

ARTIFICIAL EMBRYO

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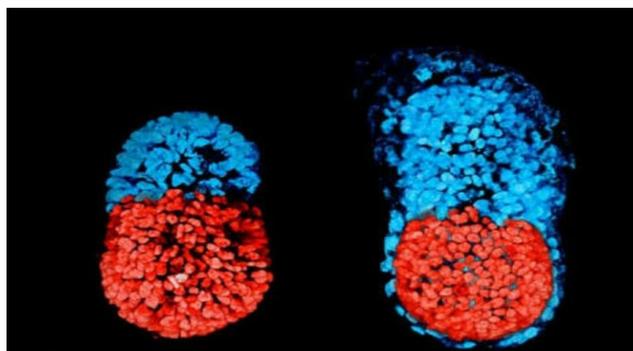
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ABSTRACT

ARTIFICIAL EMBRYO has been described as a ‘master piece’ in bioengineering, which could eventually allow scientists to grow artificial human embryos in the lab without the need for a sperm or an egg. After scientists successfully created a mammal embryo using only stem cells, artificial human life could soon be grown in the lab. Early stages of human life could be studied by the researchers by Growing embryos. They could understand why so many pregnancies fail, but is likely to prove controversial and raise ethical questions about what constitutes human life.

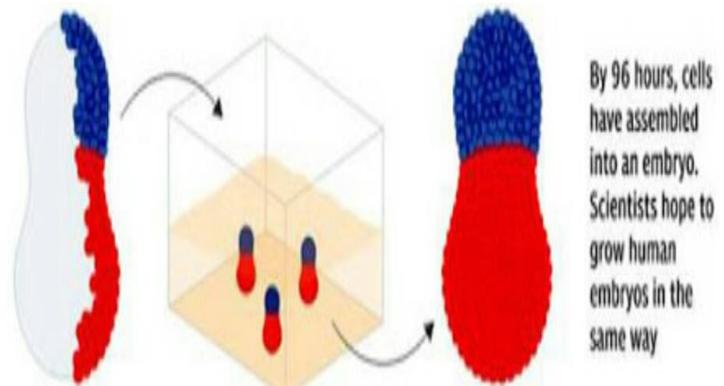
HOW ARTIFICIAL EMBRYO IS CULTURED?

The embryonic stem cells were taken and grown along with trophoblast stem cells which produce placenta. After growing the two types of cells separately, they combined them in a gel matrix and develop together. Four days later, the embryos began to resemble normal mouse embryos. Additional types of cells will likely need to be added to the mix in order for the embryos to actually start developing organs. The Cambridge researchers, for example, engineered different cell type to glow different colors so that they might track how they behave as the embryo develops. The work provided insight into how those two types of cells work together to form the blue print for the mouse body.



BODY PLAN

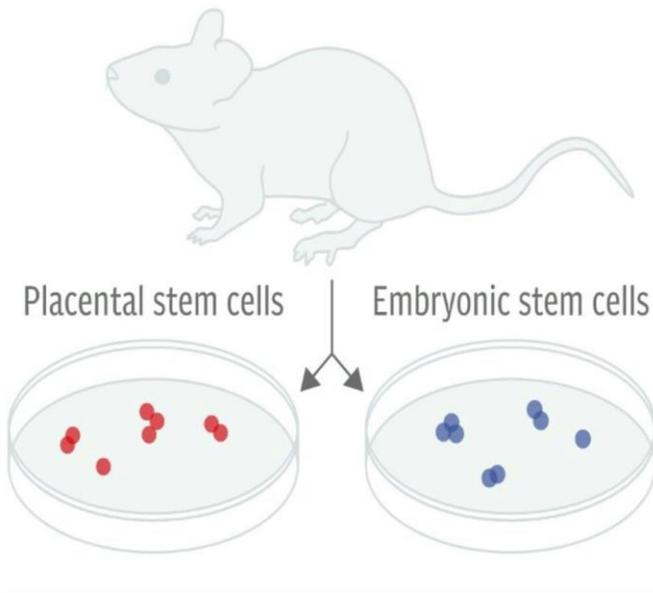
The embryos organize themselves and grow by artificial embryos which provides new insights. They engineered the artificial embryos so the cell types fluoresced in different colors, to reveal their movement and behavior as the embryos go through crucial changes. Mammal embryos developed as a symmetrical ball, then it elongates and forms a central cavity then that starts developing a type of cell layer called mesoderm, which ultimately goes on to form bone and muscle. The embryos lack two other types of cell layer required to develop the bodies’ organs: ECTODERM which forms skin and the central nervous system, and ENDODERM which makes our internal organs.



These types of cell layers develop in future experiments by adding stem cells that normally form the yolk sac, a third structure involved in embryonic development to the mix.

ARTIFICIAL LIFE IN LAB

The stem cells are mixed and placed on a 3D scaffolds are grown in a tank containing a culture medium- a special nutritious soup. A mouse embryos forms which is closely resembles the development and natural architecture of a real embryo. By 96 hours, cells have assembled into an embryo. Likewise human embryos are possible. “They are very optimistic that this will allow as studying key events of this critical stage of human development without actually having to work on (IVF) embryos. Knowing how development normally occurs will allow understanding why it is so often goes wrong”.



The embryo were created using genetically engineered stem cells coupled with extra embryonic trophoblast stem cells (TSCs) which forms the placenta in normal pregnancy. Previous attempts by using only one kind of stem cell to grow embryos proved unsuccessful because the cells would not assemble the correct positions. Then they added the second ‘placental’ stem cells, they two types began to interact with each other and forms an embryonic structure, with two distinct clusters of cell at each end and cavity in the middle which helps the embryo to develop.

IMPACTS OF ARTIFICIAL EMBRYO

Currently scientists can carry out experiments on leftover embryos from IVF treatments, but they are in short supply and must be destroyed after 14 days. Scientists say that being able to create unlimited numbers of artificial embryos in the lab could speed up research while potentially removing some of the ethical boundaries. It will be possible to mimic a lot of the developmental events occurring before 14 days using human stem cells using a similar approach to our technique using mouse stem cells.