

Chapter I

EMBRYOGENESIS

EMBRYOGENESIS

GAMETOGENESIS

The starting of the individual member of the human race is the fusion of the seed from his father and that from his mother to form one entity. To be able of such fusion these seeds or gametes have to mature. Maturation of both ovum and sperm involves a two-step division called meiotic division. In the first step the gamete divides into two cells each containing one half of the chromosome set, so that instead of the normal number of chromosomes, forty six in all other cells of the human body, the gamete contains only twenty three. In the second step of meiosis each cell gives rise to two cells each containing in its nucleus twenty three chromosomes, for each chromosome replicates by fission and aquisition of genetic material in order to give two chromosomes. Mature gametes therefore are unique in containing only a half-set or the haploid number of twenty three chromosomes in contradistinction to all the other cells of the body which contain the diploid number of forty six chromosomes to be found in normal human beings.

Of our forty six chromosomes, two in particular are concerned with determining the sex of the individual, and these are called the sex chromosomes. In the human female these two are similar and each is called an *X chromosome*, so that the sex chromosome complement of the normal human female is called XX. In the male however, only one sex chromosome is X, which is naturally derived from his mother, but the other is a small chromosome called Y, which is derived from the father and which is responsible for inducing the primitive sex glands in the early embryo so that they take the direction of becoming testicles: the sex glands in the male. The sex chromosome complement of the normal human male is expressed as XY. The remaining twenty two pairs of chromosomes are concerned with other body functions and are called the autosomes. The total normal

chromosome complement can therefore be expressed as 46, XX, for females and 46, XY for males.

During maturation of the gametes therefore, a mature ovum will contain twenty three chromosomes always including one X plus twenty two autosomes. This is not the same in sperm, for of the XY complement the X will go to one sperm and the Y to another. In the sperm population therefore there will be X bearing sperms and Y bearing sperms in equal numbers. If an X bearing sperm happens to fertilize the ovum, the ensuing cell, called the fertilized *ovum*, will have a chromosome complement of 46, XX and the baby is female. If the fertilizing sperm is Y bearing, the fertilized ovum will have the complement of 46, XY and therefore a male.

The deciding factor in establishing the sex of the baby is therefore the type of the fertilizing *sperm*. The knowledge of this fact is fairly recent in human history, and its discovery had to await tremendous advances that culminated in our present ability to discern the chromosomes and explore their role. It is therefore eye-catching to find in the Quran the subtle reference to the role of the seminal factor in determining sex. The Quran reads:

“Does man expect to be left without purpose? Was he not a drop of ejaculated *semen* later to become a sticky clot subject to fashioning and proportioning (by God) . . . and of which (God) made the two sexes: male and female?”
(75:36-39)

“That He did create in pairs male and female . . . from a drop of semen as it is ejaculated.”
(53:45-46)

Another reference the Quran makes is to the site of development of the sex glands. These are the ovaries in the female and the testicles in the male, which will later on subserve the function of providing the corresponding gametes and a number of supportive hormones. At the beginning the sex glands are indiscriminate in both sexes, and are formed of a matrix of mesenchymal tissue forming on either side of the back-bone in the upper part of the abdominal cavity, to which migrate and settle the germinal cells from the primitive gut, later to become ova or sperms. It is later on during development that these sex glands are pulled down to occupy a new position in the body, the ovaries stopping in the pelvis and the testicles continuing to descend until they come out of the abdominal cavity and rest in the pouch (scrotum). The original site of the sex glands has been revealed by advances in Embryology, a relatively recent science, and yet the Quran refers to this fact in the verses:

“Let Man look from what he is created. He is created from jetting water emanating from between the ribs and the backbone.”(86:5-7)

THE UNIQUENESS OF THE INDIVIDUAL

As already explained, we do get our chromosomes from our parents, each of them getting theirs from their parents and so on until we trace our chromosomes, and those of all people, back to our earliest ancestry and our very first common grandparents: Adam and Eve. Each new pregnancy therefore represents an extension of a long chain stemming off from Adam and Eve in the form of chromosomes. In the light of these facts it will be of great interest to read what prophet Mohammad said in one of his traditions:

“When the nutfa (earliest phase of pregnancy) is established in the womb, God has brought into it all genealogy between her and Adam.”

