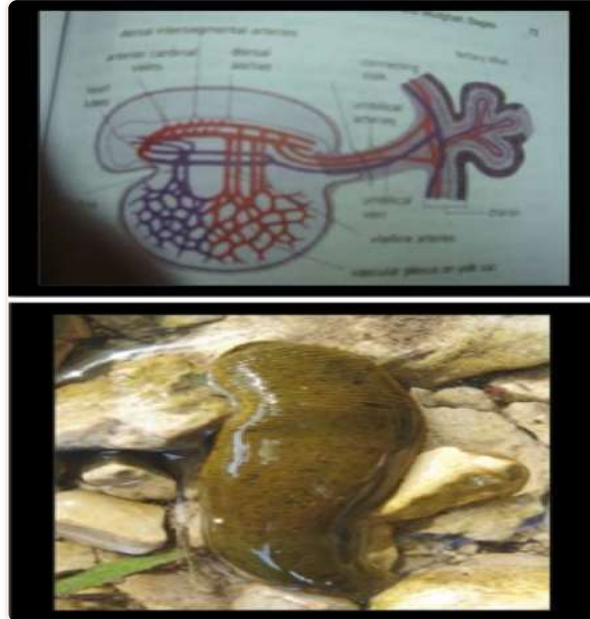
During the second main stage, the Takhliq, cell differentiation takes place to form systems and organs. It starts at the beginning of the third week upto eighth week and is a process of rapid cell growth and intense activity with regard to organogenesis.<sup>(3)</sup> The embryo goes through the following stages:



**2.1: Alaqah:-** The period begins on day 15 and is completed on day 23 or 24, when the embryo gradually acquires the shape of a leech, the Arabic word “alaqah” has three meanings --- (i) Leech (ii) a suspended thing (iii) a blood clot. There is a great similarity between a fresh water leech to early embryo. Enclosed picture shows the similarity between the two. The second meaning is a



suspended thing and that is what we can see the way embryo is attached to the placenta in this stage. Both these meanings describe and reflect accurately the external appearance of embryo at this stage. The third meaning –“the blood clot” describes the most important internal structure that affects the external appearance, for in alaqah stage blood is formed in the blood vessels in the form of isolated islands and the embryo resembles a blood clot descriptions are given miraculously by a single word----“Alaqah”.



2.2: The second stage is Mudghah which means a chewed substance. The embryo changes from Alaqah to Mudgaha stage at 24 to 26 days. The word Mudghahah means:

- Something that has been chewed by teeth
- A piece of a meat of a chewable size
- Small substance



In this phase the embryo resembles a chewed substance but still bears the teeth marks. The embryo shows the distinct somites which resemble teeth marks in the embryo's body. The second and the third meaning of Mudghah apply to the embryo in relation to its size for it is approxi-

mately 1 centimeter in length, the size of a chewable object. Outside surface in Alaqah stage is smooth and in Mudghah. It acquires furrows, swellings and corrugated surface which gives the embryo the chewed appearance.

The next stage is:



2.3: The izam... which means (bones in Arabic). The embryo stays in Mudgaha stage upto 6 weeks. In the beginning of seventh week, cartilagenous skeleton begins to form and eventually the embryo takes the human shape with formation of skeleton. Bone formation is sequential, pry. Ossification centres appear in femur in seventh week and in sternum and the maxilla in weeks 8–9. With this stage the embryo takes the human shape and this fact has been verily described in the following Hadeeth:

“When 42 nights have passed from the time of Nutfah (time of conception), Allah sends an angel to it, who shapes it and makes its hearing, sight, skin, muscles and bones.....(Narrated by Huzaiifa...in Sahih Muslim, Kitab Al-Qadar). Before 42 days embryo cannot be distinguished from embryo of other animals, but at this stage it becomes clearly distinguishable.

2.4: Laham...Al-Kisa' bil-Laham (clothing the bones with flesh)

We have already seen that skeleton is formed in seventh week and the differentiation of muscles starts in the eighth week, in other words myogenesis takes place during this stage. Development of definitive muscles starts in the trunk and the foetus starts moving, and muscles take their position around the bones. The sequence of events is very fast as is mentioned in the Quran.(use of *fa*...an Arabic conjunction which means rapid sequence of events). The Quran states the fact as

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*“Then (fa) We clothed the bones with lahm, muscle, flesh)...”* The passage also indicates that lahm stage represents the end of embryonic (takhlik) stage, which is followed by Nashah stage. The conjunction thumma (then) indicates a slow sequence with a time lag between the two stages. <sup>(3)</sup>

The Growth (Al-Nashaa)

The word Nasha'a in Arabic means: to initiate, grow and develop, to rise and increase



This phase begins from ninth week to term and is further divided in two stages:

1. *Attaining the definite human form (the first stage is An-Nashaa al khalqan)* This stage begins from 9 weeks until 26 weeks and during this stage there is rapid growth and development. Up to 12 wks the growth is slow but after 12 weeks the growth is very rapid and the overall size of the foetus increases rapidly. The proportional size of head, body and limbs is more balanced and lanugo hair appears on the body. The sex differentiation is possible amid movements are very well appreciated. By the end of this stage the various organs are fully functioning, e.g: kidneys are forming urine, blood cells are formed in bone marrow and hair follicles appear.



