

Correspondence

The practice of medicine and the utilitarian redefinition of the beginning and end of human life

To the Editor

We appreciate Dr. Al-Aqeel highlighting many of the difficulties related to defining the religious perspective on therapeutic human embryonic stem cell research.¹ We wish to further elaborate on how contemporary scientific knowledge may change the scholarly understanding of the Quran, and Hadith on the beginning, and end of human life. Accurately interpreting the Quran, and the Hadith regarding man's creation to discern the exact time when a human life begins, and when it ends has been fundamental in opining on moral, and religious stances on medical procedures performed at respective time points. Generally, the lawfulness of a medical procedure does not necessarily confer upon it either moral or religious acceptability. Advances in scientific knowledge of human biology have enhanced scholars' understanding of the Quran's description of man's creation, and development from conception until death (Figure 1). However, the scientific understanding of what constitutes life when a soul is breathed into a human creation after conception, and when a soul departs from the physical body at death is still rudimentary. We are reminded that man's precise knowledge of the human spirit (Ruh) and life will always be deficient (Figure 2). Against this background, scholars earnestly attempt to articulate a religious perspective on procurement of stem cells from human embryos, or organs from dying persons as end-of-life medical procedures for therapeutic purposes. Defining life or death in terms of the presence or absence of the soul, despite limited scientific knowledge in this field, becomes a convenient means for medical practice to achieve utilitarian goals in society. However, defining life, and death for such purposes can also obscure relevant moral problems, and lead down the slippery slope of reasoning in medical practice. Dr. Al-Aqeel and Dr. Aksoy cite 2 different Hadiths supporting the view that the life of an embryo

begins after ensoulment.^{1,2} In Sahih Bukhari, the book of beginning of creation, Hadith number 430 describes ensoulment events: "Narrated 'Abdullah bin Mus'ud: Allah's Apostle, the true and truly inspired said: (The matter of the creation of) a human being is put together in the womb of the mother in 40 days, and then he becomes a clot of thick blood for a similar period, and then a piece of flesh for a similar period. Then, Allah sends an angel who is ordered to write 4 things. He is ordered to write down his (for example, the new creature's) deeds, his livelihood, his (date of) death, and whether he will be blessed or wretched (in religion). Then the soul is breathed into him....."³ In Sahih Muslim, The book of destiny (Kitab Al-Qadr), Hadith number 6392 also describes ensoulment: "Hudhaifa b. Usaid reported directly from Allah's messenger (may peace be upon him) that he said: When the drop of (semen) remains in the womb for 40 or 50 (days) or 40 nights, the angel comes and says: My Lord, will he be good or evil? And both these things would be written. Then the angel says: My Lord, would he be male or female? And both these things are written. And his deeds and actions, his death, his livelihood; these are also recorded. Then his document of destiny is rolled and there is no addition to and subtraction from it"³ Interpreting the 2 Hadiths as a permission for the use of human embryos in stem cell research,^{1,2} raises the following 5 issues.

First, Muslim scholars differ in their interpretations of the precise time of ensoulment, based on the 2 Hadiths. Some scholars interpret ensoulment time to be 120 days, whereas others interpret ensoulment to occur at 40 days. Second, the time of ensoulment may be either the gestational age (number of days from the first day of the last menstrual period) or the embryonic age (days from fertilization of the ovum). However, an embryo at 40 days after fertilization is developmentally far more advanced than an embryo at a gestational age of 40 days (Table 1). Third, if embryo ensoulment also entails, and coincides with gender assignment, then the beginning of life may be interpreted as early as the time of fertilization when either a Y chromosome-carrying sperm (in male embryo), or an X chromosome-carrying

67. It is He, Who has created you (Adam) from dust, then from a *Nuḥfah* [mixed semen drops of male and female sexual discharge (i.e. Adam's offspring)] then from a clot (a piece of coagulated blood), then brings you forth as an infant, then (makes you grow) to reach the age of full strength, and afterwards to be old (men and women) — though some among you die before,— and that you reach an appointed term in order that you may understand.¹¹

مَوَالِدِي خَلَقَكُمْ مِنْ رُحَابٍ ثُمَّ مِنْ نُحْفَةٍ ثُمَّ مِنْ عَلَقَةٍ ثُمَّ يُخْرِجُكُمْ طِفْلًا ثُمَّ لِتَسْلِفُوا أُنثَىٰكُمْ ثُمَّ إِذَا كُنْتُمْ شُبُهًا أَوْ بَشَرًا مِمَّنْ بَيْنَ يَدَيْهِ يَنْزِلُ مِنْ سَمَاءٍ مَبْنُورَةٍ وَلَكُمْ فِيهَا حَيَاتِكُمْ الْمَوْتُ وَبَعْدَ ذَلِكَ إِلَهُكُمْ فَاعْبُدُوهُ

The Qur'an, Sura 22, verse 50

Figure 1 - Knowledge and scholarly understanding of the creation and development of man from conception until death (The Quran, Sura 40, verse 67).

