

Neuron-generating brain region could hold promise for neurodegenerative therapies

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Adult humans continuously produce new neurons in the striatum, a brain region involved in motor control and cognitive functions, and these neurons could play an important role in recovery from stroke and possibly finding new treatments for neurodegenerative disorders, according to a study published by Cell Press February 20th in the journal *Cell*. To detect the birth of new neurons in the striatum, the authors used a method that measures carbon-14 found in human DNA as a result of above-ground nuclear testing more than half a century ago. The findings reveal a surprise finding of new neurons in a human brain structure where they haven't been previously described. The discovery may open up new avenues to treat diseases and disorders that affect the striatum.

"A wide variety of disorders may affect the striatum, including acquired conditions such as stroke and also genetically inherited disorders such as Huntington's disease," says study author Aurélie Ernst of the Karolinska Institute. "We identified a unique pattern of neurogenesis in the adult human brain that might potentially be useful for the development of novel therapies for some of these neurological diseases."

Adult humans and other mammals produce immature [neurons](#) in several [brain regions](#), including the lateral ventricle wall. In rodents, new neurons in this brain structure migrate to the olfactory bulb—a brain region involved in odor perception. But this is not the case in humans, possibly because the sense of smell is less important for us than for other mammals. The fate of new neurons born in the lateral ventricle wall of humans had been a mystery.

Attempting to address this question, Jonas Frisé of the Karolinska Institute and his team used an innovative method for dating the birth of neurons. Their strategy takes advantage of the elevated atmospheric levels of carbon-14, a radioactive form of carbon, caused by above-ground nuclear bomb testing more than 50 years ago. Since the 1963 nuclear test ban treaty, atmospheric levels of carbon-14 have declined at a known rate. When we eat plants or animal products, we absorb carbon-14, and the exact atmospheric concentration at any point in time is stamped into DNA every time a new cell is born.

By measuring the carbon-14 concentration in DNA from the brain tissue of deceased humans, the researchers found that neurogenesis occurs not only in the lateral ventricle wall in adult humans, but also in an adjacent brain region called the striatum. By contrast, neurogenesis in this brain region was significantly reduced in patients who had Huntington's disease, which is characterized by uncontrolled movements and cognitive decline due to the progressive loss of striatal neurons.

"The identification of a subset of neurons that is renewed in the adult human striatum raises the question whether this process can be taken advantage of for therapeutic purposes," Ernst says. "Increasing the generation or promoting the survival of new neurons might offer an attractive possibility in some cases."

More information: *Cell*, Ernst et al.: "Striatal neurogenesis in adult humans." [dx.doi.org/10.1016/j.cell.2014.01.044](https://doi.org/10.1016/j.cell.2014.01.044)

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