(Ibn-Gareer)

Going back to the phenomenon of meiosis—the cell division giving haploid (twenty three chromosome) daughter gametes along the course of their maturation, we note that every pair of chromosomes (pair number 1 to pair number 23) align together before the two members of each pair part and each of them goes to one of the two daughter cells. That a daughter will receive the chromosome derived from the father or that derived from the mother is a matter of chance. This chance operates separately for every chromosomal pair, from chromosome pair 1 to chromosome pair 23. The different possible patterns of the chromosome complement of the daughter cell based on paternal/maternal derivation of chromosomes only will therefore be 2^{23} ie eight million possibilities (2 possibilities per chromosome pair, over 23 pairs).

But two other phenomena further compound the issue. As each chromosome pair align in preparation to parting, its two members do touch each other at certain locations (chiasmata) where they exchange genetic material so that neither of them is the same as it was, and then each goes to the new cell. This phenomenon is called crossing-over, and through it the genetic possibilities of the new cell defy any counting. If on top of that we know that spontaneous changes (mutations) might occur anew (de novo) in the genetic structure (some of these might be harmful but others are normal and even beneficial), then we can realize that although people have so much in common, yet it is practically impossible that two persons

would exactly coincide in the details of their genetic structure. Such possibility is one in infinity ie zero.

Our chromosomes are the carriers of our genes, and our genes are the blue print of our life. Genes are made of a protein called desoxyribonucleic acid (DNA), whose molecule is endowed with that foundation feature of Life: self-replication. Genes are also composed of units of amino acids, the particular sequence of which subserves the function of 'letters' in written language. The cipher of our biological language resides in our genes, translated into features common to all mankind, as well as those to a special race, a special family and ultimately a particular unique individual who is never and will never be the exact copy of another person preceding or succeeding him.

Amongst the manifestations of uniqueness of an individual is the pattern of his finger prints, hence their medico-legal value in personal identification. At some stage when Man rejected the idea of resurrection and denied that God can reclaim him long after death, God reaffirms—in the Quran that He is indeed capable of reclaiming Man and reconstructing him to the finest detail that—we knew fourteen centuries after the Quran was revealed—resides in the morphology of his fingers:

“Does man think that we cannot assemble his bones? Nay! We are very able to put together in perfect order the tips of his fingers.”
(75:4)

SEX PREFERENCE

It seems that over human history there has always been a preference to beget male progeny rather than female. The dominance of the role of the male, possibly due to his physical strength and to being nonhampered by the limitations that the function of reproduction imposes on the female, might have conditioned men and women to be projected in the following generation as males. In the area of human competition, conflict and combat, military or economic, masculinity is certainly an asset.

The reaction to begetting a female, however, varied quite a lot. When Hannah (Anne) the wife of Imran who got pregnant at an old age made a vow to devote the baby she carried to the service of God, she expected she would give birth to a male. When she begot a girl she was surprised but hardly disappointed, and the Quran relates to this incident as follows:

“Behold. The woman of Imran said: My Lord. I do dedicate unto

You what is in my womb for Your special service, so accept this of me: You are the One who hears and knows all things. When she gave birth to her, she said: My Lord, I gave birth to a female—and God knows best what she gave birth to—and the male is not similar to the female. And I have named her Mary (Mariam), and I commend her and her offspring from the Rejected Devil. Graciously did her Lord accept her and made her grow in purity and beauty and assigned her to the care of Zakariya... (3:35-37)

The Arabs in Jahiliya (ie the pre-Islamic era) represented a society where female births were most unwelcome. Exceptions occurred, but the social code on the whole considered the begetting of a female child as bad news. The Quran says:

“And when news is brought to one of them of the birth of a female child, his face darkens and he is filled with inward grief: With shame does he hide himself from his people because of the bad news about the baby: should he retain it and endure the contempt or bury it under the dust?! Ah, how evil was their verdict.” (16:58-59)

Because of their contempt of the female, those pre-Islamic Arabs made a common practice of burying alive their female infants, a practice that Islam strictly prohibited. In a reference to a series of enormous happenings on the day of reckoning the Quran cites:

“And when the female infant buried alive is questioned for what crime she was killed” (81-8-9)

In their argument against God, those pagan Arabs tried to belittle Him by assigning daughters to Him (presumably the angels):