85. And they ask you (O Muhammad صلى الله عليه وسلم) concerning the *Rūḥ* (the Spirit); Say: "The *Rūḥ* (the Spirit) is one of the things, the knowledge of which is only with my Lord. And of knowledge, you (mankind) have been given only a little."

وَسْأَلُونَكَ عَنِ الرُّوحِ قُلِ الرُّوحُ مِنْ أَمْرِ رَبِّي وَمَا أُوتِيتُمْ مِنَ الْعِلْمِ إِلَّا قَلِيلًا

(The Quran, Sura 17, verse 85)

Figure 2 - Mankind's limited knowledge of the *Ruh* (soul) (The Quran, Sura 17, verse 85).

Table 1 - A comparison of stages of embryonic development by gestational age versus embryonic age.

Gestational age, days (weeks)	Embryonic age, days (weeks)	Stage	Stage of embryo development
1-14	0	Nutfah	Fertilization of ovum Zygote (future male, or female)
15-21 (3)	1-7 (1)	Alaqah	Blastocyst (inner cell mass, and trophoblast) in uterus
22-28 (4)	8-14 (2)		Blastocyst implantation in the uterus Embryonic disc (ectoderm, mesoderm, and endoderm) Primitive streak Yolk sac, and amniotic cavity Primary stem villi (future placenta)
29-35 (5)	15-21 (3)	Mudghah	Organogenesis stage Notochord (future vertebral column) Somites (future bone, and skeletal muscle) Neuromeres (future brain segments) Neural tube (future spinal cord) Heart tube, and vasculature Hematopoiesis
36-42 (6)*	22-28 (4)		
43-49 (7)	29-35 (5)		Morphogenesis stage Optic vesicles, lens pits, and optic cups (future eye) Auditory vesicles (future ear) Brain (cerebral hemispheres defined) Circulation of blood through embryo vessels Lung buds Four limb buds Pharyngeal arches
50-56 (8)	36-42 (6)*		Heart, lungs, brain, limbs, and gonads formed
57-63 (9)	43-49 (7)		Spontaneous limb movements may be detected by ultrasound

Gestational age refers to the number of days from the first day of the last menstrual period; embryonic age is the number of days from fertilization. *Denotes the earliest time period coinciding with ensoulment at 40 days.

45. And that He (Allāh) creates the pairs, male and female,

وَالَّذِي خَلَقَ الذُّكُورَ وَالْأُنثَىٰ ﴿٥٥﴾

46. From *Nutfah* (drops of semen — male and female discharges) when it is emitted.

مِنْ نُّطْفَةٍ إِذَا تَأْتَىٰ ﴿٥٦﴾

(The Quran, Sura 53, verses 45-46)

Figure 3 - The creation of human male and female embryos at the time of fertilization (The Quran, Sura 53, verses 45-46).

8. Then He made his offspring from semen of despised water (male and female sexual discharge).

فَجَعَلْنَا سَلَمِينَ مِنْ سُلَيْمٍ مِنْ مَاءٍ مَهِينٍ ﴿٨﴾

9. Then He fashioned him in due proportion, and breathed into him the soul (created by Allāh for that person); and He gave you hearing (ears), sight (eyes) and hearts. Little is the thanks you give!

نَسْنُوهُ وَنَعَّمْ فِيهِ مِنْ مَرْجُلٍ لَكَمُ السَّمْعُ وَالْأَبْصَارُ وَالْأَفْئِدَةُ قَلِيلًا ﴿٩﴾

(The Quran, Sura 32, verses)

Figure 4 - The Ruh and development of human organs of hearing, sight, and hearts (The Quran, Sura 32, verses 8-9).

5. O mankind! If you are in doubt about the Resurrection, then verily We have created you (i.e. Adam) from dust, then from a *Nutfah* (mixed drops of male and female sexual discharge i.e. the offspring of Adam), then from a clot (a piece of thick coagulated blood) then from a little lump of flesh — some formed and some unformed (as in the case of miscarriage) — that We may make (it) clear to you (i.e. to show you Our Power and Ability to do what We will). And We cause whom We will to remain in the wombs

