

No new smell cells

Unlike other mammals, humans don't make new olfactory neurons, a study suggests



by [Tina Hesman Saey](#) Science News, May 23, 2012

People may be born with all the smell-sensing brain cells they will ever have, a new study concludes.

That makes human brains different from those of rodents, nonhuman primates and other mammals, which constantly make new nerve cells, or neurons, in the odor-processing olfactory bulb. Humans don't rely on the sense of smell as much as other animals do, so maybe it isn't surprising that people don't make new odor-sensing cells, says study author Jonas Frisé, a neuroscientist at the Karolinska Institute in Stockholm.

Neurons are born in two areas: a memory-and-learning center called the hippocampus and the subventricular zone, which surrounds the two vacant spaces in the middle of the brain. In mice, neurons from the subventricular zone migrate to the olfactory bulb and wire into neural circuits, helping the animals learn new smells.

Some evidence exists already that humans also repopulate their hippocampus with new neurons, but data have been less clear for olfactory neurons. Now, Frisé and colleagues have used the steady decline of radiocarbon produced in 20th century nuclear tests to determine the birth dates of brain cells. The results, published in the May 24 *Neuron*, show that few if any olfactory neurons are created after a person's birth.

A very small number of neurons may still be born and incorporated in the olfactory bulb, but may not be enough to matter. The researchers calculate that olfactory neurons are replaced at a rate of less than 1 percent per century in humans, compared with about 50 percent annually in rodents.

The new study may help clear up controversy surrounding neuron regeneration in the olfactory system, says Fred Gage, a neuroscientist at the Salk Institute for Biological Studies in La Jolla, Calif.

But the research can't be definitive in determining that neuron regeneration never takes place in the human olfactory system, says Jeffrey Macklis, a neuroscientist and developmental biologist at Harvard University. The method can detect only cells that have wired into the brain. Cells that are born but die without being incorporated into the brain would go undetected.

Studies in Macklis' lab and others have demonstrated that new olfactory neurons in mouse brains will die if the mouse isn't exposed to new smells. It could be that new olfactory neurons are created, but don't stick around long if humans aren't constantly exposed to new odors.

If the researchers were to study the brains of people such as perfumers, vintners, sommeliers and chefs who use their sense of smell professionally and often encounter new scents, the result might be different, Macklis says.

Many of the people in the study had psychiatric disorders or were substance abusers. Those types of brain disorders are known to reduce the amount of neuron regeneration.

Citations

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