“And they assigned daughters for God—glory be to Him—and for themselves what they desire (sons)” (16:57)

It is regrettable that this Jahiliya attitude against the female still lingers on, and it surprises us that even a highly educated person might be dismayed at the news of begetting a daughter. It is more surprising, however, to note this phenomenon in modern communities that raise the banner of equality between man and woman, and at both extremes of the ideological spectrum. In China, where the state posed stringent restrictions in favour of the one-child family, female infanticide has been resorted to in order to have another chance of a further pregnancy that will hopefully produce a baby boy. A World Health Organization publication released in the ear-

ly eighties gave an estimate of 1.2 million female infants killed since the enforcement of the restrictive laws. In a leading western country the same goal is being achieved by more sophisticated and less law-violating means. After the third month of pregnancy a procedure called amniocentesis is carried out, by which some of the (amniotic) fluid around the fetus is drawn, in which some fetal cells exfoliated from the fetal surface are suspended. These cells are grown in tissue culture and their chromosome complement is studied. If the fetus is of the undesired sex, the law—or loop holes in it—makes it possible for the woman to procure an abortion.

The Islamic stand on the issue of sex-preference rests on the basic concept that we do not create our children but we just receive them and are entrusted with them. They come through us, but not from us, as Gibran said, and as we enjoy them as a blessing we owe them the responsibilities of parenthood in the same way as our parents did unto us and their parents had done unto them. The preservation of the race necessitates the creation of men and women . . . and if it is to be a happy community then it better comprises well-raised men and women. Whatever God gives, we should receive in joy, gratitude and awareness of our responsibilities.

“To God belongs the dominion of the heavens and the earth. He creates what He wills. He bestows females upon whom He wills and bestows the males upon whom He wills. Or He couples them in males and females and He leaves barren whom He wills. For He is All Knowledgeable All Powerful.” (42:49-50)

When Islam prohibited that criminal custom of the burial alive of females it was within the context of its concept that men and women were equal even though not similar. Whatever was enjoined and whatever was forbidden applied to men and women. Reward for good and punishment for bad were equal to men and women.

“If any do deeds of righteousness, be they male or female, and have faith, they will enter heaven and not the least injustice will be done to them.” (4:124)

Such a reward will not only be in the hereafter, but during this life as well.

“Whoever works righteousness, man or woman, and has faith, We shall give 'm a good life and bestow on such their reward according to the best of their deeds.” (16:97)

To reinforce woman's role the Quran sometimes resorts to repetitive detailing such as in the following verse:

“For Muslim men and women, for believing men and women, for devout men and women, for true men and women, for patient men and women, for men and women who humble themselves, for men and women who guard their chastity, for men and women who are much mindful of God, for them God has prepared forgiveness and great reward.” (33:35)

As a further counter measure against that pre-Islamic faulty attitude the prophet Mohammad repeatedly gave positive guidance recommending females to our tender loving care. In one hadith (saying of the prophet) he teaches:

“Whoever has a daughter whom he did not bury or hurt or give preference to his male child over her, God will admit him into paradise.”
(*Ibn Dawood and Al-Hakim*).

A number of other hadiths have been reported in which the prophet relates that a parent kind and loving to daughters would be in such proximity to the prophet in heaven as the proximity of his index and middle fingers.

Islam also has different views from current Christianity on the legend of Adam and Eve and the original sin. Eve did not tempt Adam to disobey God but Satan tempted both to eat from the forbidden tree. Driven out of heaven, God inspired Adam to repent and Adam was forgiven. Man came to earth unburdened of the aftermath of the original sin and generations are not stigmatized by inheriting it. We do sin but we do not inherit them. We are endowed with God's guidance and with the built-in power to reason and to make a choice and this is the only legitimate basis for accountability, and in Islam accountability is personal.

