

Guest Editorial

A COMMENT ON POLEMICS ABOUT THE COMMENCEMENT OF INDIVIDUAL HUMAN LIFE

In simple terms we all know what a life is, but we still are in search to define the starting point of life during human development. The society has different intellectual strata, which shape the development of collective thinking and knowledge as a whole and use of that knowledge for the betterment of human life in particular. Philosophy, ethics, religion, law and science are to name a few of them. On most of the issues the opinions are not the same among them. One of the issues on which the opinions are divided among these groups is the time of commencement of life. Not only different groups have different opinions, even in the scientific community, there is no unanimous agreement on this issue.

But the question arises as to why we need to define the time of commencement of life? One of the major reasons why the debate is continuing for many a years is *abortion*. The issue of abortion is a macroscopic reality today. Also, we are presently in an era of medical science when we talk about cloning, use of stem cells for therapeutic purposes, in vitro fertilization, embryo transfer and organ transplantation. These are the issues, which are closely linked with the ethics of defining the viability of the life form. Again, viability and commencement of life are issues directly related.

As far as the issue of abortion is concerned, the ongoing debate between 'Pro-lifers' and 'Pro-choicers' converge on to the definition of 'Personhood' and 'Humanity'. These groups look on to the medical scientific community for these definitions. Medical science finds itself in a tight fix to answer these questions because these terms are used and defined by the society rather than science. But the issue of defining the onset of life is well within the prerogative of medical science. There are many views on this subject and they depend on what aspect of life one privileges to discuss.

According to one view, which may be called biological or metabolic view, the gametes, sperm cells and egg cells are as alive as any other organism, since they exhibit the property of metabolism and excitability, which are two of the common properties of any living being. However, the process of fertilization heralds the beginning of a new life form. Their argument is based on the fact that this is the time when the genes from the two parents combine to form an individual with unique properties. Their view is argued

upon by other group of scientists, which advocate ovo-implantation as the beginning of life. They consider this as the most vital event because the attachment of the embryo into the maternal uterine wall is the beginning of a series of events, which are vital for its growth and development (1).

The earliest stages of development in most animals, including the few mammalian species that have been investigated, are regulated by maternally inherited information. Dependence on expression of the embryogenic genome cannot be detected until the mid two-cell stage in the mouse, the four-cell stage in the pig and the eight-cell stage in the sheep. Information about the timing of activation of the embryonic genome in the humans is of relevance not only because gene activation signals one of the most important landmarks of development of life, but also to the therapeutic practice of *in vitro* fertilization and embryo transfer, which also is a matter of ethical debate. The first two cycles of human embryogenesis are reportedly regulated at the post-transcriptional level, utilizing maternally inherited information. Activation of embryogenic genome takes place between the four and eight cell stages and is essential, if both synthesis of proteins and further cleavage are to occur (2).

One group of scientists feel that the issue of commencement of life is closely linked with the definition of death. They argue that if one set of criteria is used to define death, could it also be used to define life? Till 1960's, death used to be defined by the cessation of the heartbeat. A stopped heart was a clear sign

of death. Physicians now use more rigorous criteria of death : brain wave activity. A flat electroencephalogram (EEG) is one of the most important criteria used to determine death. The scientists who follow this neurological view think that the acquisition of the human EEG should be taken as the beginning of an individual's life.

The buck does not stop here, as there is a difference of opinions regarding the onset of brain wave activity, in true physiological sense, in fetuses. Only 40 days after fertilization electrical waves as measured by EEG can reportedly be recorded from the human fetus brain (3). In one study, detailed EEG recordings were taken from the human embryos at 40 odd days of gestation, recovered from termination of pregnancies (4). It showed irregular slow waves, 0.2–2 per second, at 10–90 microvolt with superimposed fine waves of 30–40 per second, at 1–5 microvolt. Contrary to what Okamoto and Kirikae found, however, in modern EEG studies “normal sleep spindles” are not seen in premature babies before 30–35 weeks. This makes it likely that Okamoto and Kirikae's readings were mostly artifacts. In fact, most neurologists assume that the electrical activity in the first trimester represents random neuronal firings as nerves connect. It is now shown that, neural connections start to establish between the cortex and the thalamus during the period of 22–24 weeks of gestation. By the 27th week, fetal EEG recording shows well-organized activity that partly overlaps with the brain activity. By the 32nd week, the fetal brain pattern is close to identical to that of a full term baby.

Putting aside the matter of full brain activity in the fetus, the questions arise: how reliable is brain activity as a parameter of commencement of individual life? Can we define commencement of life in terms of consciousness in general and brain activity in particular?

According to one view individual human life begins only when it can exist separately from its maternal biological environment. The natural limit of viability occurs when the lungs mature, but technological advances can now enable a premature fetus to survive at about 25 weeks gestation. Some of the scientists who follow the immunological view see the beginning of human life when the organism recognizes the distinction between self and non-self. One other view takes into consideration the integrated physiological perspective of life. They are of the opinion that the human life begins when it has become independent of the mother and has its own functioning

circulatory, alimentary, and respiratory systems.

The emergence of element Carbon is considered as the most vital event for commencement of life on earth. But there is a difference of opinion as to which event can be taken as the time point for commencement of an individual life. This difference in opinion stems from the fact that different groups accept different criterion as the most vital event in the development of human life form. These differences in opinions make it difficult to pinpoint a single event in the developmental process of humans to define the commencement of life. Can we have a single time point in the developmental process for a valid definition of initiation of individual life? Or, should we have separate set of criteria for different needs. This question is till unanswered and leaves ample room for open debate among different groups.

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