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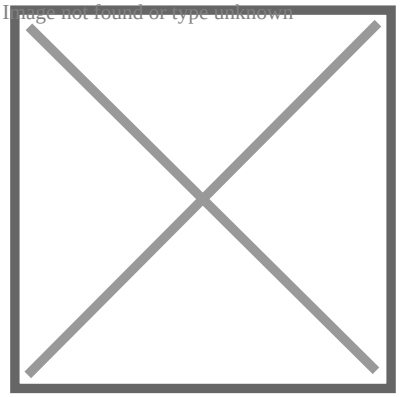

Genetic Scientists Create World’s First ‘Synthetic Embryos’

Description

Forget eggs, sperm, fertilization and sex for procreation. This is straight out of Huxley’s Brave New World, written in 1932 and looking into the face of Technocracy. Pregnancy was forbidden as genetically engineered babies were created in test tubes and “birthed” in incubators. Forget eggs, sperm and fertilization. ? TN Editor

Researchers use stem cells from mice to form embryo-like structures with intestinal tract, beginnings of a brain, and a beating heart

Researchers have created the world’s first “synthetic embryos” in a groundbreaking feat that bypassed the need for sperm, eggs and fertilisation.

Scientists at the Weizmann Institute in Israel found that stem cells from mice could be made to self-assemble into early embryo-like structures with an intestinal tract, the beginnings of a brain, and a beating heart.

Known as synthetic embryos because they are created without fertilised eggs, the living structures are expected, in the near term, to drive deeper understanding of how organs and tissues form during the development of natural embryos.

But researchers believe the work could also reduce animal experimentation and ultimately pave the way for new sources of cells and tissues for human transplantation. For example, skin cells from a leukaemia patient could potentially be transformed into bone marrow stem cells to treat their condition.

“Remarkably, we show that embryonic stem cells generate whole synthetic embryos, meaning this includes the placenta and yolk sac surrounding the embryo,” said Prof Jacob Hanna, who led the effort. “We are truly excited about this work and its implications.” The work is published in Cell.

Last year, the same team described how they had built a mechanical womb that enabled natural mouse embryos to grow outside the uterus for several days. In the latest work, the same device was used to nurture mouse stem cells for more than a week, nearly half the gestation time for a mouse.

Some of the cells were pre-treated with chemicals, which switched on genetic programmes to develop into placenta or yolk sac, while others developed without intervention into organs and other tissues.

While most of the stem cells failed to form embryo-like structures, about 0.5% combined into little balls that grew distinct tissues and organs. When compared with natural mouse embryos, the synthetic embryos were 95% the same in terms of their internal structure and the genetic profiles of the cells. As far as the scientists could tell, the organs that formed were functional.

Hanna said synthetic embryos were not “real” embryos and did not have the potential to develop into live animals, or at least they hadn’t when they had been transplanted into the wombs of female mice. He has founded a company called Renewal Bio that aims to grow human synthetic embryos to provide tissues and cells for medical conditions.

“In Israel and many other countries, such as the US and the UK, it is legal and we have ethical approval to do this with human-induced pluripotent stem cells. This is providing an ethical and technical alternative to the use of embryos,” Hanna said.

Dr James Briscoe, a principal group leader at the Francis Crick Institute in London, who was not involved in the research, said it was important to discuss how best to regulate the work before human synthetic embryos were developed.

“Synthetic human embryos are not an immediate prospect. We know less about human embryos than mouse embryos and the inefficiency of the mouse synthetic embryos suggests that translating the findings to human requires further development,” Briscoe said.

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