Human form not attained (5-6)





Definite human form

2. *The second stage is Al-Hadanah ar -rahamiya (uterine incubation)* This stage begins from 26 weeks to full term (40 weeks by dates). It is a known fact that a baby can survive outside without placental or uterine support after 24 to 26 weeks that is viability; so minimum required period to survive is up to 26 weeks. so, last 3 months can be considered a time for the uterus to provide additional support and a place for normal growth.

The Holy Quran has explained with precise definition and elegance this stage of intra uterine development and the meaning of *Nashah* applies clearly. The meaning to “initiate, describes the initial functioning of various organs and systems. The second meaning “to grow” indicates the rapid growth and the development of various organs. The third meaning “to rise and increase” describes the very rapid and obvious increase in foetal size and weight.

Therefore, the term “nash’ah” clearly and accurately describes the foetal period.

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*(Quran: Surah Az-zumar, 39: Ayah 6).*

“He makes you in the wombs of your mothers in stages, one after another, in three veils of darkness..”

This statement is from Sura 39:6. It is not known when scholars realized that human beings were developed in uterus, but the known illustration is of “foetus in a womb” drawn by Leonardo da Vinci in the 15<sup>th</sup> century but Galen in the second century AD had described the placenta and membranes in his book” on the Formation of a Foetus.



The three veils of darkness may be referred to: Anterior abdominal wall, the uterine wall and Amnio-chorionic membrane.

The interpretation seems to be the most logical from embryological point of view. With grace and elegance it has been described in the Holy Quran!

This interpretation seems to be the most logical from an embryological point of view. <sup>(4)</sup>

## Discussion

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Scientifically we came to know about these stages in 19<sup>th</sup> or 20<sup>th</sup> century and before that there is no detailed mention. Generally Scholars held the Aristotle's view that foetus was formed from menstrual blood and they believed in other fanciful and imaginative theories without any scientific proof. Many Muslim scholars refuted those views and their denial was based on their knowledge from the Holy Quran. They refuted this view in 1448 AD, on the basis of this Quranic verses

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*"Was he not a drop of germinal fluid emitted"? Al-Qiyamah,(75:37).*

They held their view as per this Hadeeth mentioned and discussed by Ibn-Hajer (852 H:1448 AD) in Fath-Al-Bari (Vol 2; p 447–491) which goes like this...*Many Anatomists claim that the male fluid has no effect on the creation of child except for coagulation of blood and that the child is formed from the menstrual blood. However, prophet's Hadeeth in this chapter refutes this claim*" It is true that they took the verbal meaning of the words but could not understand the hidden meaning which was possible only after the discovery of Electron microscope and other high tech. machines used in modern labs. It is since 19<sup>th</sup> century that we have come to know the precise steps and stages in the development of various stages in human development. The Muslims scholars were overwhelmed and started collecting data and compiling it. <sup>(3)</sup>

It was two decades ago that all the data was given to famous Scientists, Anatomists and Embryologists. Actually this work was started in King Abdul Aziz University in Jeddah. <sup>(3)</sup> One of the most eminent scholars is Keith Moore (one of the highest authorities in the field of embryol-

ogy) and he surveyed a lot and was overwhelmed to know that Muslims had this knowledge since seventh century. He studied a lot and said that he would not have been able to answer most of the questions 30 years back due to lack of scientific knowledge.

In 1981, during the Seventh Medical Conference in Dammam, Saudi Arabia, Moore said, "It has been a great pleasure for me to help clarify some statements in Quraan about human development. It is clear to me that these statements must have come to Muhammad from God (Allah), because almost all of this knowledge was not discovered until many centuries later. This proves to me that Muhammad must have been a Messenger of God (Allah).<sup>(10)</sup>

Joe, the Chairman of Baylor College of the USA said that not only the findings were correct but in fact Islam could guide science in future. <sup>(10)</sup>

Johnson, another Anatomist from USA was really surprised and contradicted his own theories that these statements from Holy Quran could be a coincidence, or else Prophet Muhammad (PBUH) had a powerful microscope and in the end said that being a scientist and depending on Quranic verses he believed that Muhammad was receiving information from somewhere and felt that Divine intervention was involved.

These great minds confirmed that this knowledge is true word by word and conformed to present embryological findings. Their surprise was overwhelming as to how all this was possible in 7<sup>th</sup> century and that Syedna Prophet Muhammad (PBUH) was illiterate and he could neither read nor write.

Above all they agreed that Divine intervention was involved!!

## Conclusion

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Holy Quran contains comprehensive description of human development; no such distinct and complete record of human development, such as classification, terminology and description existed before. This knowledge came to us in an era when there was no microscope, no slides, no fixatives or any other gadgets and above all this description is narrated by a person who was illiterate! Who would reveal this information to him except the CREATOR Himself!

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In fact Allah verily says: | Ó Ò Ñ Đ İ Î Í Ì

*"Soon we will show them our signs in the (furthest) regions (of the earth), and in their own selves, until it becomes manifest to them that this is the truth. Is it not enough that your Lord does witness all things".*

Quran (41:53).



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