ETHICS OF GENETIC ENGINEERING OF ARTIFICIAL CELL:
A philosophical analysis of latest scientific creation of Artificial Cell

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ABSTRACT

It was a marvellous achievement of the scientific world that the long term dream of the scientist to produce Life artificially was successful in the year of 2018.In this synthetic biological experiment scientist has succeeded in incorporating the simple form of metabolic function into microscopically small droplets, producing first ever artificial cell in the whole human history. Early in this year there was news that the international scientists are moving closer to create an artificial embryo in the future. Scientists says that the new discoveries are the prospect to solve many of the experimental dilemmas including the origin of life, evolution etc but still creating life artificially is exposition a lot of ethical issues which has to be studied much deeply. So this article gives certain glimpses into the latest findings of artificial cell.

Key words

Artificial cells, JCV1-syn 3.0, Lego block, Playing God, Patenting of Life, Ethical framework.

Life is a process of metabolic activities in which the living organism gain energy through breakup or break down of substances. The metabolic activities are necessary for the life to sustain and grow. This property is basically used in the synthesis of artificial cells. Thus the artificial cell is an engineered cell which resembles function of a real biological cell. Mainly there are two methods used in the making of artificial cells. In one method scientists integrate a metabolism into a space that is separated off from the environment. Here the artificial cell consists of nothing other than microscopically small water droplet which was formed in oil. They serve as artificial cell separated off from the environment by a membrane. The scientists then add different molecular components into the interior of this droplet which will indeed stimulate a metabolic reaction. In the second method, the synthetic biologist uses a real organism where they use the genetic technology in order to modify and equip the cell with new functions and properties.

When we analyse the history of scientific creation of artificial cell, it was with the effort of J.Craig Venter and his team that the first ever creation of this successful innovation happened. His team created an artificial cell of mycoplasma with a minimal genome in the laboratory and was named as JCV1-

syn 3.0. It contains about 531560 base pairs and 473 genes. It has become the smallest artificial genome ever created. They transplanted it with the living cell whose genome lost and is now viable and self propagating. In 2018 the scientist created a 'Lego block' artificial cell that can kill bacteria. The peculiarity is that this cell can sense, react and interact with bacteria and can even kill it with little dependency on their environment. As if now this artificial cell though mimic the essential features of living cells but are short living and cannot divide or reproduce them. Scientist hopes that it may be infused into patients to tackle infections resistant to other treatments. They may also be used to deliver drugs at the specific location and time or used as biosensors.

As far as the new research is concerned it is likely to impose a great step in the bio molecular research and experiments basically in the field of medical research. But playing with life always poses certain ethical concern. First and foremost what is the meaning of Life? Simply we owe the distinction of life as that cell which can reproduce and response to various external stimuli. But can these cells grow and reproduce in normal way or should we pose certain artificial conditions for their growth. The concern is the unimaginable potential risk poses by these artificial cells. When scientists engenders a new life form there is no study about what it is going to do or turn out to be. So specific systematic study about the consequences of artificial cells should be there. i.e., there should not be a rush to release it into the natural environment without the proper evaluations about the net result it causes to the external environment. Everything lives in this ecosystem is so balanced and that any imbalance will directly affect the balance of ecosystem altogether.

This technology is new and has immense potentiality to be used for the beneficial purpose both in the field of medicine and also in therapeutic researches, but still there are many concern about this new innovation that should be sorted out in order to get maximum benefits from these researches. Many of the extrinsic concern are based on doubt about the technology, its possibilities, and newness and about the implications to all forms of life. Besides, there is even a fear that the human misuse will go beyond the limit and will use it for distraction activities including the bio war fare. Individual ethics is very important in every technological development. Scientist should possess higher values and morals in their life in order to draw maximum benefits from all the research developments.

For most concern is about the human misuses is whether he will use this technology for commercialisation and profit making. Many of the drug industries have been dragging human life as a mere commercial market commodity. So the most important ethical concern will be the issue of Patenting of Life. Another concern is the possibility of crossing Natural species boundaries in creating new life form and inventing a new world through creating artificial life developments. It may disrupts the balance and integrity of Nature and will directly or indirectly will harm the balance of our ecosystem. Another concern is the fear that it could be misused for cloning purposes[i] and will result in the making of genetically enhanced designer babies and in the future it will result in choice and selection of characters of newly born babies including its

shape, size, colour and even the gender. Technically, in the spiritual sphere, the phenomena of experimenting with life are known by the name 'Playing God' and along with that it point towards the parents right to reproductive freedom or procreative liberty[ii].

But when analysed deeply, can creating a minimal genome and inserting that into a recipient cell is it making a new life. In the field of agricultural practices, for generations and generations, farmers are using stem cuttings for propagating new generation of yield variety against the natural cause of planting seeds. Is this playing with God? A scientist says that JCV1-syn 3.0 is not a synthetic form of life but a synthetic genome inserted into a naturally occurring cell. Also it is very important to study and understand on how the cells grow, divide and self replicate since it possesses a far reaching application in the field of agriculture and health care system. It will be helpful for waste management problems and cleaning of toxic industrial effluents. Also the synthetic bugs can be used for producing enzymes which can degrade toxic as well as plastic wastes. Artificial cells with immobilized or insoluble haemoglobin can provide effective solution as oxygen carriers, which can engineered to bear genes to boost immunity and disease resistance.

Scientific innovations and temper should not block in its initial stages of research. Renowned physicist Richard Feynman's statement that what I cannot create, I don't understand, is very important in this context. We should support and develop all the scientific revolution not by blocking it with strict ethical questions but by making it advance by framing it under the support of ethical values and norms. Concentration should be on developing a deep moral sense among the scientists involved in these researches and also in developing a comprehensive ethical framework for free research work. So with the latest development of researches in artificial intelligence and gene editing, artificial cell can be used as a potential tool for all our future developmental activities of human being including the health care, agriculture and pollution control.

[i] Michael J. Reiss, and Roger Straughan , *Improving Nature ? : The Science and Ethics of Genetic Engineering* (1996; rpt.Cambridge: Cambridge University Press, 2002),p.53-54.
[ii] Ruth Chadwick. ed., *The Concise Encyclopedia of the Ethics of New Technologies* (New York :Academic Press,2001),p56