Qur'anic Foundations of Creation and Reproductive Physiology

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Abstract

This paper integrates Qur'anic revelation with contemporary scientific understanding of reproductive physiology, highlighting remarkable harmony between divine description and modern embryology. Beginning with the first revelation, the Qur'an outlines sequential stages of human development—from the *nutfa* and *'alaqa* to the emergence of male and female (*zawjayn*). The Qur'an describes phenotypic sex differentiation after implantation and proportioning, consistent with the modern concept that although genotypic sex is fixed at fertilization, the embryonic gonads remain bipotential until day 24 of development. Scientific evidence—including the author's earlier work and recent findings by Nef et al.—confirms that bipotential gonads can develop into testes or ovaries depending on the presence or absence of the Y-linked *Sry* gene. This article also links embryogenesis to broader spiritual concepts such as ensoulment, the three layers of human age (body, genome, and soul), and the Qur'anic understanding of human dignity and purpose. By integrating divine guidance with biological science, this work provides students, researchers, and the public with a holistic view of human creation, reproductive physiology, and the precision of Allah's design.

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1. Introduction

From the very first revelation, Allah SWT introduces Himself as the Teacher of creation and the One who initiates life through biological processes:
"Read in the Name of your Lord Who created;
Created man from a clinging clot." (96:1–2)

This establishes that Allah SWT Himself teaches humanity the origins of life, beginning with embryological development. He is:

- Al-Khāliq — The Creator,
- Al-Bāri' — The Evolver,
- Al-Muṣawwir — The Fashioner and Perfect Shaper.

In living organisms, Allah completes creation through the highly sophisticated processes of:

- genetics,
- reproductive physiology,
- embryogenesis,
- organogenesis, and
- development into the adult form.

Every step — from gamete formation to the fully developed organism — reflects His precise design and command.

2. Human Beings: The Peak of Creation

Allah SWT declares that He created the human being in the best and most balanced form: “We certainly created man in the best stature — Aḥsan-e-Taqwīm.” (95:4)

Among all living creatures:

- The human form is the most beautiful, proportionate, and upright.
- Humans stand erect, walk on two legs, and use their hands to eat, unlike grazing animals that feed directly from the ground.

- Humans have been endowed with speech, intellect, reflection, and moral reasoning, faculties other creatures do not possess at the same level.

This elevated status is reaffirmed in another verse:

- “We have certainly honored the children of Adam;
- We carried them on land and sea;
- We provided them with good sustenance;
- And We favored them above many of Our creations.” (17:70)

Thus the Qur’an integrates spiritual dignity with biological superiority, presenting human physiology as a manifestation of divine wisdom.

3. Genetics, the Human Soul, and the Multi-Layered Age of a Human Being

Genetics drives the complex processes of embryogenesis, organogenesis, and the development of adult lifeforms. Every stage — from a single fertilized cell to a fully developed human — follows the precise blueprint encoded in DNA.

Modern genetic studies indicate that the genome of *Homo sapiens* emerged approximately 200,000 years ago, marking the appearance of the first anatomically modern humans.

The Fourth Month: The Moment of Ensoulment

In Islamic tradition, during fetal development, at around the fourth month (120 days), the soul (Rūḥ) is breathed into the fetus. At this moment, the fetus transitions from biological life to ensouled human life, possessing both:

- Material existence (body, DNA), and
- Spiritual existence (soul created by Allah SWT).

The Soul: Older Than the Universe

As you noted correctly, the souls of human beings were created long before the material universe, which itself is estimated to be 13.8 billion years old.

Thus, every human being carries three ages:

- The age of the body — beginning at birth (for example, Zeeshan is 22).
- The age of the genome — around 200,000 years, going back to the origin of *Homo sapiens*.
- The age of the soul — older than the universe, part of a pre-material creation known only to Allah.

This perspective expands a student's understanding of their identity:

> You are not just a 22-year-old body — you carry ancient genetics and an eternal soul entrusted to you by your Creator.