بِأَنبِيَاءِ النَّاسِ إِن كُنْتُمْ فِي رَيْبٍ مِّنَ الْبَعْثِ فَإِنَّا خَلَقْنَاكُمْ مِنْ تُرَابٍ ثُمَّ مِنْ نُطْفَةٍ ثُمَّ مِنْ عَلَقَةٍ ثُمَّ مِنْ مُّضْغَةٍ مُّخْتَلِفٍ وَّغَيْرِ مُّخْتَلِفٍ أَلْهِنَّاكُمْ وَتُفْرِقُوا فِي الْأَرْحَامِ مَا نَشَاءُ إِنَّ لِجَلِّ سَمْعٍ ثُمَّ نَعْرِجُكُمْ بِغُلَاقٍ ثُمَّ نَنْسِفْكُمْ إِلَىٰ أَرْضٍ تَرْجَعُ إِلَيْكُم مِّنْ بَيْنِ يَدَيْكُمْ وَإِلَىٰ أَرْضٍ آخَرَ لَعَلَّكُمْ تَعْلَمُونَ ﴿٥٠﴾

for an appointed term, then We bring you out as infants,^[1] then (give you growth) that you may reach your age of full strength. And among you there is he who dies (young), and among you there is he who is brought back to the miserable old age, so that he knows nothing after having known. And you see the earth barren, but when We send down water (rain) on it, it is stirred (to life), and it swells and puts forth every lovely kind (of growth).

سُبْحَانَ الَّذِي أَرْزَقُهَا حَامِدَةً قَدِ انزَلْنَا عَلَيْهَا الْمَاءَ غَدِغَتْ وَرَبَّتْ وَالْبُسْتِ بَيْنَ كَيْلٍ ذَرَعٍ يَبْرِجُ ﴿٥١﴾

(The Quran, Sura 22, verse 5)

Figure 5 - Proof of resurrection and the creation, birth and death of man (The Quran, Sura 22, verse 5).

sperm (in female embryo) fertilizes an ovum. Indeed, gender assignment at the time of fertilization can be inferred from the Quran (Figure 3). Fourth, the Quran describes stages of development after the soul (Ruh) is breathed into a human creation (Figure 4). A possible interpretation of this verse is the description of the stages of organogenesis and morphogenesis of the heart, auditory (future ear), and optic (future eye) vesicles that begin as early as 29 days after gestation (Table 1). Fifth, the purpose of the Hadith description of human creation, and ensoulment could very well be to confirm God's ultimate power on creation, and resurrection of life (Figure 5). Therefore, the specific description of the timeline of human creation in the Hadith can be interpreted as additional proof of the sanctity of God's creation from the time of conception until death. If medical utility drives changing the definition of the beginning of life from one based on science to one that is a social construct, then we risk minimizing the sanctity of life, and moral obligations afforded to the pre-ensoulment stages of God's creation of man. This has profound and serious consequences. It is important to note the distinct difference between the discussion of redefining the beginning of life as a social construct to justify using human embryos for medical purposes, and the permissibility of therapeutic abortion.

Similarly, at the end of life, the desire for procuring organs that are suitable for transplantation has played a major role in formulating a utilitarian definition of death and arbitrarily assigning an "exact" time of death or the departure of the soul from the physical body. Beginning in 1986, many began interpreting death as the irreversible cessation of all brain functions (brain death) in comatose persons on mechanical ventilation, who have spontaneously beating hearts, and normal body functions, thereby permitting terminal procurement of organs for transplantation.⁴ It is assumed that the soul departs from the physical body of a person who is in an irreversible coma because all brain functions have supposedly ceased. Advances in knowledge of human brain structure, and function have disproved this assumption and confirmed that persons who are in coma (and declared medically as brain dead) are not truly dead but continue to have residual brain functions because of a normal beating heart and circulation.⁵ Recent scientific evidence, which is consistent with the Quran, recognizes the linkage of human brain and beating hearts as signs of life (Figure 4).

We agree with Dr. Al-Aqeel that caution must be exercised when endorsing medical procedures founded on arbitrary definitions of life and death constructed for societal purposes. Lack of scientific validation of current definitions of human life, and death in reality means sanctioning actively ending a human life to save someone else's life. To argue in societal term of which is

the lesser of 2 harms or the potentially greater benefit of "saving lives" does not alter the nature of or defend the act of sacrificing a human life, and violating the sanctity of God's creation. Ultimately, even a good intention does not constitute a permission to commit an evil or immoral act.

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Reply from the Author

I appreciate Rady et al's contributions on the difficulties related to defining the religious perspective on therapeutic human embryonic stem cell research, and defining the beginning and, end of human life for such research, and for organ transplantation. I agree that the scientific knowledge on the human spirit, for example, soul (Rouh) and life and death is and will be deficient, as clearly stated in the Holy Quran, Suraha 17, verse 85 (Figure 2). There is no clear statement in the Holy Quran on the timing of "Nafkh Al Rouh" inspiration of the soul (spirit), although the islamic scholars (jurists) have agreed that it occurs after the "Modgha stage" when God says "then we brought it forth as another creation" (Figure 6)^{6,7} which has been agreed on by many islamic scholars to occur after 120 days embryonic age, from the time of conception.^{1,3,6-9} This is equal to 134 days gestational age (from the last menstrual period (LMP)). In the 120 days Hadith narrated by Abdullaha Ibin Masoud, which is in both Sahih Albukhari and Muslim,^{3,8-9} the inspiration of the soul, is mentioned, but in the 42 days hadith narrated by Hudhaifa bin Usaid,^{3,9}

14. Then We made the *Nutfah* into a clot (a piece of thick coagulated blood), then We made the clot into a little lump of flesh, then We made out of that little lump of flesh bones, then We clothed the bones with flesh, and then We brought it forth as another creation. So Blessed is Allāh, the Best of creators.

