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## Scientists Genetically Engineer a Monkey

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By Maggie Fox, Health and Science Correspondent

WASHINGTON (Reuters) - Scientists say they have genetically engineered a monkey, the closest relative yet to a human to be genetically altered, in a step that could hasten the development of cures for diseases ranging from cancer to Alzheimer's.

The baby rhesus monkey is named ANDi, backward for "inserted DNA," and looks like any other baby monkey, said Gerald Schatten and colleagues of the Oregon Regional Primate Research Center at the Oregon Health Sciences University.

"ANDi is robust and plays normally with his two roommates," said Schatten's team, who reported the achievement in Friday's issue of the journal *Science*.

Many animals have been genetically engineered. Flocks of genetically modified sheep produce human proteins for use in the drug industry and genetically engineered bacteria and yeast routinely provide human proteins such as insulin.

Mice carrying human genes are used to study cancer, heart disease and many other conditions.

But until now no one had managed to put a new gene into a primate, the class of mammals that includes humans.

"We think it's a special step," Schatten, whose team developed the first cloned monkey in 2000, said in a telephone interview.

The extra gene that ANDi carries does not do much. Called GFP

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for green fluorescent protein, it is taken from jellyfish and is often used as a "marker" gene because cells containing it can be seen glowing under a special microscope.

Schatten stressed that ANDi is not green. "These are not Day-Glo monkeys," he said.

The idea is to engineer monkeys with genes known to cause disease in humans. Perhaps these monkeys could even be cloned, so that exact copies could be used to study drugs and other potential treatments without having to factor in genetic variation, Schatten said.

Mice are already used in this way but are not always similar enough to humans to be good models.

"If you are a mouse with Alzheimer's, there are very good vaccines available. But long before we would want to help (former) President (Ronald) Reagan, (who suffers from Alzheimer's), we'd want know that those vaccines could be optimized," Schatten said.

#### BRIDGING GAP BETWEEN MICE AND MEN

"The world may be ready for some specially bred monkeys that literally bridge the gap between mice and people."

Monkeys are much closer to humans than mice are, he said. "Animals that don't have monthly cycles don't suffer from breast cancer like women," he said. "That is why we think a limited number of specially bred monkeys could help us eliminate cancers."

Schatten said he does not want to breed hundreds and hundreds of monkeys for medical research.

"We wouldn't want to make a monkey that carries a disease unless we knew there was a cure right in front of us. Our goal isn't to make sick monkeys. Our goal is to eradicate diseases," he said.

It would be hard to make many transgenic monkeys now, in any case.

Schatten's team said it used a retrovirus to carry the GFP gene into 224 monkey eggs. Researchers used a common infertility technique called ICSI, in which a sperm is injected into an egg, to fertilize the eggs.

Only 40 embryos and five pregnancies resulted and only three monkeys were born alive. Just one, ANDi, carried the GFP gene but dead twin monkeys also carried the gene.

Schatten said his team next wants to learn how to control just where the gene is inserted into a cell's DNA, which could be

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important to how the gene works.

He also said a genetically modified monkey is not a first step to making designer babies.

"We are only in this business to make disease models to eradicate diseases," he said -- adding that there is no single gene for height, good looks or intelligence anyway.

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