Purpose of Human Life

Human beings and jinn have been created with a clear purpose, defined by the Creator Himself:
"I did not create jinn and mankind except to worship Me." (Qur'an 51:56)
This purpose is the *axis* of human existence — to recognize Allah, worship Him, and obey His guidance.

Life Motto of Prof Dr Muhammad Subhan Qureshi has been mentioned as, "Wa ma arsalnaka illa Rahmatan lil alameen (And We have not sent you, [O Muhammad], except as a mercy to the worlds (Al-Qur'an: 21-107)".

The Motto was further elaborated as, "I am devoted to easing the burdens of humanity, particularly within my local community through the initiatives of the Dairy Science Park. I pledge to apply my knowledge, skills, and experience, guided by the divine principles illuminated through Prophet Muhammad SAW and the benevolent guidance of Allah the Almighty. My life's purpose is to serve as a wellspring of relief, harmonizing both my earthly capabilities and spiritual insights to catalyze positive change in the lives of others."

Responsibility Begins at Puberty

Although the soul is ancient and the body is formed in the womb, a human being is not held accountable for religious duties until puberty (bulūgh). Before puberty:

- Actions are not recorded as sins or obligations.
- Learning, guidance, and moral upbringing are emphasized.
- Accountability begins only when the mind, body, and moral awareness mature.

This aligns perfectly with both Islamic jurisprudence and biological maturation.

4. The Hadith and Creation of Mankind

The Prophet ﷺ was once asked by the Jews about the origin of human beings. He replied that man is created from two fluids: the male *nutfa* and the female fluid.

- The Jews acknowledged his answer, noting that it was consistent with what earlier prophets had taught (as narrated by Imam Ahmad in Al-Musnad).
- This shows that the principles of reproduction were divinely communicated to humanity long before the advent of modern science.

5. Qur'anic Description of Embryonic Development

The Qur'an describes the stages of human embryogenesis:

"Then We made the nutfa into a clinging clot (‘alaqah), then We made the clot into a lump (mudghah), then We made the lump into bones, and We clothed the bones with flesh; then We developed it into another creation. So blessed is Allah, the best of creators." (23:14)

Key stages highlighted:

1. Nutfa — the sperm and ovum fluid.
2. ‘Alaqah — the "leech-like" stage, the clinging clot:
    - Begins approximately day 15 of embryonic development.
    - Lasts until about day 23–24.
    - The embryo at this stage resembles a leech, reflecting its clinging and curved appearance.
3. Attachment to the Uterus — the process of implantation and placentation, enabling the embryo to receive nourishment and continue development.
    - This description in the Qur'an aligns closely with modern embryology, highlighting stages observable under microscopy.
    - The term ‘alaqah captures both the physical form and the behavior of the early embryo, demonstrating the precision and wisdom of divine revelation.

6. Scientific and Spiritual Integration

By teaching this, the Qur'an and Sunnah:

- Encourage observation of nature as signs of Allah's creation.
- Establish embryonic development as a reflection of divine wisdom.
- Show that knowledge of reproductive physiology is not separate from faith — it is a path to understanding the Creator.

7. The Biopotential Gonads described by the Qur'an

أَلَمْ يَكُ نُطْفَةً مِّن مَّنِيٍّ يُمْنَىٰ ٣٧

Were they not ˹once˺ a sperm-drop emitted?

ثُمَّ كَانَ عَلَقَةً فَخَلَقَ فَسَوَّىٰ ٣٨

Then they became a clinging clot, then He developed and perfected their form,

فَجَعَلَ مِنْهُ ٱلزَّوْجَيْنِ ٱلذَّكَرَ وَٱلْأُنثَىٰٓ ٣٩

producing from it both sexes, male and female.

أَلَيْسَ ذَٰلِكَ بِقَـٰدِرٍ عَلَىٰٓ أَن يُحْۦِۦَ ٱلْمَوْتَىٰ ٤٠

Is such ˹a Creator˺ unable to bring the dead back to life?