رُحْمًا نُّطْفَةً عَلَاقَةً فَخَلَقْنَا الْعَلَقَةَ مُضْغًا
فَخَلَقْنَا الْمُضْغَةَ عِظْمًا فَكَسَوْنَا الْعِظْمَ
لَحْمًا ثُمَّ أَنْشَأْنَاهُ خَلْقًا آخَرَ فَبَارِكْ لَكَ اللَّهُ
أَحْسَنُ الْخَالِقِينَ

(The Holy Qur'an 23:14)

Figure 6 - Embryo development. Zygote (nutfa); something that clings (implantation) ('alaqa); formation of somites-the appearance of the primitive streak-(mudgha), and the beginning of the formation of bone, and muscles. The inspiration of the soul "Rouh", when God says "Then We brought it Forth as a another Creation." of the primitive streak-(mudgha), and the beginning of the formation of bone, and muscles. The inspiration of the soul "Rouh", when God says "Then We brought it Forth as a another Creation."

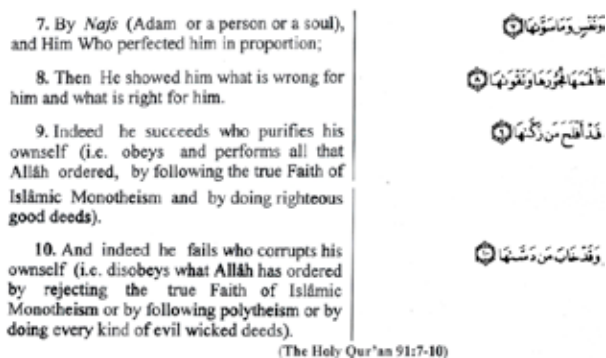


Figure 7 - The Holy Quran refers to the soul as “Nafis”.

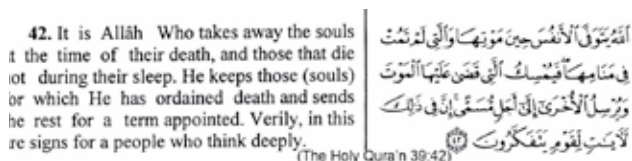


Figure 8 - The true death, and the small death during sleep.

which is narrated in 3 eligibly different narrations in Kitab Al-Qadar,³ there is no mention of breathing of the soul. But in one of these narrations it mentions the creation of hearing, vision, skin, flesh, bone, and gender at 42 days, so it mainly refers to organogenesis, which takes place after the Modgha stage at the third week of embryonic age with formation of all organs at 6-7 weeks of embryonic age (42-45 days).^{8,9} However, there is no consistent agreement by islamic scholars about gender assignment and its relationship to the inspiration of the soul.^{8,9} It is also important to note that sanctity of God’s creation is from the time of conception in utero until death. Therefore, sanctity for the developing embryo and then the fetus increases once it is implanted in the uterus and it is culminated once the soul is breathed in.^{1,3,6-9} However, dealing with left over zygotes or excess embryos (from in vitro fertilization laboratories) at 3-4 days of embryonic age in a test tube or petri dish should not be considered as embryos since they are not already in the uterus and not implanted yet. Therefore, they have little sanctity.¹ The soul “Al Rouh” is mentioned in the Holy Quran as “Nafis” which has its own identity and characteristics, as it is evident in several verses in the Holy Quran sura 39, verse 42, sura 89, verse 27-29, sura 91, verse 7-10 (Figures 7-8). The departure of the soul from the physical body occurs during true death

and sleep, which is considered as a small death, the Holy Quran, Suraha 39: verse 42 (Figure 8). In true death, the soul departs totally from inside and outside the physical body with cessation of all functions. But in sleep (small or gradual death) there is departure of the soul from the outside of the physical body in some aspects with no departure from the inside, as a sleeping person is disconnected from the outside world, but all his physiological functions are working. However, by most islamic scholars brain death is considered a sign of death in a comatose person. Since brain function cannot be resumed except if a person is alive, which is a function of the soul, which nobody knows exactly what it is or how it works except “God” (figure 2). This leads us to further thinking and belief of the only God and of resurrection.¹⁰

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