Special Communication

MOLECULAR GENETICS OF FETAL ORGANOGENESIS IN THE QURAN: TRACKING A MODERN CONCEPT IN AN ORIGINAL RELIGIOUS TEXT

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ABSTRACT

Over the recent decades, science especially in the fields of medicine and molecular genetics has been developed with incredible extension and provide us the huge bulk of new concepts in biological phenomena and all these findings result in discovering the mysteries of life more deeply. A distinct and valuable aspect of these investigations would be tracking of these newly discovered themes in original religious records. The Qur'an as an original religious text had pointed so many times to the creation of human beings and its complex process by specification. These considerations and discussions have many things in common with newly found scientific facts. This paper is a brief study between these two apparently different discussions which shows the high similarities between the facts about organogenesis stages in scientific texts with its counterpart descriptions in the Quran.

KEY WORDS: The Qur'an, Organogenesis, Molecular genetics.

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INTRODUCTION

A brief but thorough search among modern scientific records and original religious texts like the Qur'an, in basic concepts in the fields of medical and molecular genetics may raise the possibility of finding counterpart contexts and similar expressions. In some selected verses one may find very delicate facts tracking in the field of scientific contexts such as human being creation steps from zygote formation up to the end of fetal period.

The major part of these similarities would be in the themes the structures and functions of fetal organs, and also the process of in uterus creation of human body parts and tissues; the process which is today named as organogenesis.

There are so many complex molecular behaviors in the fetus which determine the directions of tissues growth and their differentiation and final mass. One major critical and interesting point in between would be the regulation of cellular viability, growth patterns and even dynamic balance between cell generation and cell apoptosis through the fetal development period which show fine programming and regulation in every single step of the organogenesis. There is a very close similarity in discussion and context herein among the Qur'an and scientific description of fetal and embryonic development.

Fetal Organogenesis at a glance: Fetal development occurs through a set of complex and pre-

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programmed stages in which there is a cascade of cell differentiation and protein signaling.

Different cell types make different sets of proteins, even though their genomes are identical. Each human being has roughly 150,000 genes in each nucleus, but each cell uses only a small subset of these genes and makes its own way to progress to the pre-determined destiny. Red blood cells make globins, lens cells make crystalline, melanocytes make melanin, and endocrine glands make their specific hormones.[1]

These processes go on and make the morphology and also total mass and size of the targeted organ. There is increasing evidence that the control of cell proliferation and survival plays a central part in regulating the numbers of many tissues development and specifications such as blood cells, hepatocytes and many other cell types.

One of the pivotal mechanisms in organogenesis balance would be the apoptosis by which the total mass and final number of the constituent cells of an organ could be determined; hence the morphogenesis in each unit of the tissues and organs appeared in the right way.[2]

One example of an apoptosis-inducing extra-cellular signal is bone morphogenetic protein (BMP), a TGF family member. BMP helps trigger the apoptosis that removes the tissue between the developing digits in the mouse paw.

The overall size of an organ may be limited in some cases by inhibitory signaling proteins. Myostatin, for example, is a TGF-? family member that normally inhibits the proliferation of myoblasts that fuse to form skeletal muscle cells. When the gene that encodes myostatin is deleted in mice, muscles grow to be several times larger than normal. Both the number and the size of muscle cells increase.[3,4]

Cell number, in turn, depends on the amounts of cell division and cell death. Organ and body size are therefore determined by three fundamental processes: cell growth, cell division and cell death. Each is independently regulated both by intracellular programs and by extracellular signal molecules that control this programs.[5]

Obviously any imbalance in between may end in an abnormal growth or differentiation and morphology or function of the organ.

Examples of imbalance: There are many clinical and genetic events that show directly the imbalance between the above-mentioned mechanism in cell number, differentiation and growth during the time of fetal organogenesis.

Classic blepharophimosis syndrome (BPES) is a complex eyelid malformation invariably characterized by four major manifestations: blepharophimosis, ptosis, epicanthus inversus, and telecanthus.[6]

Occasionally individuals with BPES have cytogenetic rearrangements, such as interstitial deletions and translocations involving 3q23. *FOXL2* is the only gene currently known to be associated with BPES. Mutations are identified in approximately 80% of affected individuals.[7,8]

Another example in between would be the process of Embryonic Salivary Gland Branching Morphogenesis (ESGBM) in which one may find a clear cut kind of imbalance as the lack of compensation in cell signaling patterns.

