AUC: Asian Journal of Religious Studies
AJRS 60/2 Mar 2015, P-ISSN 2249 –1503 29-35

The Power and Problem of Stem Cells in Regenerative Medicine

J. Charles Davis[1]
Jnana-Deepa Vidyapeeth, Pune 411014

"With regard to fundamental organismal existence (and inviolable moral standing), the act of fertilization is a leap from zero to everything." William B. Hurlbut[2]

An ancient Greek myth informs us that Prometheus transgressed the law of the gods when he gave fire to humanity. As a punishment for his act, he was chained to a rock, and an eagle was sent every day to eat his liver.

[1] The author teaches Bioethics and Social Ethics at Jnana-Deepa Vidyapeeth, Pune. For a detailed study on this subject, please see J. Charles Davis, *The Ethics of Human Embryonic Stem Cell Research: Proposals for a Legal Framework for India* (New Delhi: Atlantic Publishers and Distributors Ltd. 2014); also "Embryos: Humans or Biomaterials? Ethics and Law," in Scaria Kannizakonil (ed.), *New Horizons in Christian Ethics: Reflections from India* (Bangalore: ATC, 2014): 411-430.

[2] William B. Hurlbut, "Framing the Future: Embryonic Stem Cells, Ethics and the Emerging Era of Developmental Biology," *PediatricResearch* 59: 4/2 (April 2006): 4R-12R, 8R.

However, his liver regenerated during the night and he survived.[3] This idea of regeneration has been in history for quite some centuries. The regenerative medicine has the goal to develop a form of medical therapy that regenerates the damaged tissues. Regenerative medicine can not only stop the deterioration but also provide the power of organ renewal. For example, the damaged heart muscle can be regenerated or renewed with healthy heart muscle. This is exactly the promise of embryonic pluripotent stem cells.

The use of stem cells raised high hopes in diagnosis and treatment of incurable diseases in a predictable span of time. Scientists conceived the idea to regenerate not only the heart but also the brain, pancreas, liver, and spinal nervous system. It is a marvellous science certainly. What are stem cells? Stem cells are those cells that can make more cells. They are the progenitor cells from which tissues stem. They are unspecialized or undifferentiated cells which are not yet assigned to specific tasks and can thus in principle give rise to many different specific cell tissue types such as skin, liver, kidney, heart, etc. They are thus originator cells that can give rise to multiple tissue types. They "have the unique property of being able to either reproduce themselves (a process called self-renewal) or differentiate into a variety of more specialized cells."[4]

---

[3] Steinar Funderud, "Stem Cells: Sources and Clinical Applications," in: Lars Østnor (ed.), *Stem Cells, Human Embryos and Ethics:Interdisciplinary Perspectives* (Norway: Springer, 2008), 21.

[4] Canadian Institutes of Health Research, Human Stem Cell Research, *Opportunities for Health and Ethical Perspective: A Discussion Paper* (Ottawa: CIHR, 2001), 1.

There are generally two types of stem cells: embryonic stem cells and adult stem cells such as nerve or bone marrow stem cells. The history of research with adult stem cells began around 1960s, when researchers discovered stem cells in the bone marrow. Since then, many more adult stem cells have been identified in many parts of the body and are being used in research as well as in clinical application to cure diseases. The success stories of using adult stem cells are many and are non-controversial and scientists are encouraged to carry on. Umbilical cord blood also contains stem cells and research with them does not involve any ethical controversy either. However, human embryonic stem cell (hESC) research raises an ethical problem, because *embryos die while extracting their inner cell mass* which contain embryonic stem cells.

A fertilized egg is totipotent. It means it is totally potent. It can become all cell tissues of the body including forming a complete organism. If a totipotent cell is implanted into the womb of a mother, it will grow into a baby. Pluripotent stem cells are capable of giving rise to all tissues of the body except forming an embryo. They cannot form a baby if implanted into the womb, because they are unable to give rise to extraembryonic tissues like placenta which are essential for fetal development. Multipotent stem cells are present in born individuals. They are also called somatic stem cells. Their potential lineages are less plastic and more determined. They can produce tissues of specific types. These are found in our mature human body and in the umbilical cord blood. They can no longer become all but a few types of tissues.

A unipotent stem cell is capable of creating only one kind of tissue.

The plasticity of adult stem cells is far less than that of the embryonic stem cells. Embryonic stem cells can be also cultured in large numbers. Their capacity for self-renewal and multiplication is higher. However, a potential advantage of using stem cells from an adult or umbilical cord blood is that the patient´s own cells could be harvested in culture and then reintroduced into the patient. The use of one´s own stem cells in therapy would not be rejected by the immune system. The use of embryonic stem cells can cause immuno-incompatibility and would need immunosuppressive drugs. Transplant rejection is possible in implant of alien tissues.

