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Description

In 1984, scientists at the Wistar Institute of Anatomy and Biology remove and replace genetic material in mice eggs through ova transplants -- a process that could be duplicated in humans.

Keywords

Egg, Ovum, Ova, Ovum Transplant, Mice, Mouse Egg, Fertilize, Fertilization, Sperm, Conception, Cell, Cellular Material, DNA, Information, Instructions, Genetic Instuction, Divide, Cell Division, Genetic Material, Remove, Replace, Insert, Glass Needle, Microscope, Merge, Virus, Pronuclei, Pronucleus, Foster Egg, Host Egg, Implant, Black Mouse, White Mouse, Application, Human, Mammalian Eggs, Genetic Defect, Genetic Disease, Cloning, Human Cloning, Exact Copy, Dr. Davor Solter, Dr. James McGrath, Wistar Institute of Anatomy and Biology, Philadelphia, Pennsylvania, Genes, Genetics, Genetic Engineering, Biology
Ovum Transplantation in 1984 Leads to Questions of Cloning

BRAYNT GUMBLE, anchor:

Our science correspondent Robert Bazell has joined us up here this morning to bring us a report on eggs, mouse eggs, and how scientists are manipulating them to learn some of the most basic processes of life. How so Bob?

ROBERT BAZELL, reporting:

Well Bryant, any day now in California a baby will be born as a result of something called an ovum transplant. An egg from one woman was fertilized and placed in a second woman who will actually give birth. That technique would have been considered impossible just a few years ago. But if we look at some of the things researchers are doing with animals now, we get some idea of the possibilities that lie ahead. This is the moment when life begins. The sperm enters a human egg. One of the most important questions of biology, perhaps the most important question, is where is the information in this tiny cell which gives the instructions for it first to divide again and again, and eventually become a living creature. At the Wistar Institute of Anatomy and Biology in Philadelphia, Dr. Davor Solter has developed a system in mice, which may answer one crucial aspect of that question. How much of the information comes from the genes of the mother and father, and how much comes from the cellular material of the mother’s egg? Dr. James McGrath, a colleague of Dr. Solter’s, performs the procedure. Generally handling mouse eggs under a microscope. First he takes an egg from one of these mice, a strain of genetically identical animals, which are white. Holding the egg with a small suction device, he inserts a tiny glass needle. The egg was fertilized a few hours before and it contains two small bodies called pro-nuclei, one containing the father’s genes, the other the mother’s genes. He sucks out both pro-nuclei, and withdraws the needle, leaving an
egg with no genetic material. Next, he takes an egg from one of this strain of black mice. From this egg he also takes out the pro-nuclei. He then puts these pro-nuclei, which contain the genes from the black mice, into the egg from the white mice. The pro-nuclei do not merge into the foster egg on their own. To help them along, he adds a solution containing a special virus, and inserts this into the egg along with the pro-nuclei. After about ten minutes, the virus makes the pro-nuclei merge into the host egg, and in a few hours, it will begin to divide. So what the scientists have done is taken a fertilized egg from a white mouse, discarded the genetic material inside, and replaced it with the genetic material from a black mouse. This egg is then put into the womb of a third mouse, and eventually, this is what develops – a black mouse. But what the scientists are studying is how different is this black mouse from the others? In other words, how much was it changed because the egg came from a different strain? In the future, Dr. Solter hopes to accomplish an even more difficult task.

DR. DAVOR SOLTER (Wistar Institute of Anatomy and Biology, Philadelphia): The ultimate goal of any such procedure would be what people call cloning. And the cloning has maybe practical applications but it certainly has important theoretical applications.

BAZELL: Cloning would involve taking genetic material from an adult and putting it inside an egg to make a exact copy of that adult. The scientists are not sure yet whether they can do that.

GUMBLE: Bob that’s a fascinating report, but the danger with that kind of thing always is to overstate the potential for it. How close does that get us to what we’ve commonly called cloning?

BAZELL: Well it doesn’t get there because cloning would be taking, for instance if somebody wanted to make a clone of you, they would take a cell from someplace in your body, your skin or something, put it into an egg, like the eggs we saw there where all the genetic material had been taken out, and then that would develop into an exact copy of you.

GUMBLE: Uh huh.

BAZELL: That has not been done even with animals, let alone with you, I haven’t seen any other

GUMBLE: Uh huh.

BAZELL: Copies of you walking around here, but the point is that is a long way off, although the scientists think it probably is not impossible. One of the things to keep in mind with the sort of things you’re seeing there is that a mouse egg is almost identical to a human egg.

GUMBLE: Well I was going to ask you what the similarities were and what are the major differences between a mouse egg and a human egg.

BAZELL: Almost none. All mammalian eggs are just about the same, so the kind of manipulations that they’re learning to do now with animals have the potential of being applied to human beings. Now that’s not all bad, I mean because people raise the possibilities of cloning and all these horrible things, but if they could, if it would be feasible to take an egg for instance from somebody with some kind of genetic defect, genetic disease, and correct it, put it back in the woman and have a normal child grow up, obviously that would be a very strong benefit.

GUMBLE: Was that experiment we saw, that successful experiment, was that the norm or the exception, I mean is that something now being commonly done?

BAZELL: No. This group at Wistar Institute in Philadelphia has just developed that technique, and the
magic of it is that business where they put a virus, a usable infectious agent, which for some reason that
isn’t really understood, makes the genetic material merge inside. And that’s the kind of things, the kind of
tinkering they have to be able to do to accomplish this.

GUMBLED: But again, we’re a ways off from even attempting that to humans, and let no one walk away
from this saying hey I saw a report that says we’re right around the corner from cloning.

BAZELL: Oh absolutely, and if it were to be attempted I think a lot of people would have a lot to say
about it.

GUMBLED. Yea. We would, we would definitely have something to say. Okay Bob Bazell, thank you.