These verses from Al Qur'an, 75:37-40, describe the creation of mankind from the: 37-ejaculating semen and oviductal fluids, 38-leading to formation of a leach-like blood clot attached to the uterine wall. 39-Then, it is developed into two sexes, male and female. 40-Allah SWT asks mankind whether He is unable to bring the dead back to life?

Allah SWT reveals to us the transformation of an embryo into a male or a female fetus. Genetic sex of a mammal is determined at the time of fertilization (day 1), where the X bearing spermatozoon leads to formation of a female zygote and Y bearing spermatozoon produces a male one. But the Qur'an has mentioned the formation of male and female individuals after the formation of leach-like clot (Alaqa, day 6-7) and then fashioned it in due proportion (Fasawwa, day 19-24).And then He made it into two sexes, male and female (Zawjain, day 25-26). Hence, phenotypic sex differentiation during embryogenesis, has been mentioned by the Qur'an after the genotypic sex differentiation on the day of fertilisation.

Recent investigations (Qureshi MS 2011, Reprod Physiol Dom Anim; Nef et al, 2019, Current Top Reprod Biol 134:167-194.have discovered the bipotential gonads as the common precursors of gonads, having the potential to develop into the testis or ovaries. Although the genetic sex is determined at the time of fertilization, the bipotential gonads retain the capacity to lead to formation of either testis or ovary driven by the presence of Y-linked Sry gene. Presence of the Sry gene in the embryo stimulates the formation of tests and suppresses the formation of development of ovaries. Absence of the Sry gene in the embryo leads to formation of ovaries and the female reproductive organs.

Development of Bipotential Gonads into Testis or Ovary

Gonadal development is one of the most fascinating processes in reproductive biology. For students of theriogenology—and for anyone curious about how male and female reproductive organs form—this brief article provides an accessible explanation of the key steps involved. This blog is prepared for the Dairy Science Park website to support learning and public awareness.

The Bipotential Stage: A Window of Possibility

In early embryonic life, the gonads are in a bipotential or undifferentiated state. This means they have the potential to develop into either testes or ovaries. In humans and most mammals, this stage lasts until about day 24 of embryonic development.

During this period, the embryonic gonads contain precursor cells and supporting tissue capable of following either developmental pathway. The direction they take depends on genetic signals that switch on or off at the right time.

What Determines Sex Development?

The critical turning point appears around day 25–26. At this stage, the embryos begin to follow one of two paths:

1. Development Into Testes

If the embryo carries a Y chromosome with an active Sry (Sex-determining Region of Y) gene, the bipotential gonad receives a strong signal to initiate testicular development.

The *Sry* gene triggers a cascade of genetic and cellular events, leading to the formation of:

- Sertoli cells
- Testicular cords

- Leydig cells (which later produce testosterone)

2. Development Into Ovaries

In the absence of the Y-linked *Sry* gene, the gonad naturally follows the ovarian pathway. This process involves:

- Activation of ovarian-promoting genes (such as *Wnt4* and *Foxl2*)
- Differentiation of granulosa and theca cells
- Formation of early ovarian follicles

This pathway also supports the development of female reproductive structures in the absence of testicular hormones.

Why Is This Topic Important?

Understanding these early developmental processes is essential for:

- Veterinary theriogenology students learning the foundations of reproductive biology
- Livestock professionals studying congenital or developmental reproductive issues
- Researchers exploring genetic disorders of sex development
- The general public, who often find the genetics of sex determination intriguing

Gonadal Development and Animal Health

In farm animals, disturbances in gonadal development can lead to infertility, intersex conditions, or poor reproductive performance. Knowledge of these mechanisms helps veterinarians:

- Diagnose developmental abnormalities
- Advise breeders on genetic risks
- Improve reproductive management through timely interventions

Conclusion

The transformation from a bipotential gonad to a testis or an ovary is a precise, finely regulated process. It highlights the remarkable complexity of animal development and the power of genetic signaling. This understanding forms a foundational concept in theriogenology and reproductive biotechnology.

For more educational content and updates, visit Dairy Science Park at *dairysciencepark.org*. Let us continue promoting scientific awareness and good practices in animal health and production.

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