In ESGBM, endogenous levels of other FGFR-mediated or parallel signaling pathways (TGF-á /EGF/EGFR, IGF/IGFR) could not compensate for the absence of FGF10/FGFR2-IIIb or FGF8/FGFR2-IIIc signaling.[9,10]

Organogenesis tracking in the Qur'an: There are so many evidences that religious texts such as the Qur'an had discussed the stages of human being creation in a general or specific manner. Throughout these texts, the more exploration, the more the facts on detailed but relatively hidden points towards the modern concepts of creation steps.

Among these verses one may find 82nd of the AL-INFITAR, 11th of the AL-AARAF and 3rd of the AL-TAGHABON as some of the prominent discussions of the human being creation stages and its detailed descriptions.

In chapter (Surah) 82 namely Al- INFITARr for example in the verse 7 one may find this theme:

In three most widely accepted translations of Qur'an by Yusufali and Pickthal and Shakir[11,12] this verse means:

"الَّذِي خَلَقَكَ فَسَوَّاكَ فَعَدَلَكَ"

YUSUFALI: Him who created thee. Fashioned thee in due proportion, and gave thee a just bias;
PICKTHAL: Who created thee, then fashioned, then proportioned thee?
SHAKIR: Who created you, then made you complete, then made you symmetrical?

The balance in the process and also the proportionately fashioned separation of organs are the main points in the verse. As one may consider, the word proportion mean *agreeable or harmonious relation of parts within a whole; balance or symmetry*

Obviously there is a core interrelationship between the gene expression process in the continuous sequence of organogenesis in a balanced way and the word and also the same is true for the apoptotic cell death step in the formation of organs of the body as a necessary part of normal dفَعَدَلَكَormation with the word فَسَوَّاكَ. Herein one may find a well-balanced interaction between all stages of organogenesis like cell growth rate, cell division slope in the fetus organs, cell migration pattern and finally cell death regulatory mechanism which had been mentioned thoroughly by the text of the Qur'an through the words due proportion in the above-mentioned verse.

In some discussions about these verses one may find the direct theme of human being creation process like this:
This discussion points directly to the balance in the stages of cell proliferation and also apoptosis during the creation of some parts of the body.[13]

خلقناكم في أصلاب الرجال ثم صورناكم في أرحام النساء عن عكرمة و قيل خلقناكم في الرحم ثم صورناكم بشق السمع و البصر و سائر الأعضاء انتهى.

Other examples of this due fashioning of the human body in the verses may be sought in the 11th verse of the AL-ARAF and also in 3rd verse of AL-TAGHABON respectively[11,12]:

YUSUFALI: It is we who created you and gave you shape; then we bade the angels prostrate to Adam, and they prostrate; not so Iblis; He refused to be of those who prostrate.

PICKTHAL: And we created you, then fashioned you, then told the angels: Fall ye prostrate before Adam! And they fell prostrate, all save Iblis, who was not of those who make prostration.

SHAKIR: And certainly we created you, then We fashioned you, then We said to the angels: Prostrate to Adam. So they did prostrate except Iblis; he was not of those who prostrated.

YUSUFALI: He has created the heavens and the earth in just proportions, and has given you shape, and made your shapes beautiful: and to Him is the final Goal.

PICKTHAL: He created the heavens and the earth with truth, and He shaped you and made good your shapes, and unto Him is the journeying.

SHAKIR: He created the heavens and the earth with truth, and He formed you, then made goodly your forms, and to Him is the ultimate resort.

The same points with different framework may find in the rest of verses which have been mentioned above. All of these verses contexts have pointed to two major facts; the separation of parts of organs in body in a highly programmed manner and also the existence of a delicate balance not only between the stages of the organogenesis but also among the interactive elements in the process.

A well-extended and comprehensive viewpoint between these findings in the context of the Qur'an verses and our modern understandings of the organogenesis may lead to some kind of correlation between the two apparently different subjects; original religious contexts and their conceptual meanings as the first consideration and the modern scientific findings of human genetics as the second.

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