“Every soul draws the meed of its acts on none but itself; no bearer of burdens can bear the burden of another.” (6:164)

“Who follows the guidance indeed follows it for his own benefit. Who goes astray does so to his own loss. No bearer of burdens can bear the burden of another. Nor would We visit with Our wrath until We had sent an apostle.” (17:15)

“Nor can a bearer of burdens bear another's burden. If one heavily laden should call another to share his load, not the least portion of

it can be carried by the other even though he was a near relative.”
(35:18)

When we sin it is by personal shortcoming and not by inevitable inheritance. When our conscience aches we address our repentance directly to God without mediation of a third party (there is no clergy in Islam). My sin is my personal responsibility and my salvation rests in God’s acceptance of my honest repentance. To repent after sinning is an act of goodness, and God says in the Quran:

“Indeed God loves those who repent to Him constantly and He loves those who keep themselves pure.”
(2:222)

The concept of vicarious sacrifice to atone for sins committed by others is not an Islamic concept. Jesus is highly revered in Islam, he is described as:

“Christ Jesus the son of Mary was an apostle of God and His Word that He bestowed on Mary and a Spirit proceeding from Him. . .”
(4:171)

but the concept that he was killed on the cross in settlement of the sins of people was refuted by Islam.

Multiple reference was made in the Quran to the issue of Adam and Eve, the following is an illustrative example denoting that God had chosen the human race for His vicegerency on earth, then declared His intention to the angels who were taken by surprise, His fitting of Adam with the complex human attributes that made him superior even to the angels, the prelude of sin and forgiveness and the colonization of earth by Man:

“Behold . . . Your Lord said to the angels: I am enstating a vicegerent on earth. They said: Will You place therein one who will make mischief therein and shed blood whilst we do celebrate Your praise and glorify Your holy Name? He said: I know what you know not. And He taught Adam the nature of all things then He placed them before the angels and said: Tell me the nature of these things if you are right. They said: Glory to You . . . of knowledge we have none save that You have taught us . . . verily it is You who are perfect in knowledge and wisdom. He said: Oh Adam! Tell them their nature. When he had told them, God said: Did I not tell you that I know the secrets of heaven and earth and I know what you reveal and what you conceal? And behold: We said to the angels: Bow down to Adam. And they bowed down save for Iblis . . . he refused and was haughty and was of those who

reject the Faith.

We said: Oh Adam . . . dwell you and your wife in Paradise and eat of the bountiful things therein wherever you wish, but approach not this tree or you have transgressed.

Then did Satan make them slip out of it and get them out of what they had been in. We said: descend all of you (people) with enmity between yourselves . . . on earth will be your dwelling place and your means of livelihood for a time. Then Adam received some Words from his Lord and his Lord forgave him, for He is the most Forgiving, most Merciful.

We said: get down all of you from here, and if—as is sure—there comes to you guidance from Me, whosoever follows my guidance, on them shall be no fear, nor shall they grieve. But those who reject Faith belie Our signs, they shall be companions of the fire, they shall abide therein.” (2:30-39)

The assumed role of Eve in tempting Adam into disobedience and the concept of the inheritance of (original) sin seem to have caused woman to be wronged over a long period of Church history, so much so that centuries ago comprehensive ecclesiastical congresses were held to debate whether Woman had a soul or not and brand her of being a lowly creature and an indispensable evil. Current attitudes are a great departure from old ones, but it seems that for many people old ways have been more tamed than eradicated.

And now we seem to be at the gates of scientific pre-pregnancy sex-selection. Different characteristics of X bearing and Y bearing sperms have been studied and put to application for separating semen to Y-rich and X-rich portions and using these for artificial insemination. The practice is fairly established in animal husbandry, and available data denote that it will not be long until it can be applied in human reproduction.

So far God's plan (Nature) has seen to it that on the whole almost equal numbers of men and women are available at the time of pairing off after puberty. Given the constantly observable predilection towards male progeny (remarkably accentuated in many communities), would tampering with this natural achievement disturb the human balance in favour of an excess of the male sex? And what would be the social and moral and ecological sequelae thereof? The issue cannot be oversimplified by claiming that most families will do with two children, the sex of the first to be decided by Nature and another of the opposite sex to be ordered at the doctor. While this might go well with an English family, some Arab family might wish

for ten boys and no girls, while most Chinese families would decide on a boy for their only child! Perhaps one shortcoming of modern science is that it lacks a built-in mechanism to study and anticipate the far reaching implications of its achievements and perhaps censor or antidote them when necessary. Whenever a new scientific discovery is made it is promptly rushed into the realm of applied technology, and short-term gains take the upper hand over long-term results.

When the first atomic bomb was dropped over Hiroshima, Oppenheimer—the father of the atomic bomb said: “This day physicists have fallen into sin”. One wonders what is in store for reproductive medicine!

