NEWS

# 'Chimeric' mice host mix of mouse, human cells

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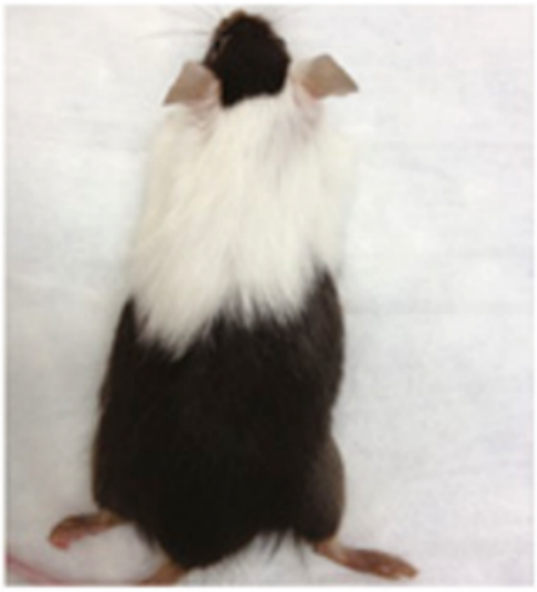

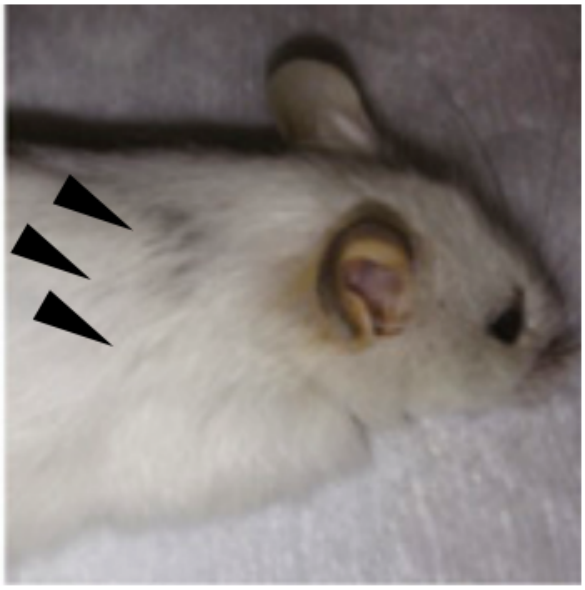

Injecting cells from people into white mice, researchers have created spotted animals that carry a mix of mouse and human DNA. The approach could allow researchers to track the fates of cells with autism-linked mutations.

The chimeras are the latest attempt to grow cells from people inside laboratory animals. Researchers can coax skin cells from people with autism into becoming neurons and trace the effects of any mutations in those cells. But growing these neurons in a flat dish — or even **as three-dimensional 'mini-brains'** — fails to recreate the complex environment of the developing body.

Previous attempts to create mouse-human chimeras involved injecting human stem cells into mouse blastocysts — small balls of cells that form after fertilization but before implantation in the

uterus. But other researchers have not been able to reproduce these results. What's more, because of ethical concerns about 'humanized' mice, researchers may not be permitted to let these embryos grow to term.

In a new study, published 9 February in the *Proceedings of the National Academy of Sciences*, researchers increased the likelihood that the human cells would take hold in the mice by injecting them later in development[1]. Instead of stem cells, which can become any cell in the body, the researchers used neural crest cells, which are already on the path to becoming a select class of cells that includes peripheral nerves, bone, smooth muscle and pigmented skin. This method also bypasses the ethical concerns, because these cells cannot become brain cells.

## Freckled fur:

The researchers derived neural crest cells from the skin cells of an African-American individual and injected them into 8.5-day-old white mouse embryos that were genetically engineered to lack precursors to pigmented skin cells. Of the 41 resulting mice, 15 had specks of black fur and carried human DNA in an estimated 0.1 percent of their coat cells.

The researchers also gave other mice neural crest cells from rats or a different mouse strain. These experiments yielded chimeric animals at a rate similar to the attempts involving human cells. But the foreign rodent cells contributed to more of the recipient's coat cells: about 5 times more for the rat cells and roughly 50 times more for the mouse cells.

Although the human cells performed one of their expected functions in the mice, neural crest cells do not populate the brain, so researchers cannot use them to directly study autism. Instead, they would need to use neural precursors — a controversial proposition because of the perception that mice might develop '**humanized brains**,' which raises ethical concerns. Last September, the U.S. National Institutes of Health instituted a ban on funding research that **could lead to human neurons** in the brains of other vertebrate animals.

**REFERENCES:**

1. Cohen M.A. *et al. Proc. Natl. Acad. Sci. USA* **113**, 1570-1575 (2016) **PubMed**