Scientists postulated to achieve new insights with the use of embryonic stem cells not only for basic research in discovering (mal)developments of cells, but also for unearthing new opportunities in drug testing or regenerative cell therapies in medicine for incurable diseases, such as, Alzheimer´s and Parkinson´s. Proponents argue that IVF surplus embryos can be used for research because there are high-ranking noble goals, while opponents argue that embryos are humans who cannot be instrumentalized as a mere means to any end.

The surplus embryos do not turn to be objects because they are not implanted. The status of non-implantation itself is a moral wrong, since the original intention was to get a baby. Since they are no more required or anyway they are going to be discarded from cryopreservation, does it mean that they become objects? In the first place, creating more embryos than required is wrong. In the Catholic Church, the very use of IVF for getting babies is

wrong, since it attacks the very definition and purpose of marriage. And IVF brings out a baby as a "product" rather than a gift of God. One should not forget that only God creates and humans only beget.

The developmental biology asserts the statement of Hurlbut that the act of fertilization is a leap from zero to everything. With the joining of gametes, namely, the sperm and the ovum, a new being comes into existence. It is a complete living organism, which is integrated, self-developing and self-maintaining unity under inbuilt immanent plan. Nothing is added to the ontological and moral status of the embryo, except nutrition, warmth and place that even an adult human being needs for development.

As Jerome Lejune, a developmental geneticist, Nobel Prize laureate states, "Each of us has a unique beginning, the moment of conception. As soon as the 23 chromosomes carried by the sperm encounter the 23 chromosomes carried by the ovum, the whole information necessary and sufficient to spell out all the characteristics of the new being is gathered, a new being is defined which has never occurred before and will never occur again… It is a very specialized individual."[5] This human individual that begins the existence at conception or fertilization develops itself as human and never unto human.

[5] Jerome Lejeune gave his testimony in *Davis* vs *Davis*, Circuit Court for Blount County, State of Tennessee at Maryville, Tennessee, 1989. Reprinted in: Martin Palmer (ed.), *A Symphony of the preborn child: Part Two* (Hagertown, MD: NAACP, 1989), 9-10.

A fertilized egg is a human being, which has inbuilt natural provisions for development after nuclei have emerged. There is really no difference between a human being and human person. Were we not humans at some point of time or when we were embryos and how can a non-human turn into a human? Social and legal functions; qualities and abilities, which can vary according to persons, cannot be used to justify a graded moral status to any human being including the unborn humans.

The media have oversold the promises of pluripotent embryonic stem cell research, whereas there are not even one successful therapy of using embryonic stem cells, while there are thousands of success stories with the use of adult stem cells. In fact, there have been adverse results with the use of embryonic stem cells. For example, after embryonic stem cell treatment to cure a brain tumour, the patient grew into a monster. To-date the pluripotent embryonic stem cell research is only a promise. The promise of regenerative treatment for almost all diseases with the use of stem cells obtained from human embryo that first began in 1988 has also caused many countries to spend billions of money, but it has not achieved any success. On the other hand, adult stem cells have been promising and result-giving. The latest induced Pluripotent Stem (iPS) Cell research is great alternative besides adult and umbilical cord blood stem cells, which are ethically non-problematic.

In the induced Pluripotent Stem Cell research, an adult cell of the human body can be reprogrammed to an embryo-like stage, from which pluripotent stem cells can be obtained. This research is still in the process of achieving its goal. The co-winner of Nobel Prize for Medicine for his discovery of iPS cells, said the following after looking at an embryo through a microscope: “When I saw the embryo, I

suddenly realized there was such a small difference between it and my daughters.. There is no way now to get around some use of embryos, but my goal is to avoid using them."[6]

An unborn human embryo, whether in vivo or in vitro, is always human and a human. He is an individual and a member of human species. He grows as human and as a human and as a human individual and not unto human or unto a human or unto a member of any other species other than *homo sapiens*. No human embryo should ever be used as a mere means even for a noble cause. Dignity is intrinsic to humans from the moment of conception. Dignity is inviolable. In religious sense, dignity is also described as sanctity. This dignity or sanctity is at all-time present in human existence.

Science and technologies have limits. Scientific freedom is not unlimited. No medical ethics teaches that one human life should be saved at the cost of killing another life. The principle *first do no harm* (*primum nil nocere* –non-maleficence) has precedence over the principle of doing good (beneficence). In India, embryonic stem cell research is booming without binding legislations. In country like India, where basic health care is not adequately given to all, unethical researches costing billions of rupees must be legally stopped. A society will perish sooner than later without ethic

[6] Martin Fackler, Risk Taking is in His Genes, *The New York Times* (December 11, 2007).