Fetal Development

That the fetus is formed by the fusion of a male and a female gamete contributing equally to its structure, is a fairly recent fact, discovered only in the nineteenth century. An ancient theory maintained that the fetus was maternal in origin and that the role of insemination was to stimulate it to grow. This theory was supplanted with the theory of paternal origin, which proclaimed that the seed of the male was implanted in the woman just like plant seeds are implanted in the soil, to grow and bear fruit. When the spermatozoa were discovered and actually seen under the microscope, it was thought to be a human being in miniature and old books showed its diagrammatic representation with the topography of various regions of the body illustrated.

When prophet Mohammad peace be upon him was asked by a Jew from what a human being was created, the prophet answered:

“He is created from both . . . from the *nutfa* (little drop) of the man and the *nutfa* of the woman.” (Imam Ahmad)

The Quranic reference to this dual creation of the human being is given in the following verse:

“Verily We created man from a drop (*nutfa*) of a *mixed* nature in order to try him, so we gave him the gifts of hearing and sight.” (76:2)

It is noteworthy that whenever God mentions the two senses of hearing and sight, hearing consistently is mentioned before sight, in keeping with the fact—discovered only by modern embryology—that the auditory system precedes the visual apparatus in structure and function. The following other verses are illustrative examples:

“Or who is it that has power over hearing and sight? And who is it that brings out the living from the dead and the dead from the living?
(10:31)

“And pursue not that of which you have no knowledge, for every act of hearing or of seeing or of (feeling in) the heart will be enquired into (on the Day of Reckoning).”
(17:36)

“It is He who has created for you (the faculties of) hearing, sight, feeling and understanding . . . little thanks it is that you give.”
(23:78)

“Then He fashioned him (man) in due proportion and breathed into him from His spirit, and He gave you hearing and sight and feeling. Little thanks do you give.”
(32:9)

“Say: It is He who has created you and made for you the hearing, seeing and feeling . . . little thanks it is you give.”
(67:23)

“And we have endowed them with hearing, seeing, heart and intellect: but of no profit to them were their hearing, sight and heart and intellect when they went on rejecting the signs of God, and they were encircled by that which they used to mock at.”
(46:26)

“Say: imagine if God took away your hearing and your sight and sealed up your hearts . . . who—a god—other than God could restore them to you?”
(6:46)

“You did not seek to hide yourselves lest your hearing, your sight and your skins should bear witness against you. But you did think that God knew not many of the things you used to do.”
(41:22)

The Quran presents the sequential development of the fetus through various stages of well defined features, at a time when human knowledge had no notion about embryology, and in a sequence which is in keeping with modern scientific views. The seminal nutfa (little drop) and the mixed nutfa of mixed male and female origins have been referred to. This is followed by the stage of ‘alaqa’ (in Arabic the leech is called alaqa . . . since the verb alaqa means to stick or to attach to), which is a precise description of the blastocyst as it attaches itself to the lining membrane of the uterine cavity, preparatory to actually burrowing its way into it in the proces of nidation or implantation. The mass of cells inside the blastocyst—the inner cell mass—embarks on a series of division and differen-

tiation, shaping up to a body with a head end and a tail end, and furrowed by a series of grooves on either side. These furrows demarkate the body to consecutive pairs of 'somites', and the general morphology then resembles a masticated bolus of food (or meat) with the molar teeth markings grooving it: hence the Quranic terminology of "modgha" which is a chew bolus of food.

Inside the "modgha" the prodromata of the boney skeleton are set. But the boney skeleton is in fact a series of lever arms with the axes of the levers at the joints. These lever arms require energy to pull on them to effect various movements, and so mesenchymal tissue is transformed to muscle tissue around the bones which is suitably attached to the bones on either side of the joint hinge so that when the muscle contracts movement occurs at the joints. All this sequence was revealed to Mohammad in the Quran some fifteen centuries ago...to await its direct exegesis in the recent science of embryology over the nineteenth and twentieth centuries.

We do acknowledge that the Quran was not meant to be a book of science, although it did ordain on the human mind and challenged it to seek to discover the 'tradition of God in His creation'...ie 'scientific research' in modern terminology. The Quran is replete with verses pushing man to use his brain and pursue knowledge, and we here give a few examples; starting with the first words of the Quran ever revealed:

"Read! in the name of your Lord who created...created man out of a sticky material (alaq)...Read! and your Lord is the most Bountiful...Who taught with the pen...taught man that which he knew—not."
(96:1-5)

"God will raise up to higher ranks those of you who believe and who have been granted knowledge."
(58:11)

"And say: O my Lord! Advance me in knowledge."
(20:114)

"We will show them our signs in the horizons and in their own selves until it becomes manifest to them that this is the truth."
(41:53)

"On the earth are signs for those of assured faith. And also in your own selves: will you not then see?"
(51:20-21)

"Are those equal: those who know and those who do not know? It is those endued with understanding that receive admonition."
(39:9)

"Among His servants it is those who have knowledge who truly fear

Him most."

(35:28)

And yet it seems that the Quran bears more miracles than its linguistic inimitability. The latter at the onset of Islam overwhelmed the Arabs whose only pride was their literary excellence. Staunch enemies of Islam would listen to the Quran and immediately feel spellbound by its divine language. No less a person than Umar ibn al Khattab, who was an extremely formidable figure amongst the enemies of Islam, would hear that his sister had embraced Islam and went to punish her, and upon listening to a few lines from the Quran he promptly embraced Islam. Those people were our reliable indicators concerning the divine nature of the Quran, just as litmus paper is a reliable indicator of the acidity or alkalinity of a liquid. At our present age of scientific advancement, yet another miracle addresses the scientific mind of the twentieth century, as more and more scientific facts are revealed and the present day scientist stands astounded as he realizes that the Quran makes direct reference to them. This seems to be the scientific miracle of the Quran, starting to unfold after so many centuries. It is no wonder that some of the most imminent scientists of our time were amongst the many Europeans and Americans who lately embraced Islam (such as Roger Garaudy, Maurice Beaucaille and Arthur Ellis).

On the subject of the development of the human fetus we will present some relevant verses of the Quran without any comment of note. We do not feel the need to go at any length in stretching the exegesis or manipulating the words to make the text appear to coincide exactly with what is written in works on embryology. It is our opinion that exegists of the past and Islamic scientists of today need not and should not overdo it in a—sometimes—desperate attempt to prove that "God knows!"

"O mankind! If you have a doubt about the resurrection, (consider) that We created you out of dust, then out of a nutfa (little drop... of semen then of double composition), then out of a leech-like clot (alaqa), then out of a chewn morsel of flesh (modgha) partly formed and partly unformed, in order that We might manifest (Our power) to you, and We cause whom We will to rest in the wombs for an appointed term, then We bring you out as babes, then (foster you) that you may reach your age of full strength, and some of you are called to die, and some are sent back to the feeblest old age, so that they know nothing after having known (much)."

(22:5)

"It is He who has created you from dust, then from nutfa, then from a leech-like clot (alaqa), then does He get you out as a child; then

lets you reach your age of full strength, then lets you become old; though of you there are some who die before, and lets you reach a time appointed, in order that you may learn wisdom.” (40:67)

“We did create man from a sulala (this word fits two meanings: 1. quintessence, 2. genealogy) of clay, then we placed him as a nutfa (little drop . . . semen . . . then sperm cum ovum) in a firmly secure sanctuary, then We made the nutfa into alaqa (sticky leech-like being), then We made the alaqa into a mudgha (chewn morsel), then We made out of that lump bones and clothed the bones with flesh. Then we set it in another creation. So blessed be God . . . the best to create.” (23:13-14)

The verses are quite striking to the modern scientist even if we refrain from over-exegesis that is sometimes exercised, and the prescribed way for further knowledge is to pursue hard work in further research in the laboratory or otherwise, in accordance with the criteria of scientific research humanity has come to formulate, without preconceived conclusions and avoiding over-zeal. It was this honest scientific research that eventually revealed the marvels of the Quran and will continue to do so in the future. We quote as an example the Quranic verse that reads:

“He makes you in the wombs of your mothers in stages, one after another, in three veils of darkness . . .” (39:6)

Several views have been expressed defining those three veils of darkness by old as well as contemporary exegists. The only difference is the resort of the latter to the achievements of scientific discoveries, and—with equal confidence—the three darknesses have been explained as ammion, chorion and uterus; placenta, uterus and maternal abdominal wall; lack of sight, hearing and intellect; insecurity about prenatal, intranatal and postnatal existence . . . and so on . . . while the simple and honest answer in our view is to say that we do not know for sure what God specifically meant by those three darknesses, and be confident that our ignorance will not undermine the Quran in the least or reflect negatively on our prestige as a learned people. In our present era of Islamic revival great care is needed to avoid emotionalism and confusion. We have witnessed a few muslim scholars going far out of the way in order to connect a statement in the Quran with some modern scientific discovery. We remain convinced that the proper place of Muslim scientists is their laboratories and research institutions playing their proper role the hard way as their forebears did in the era

of Islamic civilization and as their peers in today's scientific world do. This is certainly the only effective way to live Islam, benefit humanity and serve the Quran.

Metaphysical Development

On the physical side Man has so much in common with other living beings concerning body structure and function. His body seems to be made from the same basic ingredients that make all living things . . . all revolving around a central role of water, as the Quran tells.

“Do not the unbelievers see that the heavens and the earth were joined together (as one unit of creation) before We clove them asunder? And We made from water every living thing? Will they not then believe?”
(21:30)

“And God has created every kinetic creature from water; of them there are some that creep on their bellies, some that walk on two legs and some that walk on four . . .”
(24:45)

The other constituents of the body of Man are the same as make the earth . . . and also not special to Man only.

“It is He who has produced you from the earth and settled you therein . . .”
(11:61)

This mixture of earth and water makes mud or clay.

“God began the creation of man from clay”
(37:11)

And yet—as is quite obvious—there is much more to man than his clay composition. Neither physiology nor anatomy are the basis of the uniqueness of man.

As we know it, man is the unique creature endowed with the concept of good and evil, a built-in mechanism to differentiate between them and an intrinsic will to make a choice and act upon it. Living beings we know of, do live upon instinct alone and are fully programmed to be guided by it. Living creatures we are told about by religious scriptures viz the angels, also act upon their given good nature and do not sin because they do not know how to sin. Man is the only species with freedom of choice and hence is subject to accountability. Such must be the “amana” referred to in the Quran as:

“We did indeed offer the ‘Amana’ (Trust) to the heavens and the earth and the mountains but they declined to undertake it being afraid thereof, but man undertook it.”

This unique endowment possessed by man is illustrated in various sites of the Quran, denoting that on top of the earthly element in man which is controlled by non-unique biological laws, man has received Spirit from God, and this is indeed human-specific:

“Behold! Your Lord said to the angels: I am about to create man from sounding clay from mud moulded into shape, when I have fashioned him and blown into him of My spirit, fall down prostrating yourselves before him.” (15:28)

The nature of this “spirit” from God we do not know, and will never know:

“They put questions to you concerning the Spirit, say the Spirit is at my Lord’s command . . . and of knowledge only a meagre part has been imparted to you.” (17:85)

It is certainly metaphysical, and is manifested in encoding man over countless generations so as to embrace such values as conscience, self criticism, self restraint and the transcendence above the mere calls of his clay structure.

Such encodement that started with Adam and has since been passed down through human genealogy must—in all probability—reside in the genes which are our only unbroken chain linking us to Adam and him to us, and which are known to transmit behavioural, conceptual as well as physical traits. This heritage almost glows as one reads in the Quran:

“When your Lord drew forth from the Children of Adam—from their loins—their descendants, and made them testify concerning themselves (saying): Am I not your Lord? They said yes—we do testify. (This) lest you say on the Day of Judgement: of this we were never mindful.” (7:172)

“He Who has made everything which He created most good. He began the creation of man with clay, and made his progeny from a quintessence of the nature of a despised fluid. Then He fashioned him in due proportion and blew into him from His spirit. And he gave you hearing and sight and intellect.” (32:7-9)

Humanity—noble Humanity—is uniquely characteristic of Man and is

encoded in his gene legacy. It entails freedom and accountability unshared by any other creature, awareness of the Creator on the part of the created, that God's whisper in the depths of every human heart that we call conscience, and that natural inherent guidance that Islam calls "*Fitra*".

"By the soul and the proportion and order given to it, and its inspiration as to its wrong and its right...truly he succeeds that purifies it...and he fails...that corrupts it". (91:7-10)