Repeated anesthesia may affect kids' learning

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Courtesy University of Gothenburg
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A study with young rodents shows repeated anesthesia wipes out memory-forming brain cells, scientists say.

The results suggest children may also suffer learning and memory impairments after repeatedly being put out of consciousness to undergo surgeries, according to the researchers. But plenty of exercise may help undo the damage, they noted.

Adult animals weren't found to suffer long-term impairment from anesthesia.

The study, from the University of Gothenburg, Sweden, is published in the *Journal of Cerebral Blood Flow & Metabolism*.

Anesthetics are typically administered to patients by inhalation, injection or both before significant surgeries. Patients then fall asleep, relax their muscles and feel no pain. Often several different drugs are given at once; they take about 15 to 20 seconds to work, depending on when the anesthetic reaches the brain.

"Pediatric anesthetists have long suspected that children who are anesthetised repeatedly over the course of just a few years may suffer from impaired memory and learning," said Gothenburg researcher Klas Blomgren.

His research team accidentally discovered a link between repeated anesthesia and loss of key stem cells that mature into memory-forming cells. The group was studying what happens to stem cells exposed to strong magnetic fields, as during a brain scan.

It turned out magnetic fields had no tangible effects, but repeated anesthesia did. It "wiped out a large portion of the stem cells in the hippocampus, an area of the brain that is important for memory," said Blomgren. "The stem cells in the hippocampus can form new nerve and glial cells, and the formation of nerve cells is considered important for our memory function." The effect was evident only in young rats or mice, possibly because stem cells are more sensitive in an immature brain, he speculated.

"We have not been able to understand exactly what happens when the stem cells are wiped out," he added. "We couldn't see any signs of increased cell death, but are speculating that the stem cells lose their ability to divide."

Another treatment that destroys stem cells in the brain is radiation therapy, used on cancer patients. Blomgren and his research team have used animal studies to show that physical activity after radiation therapy can result in a greater number of new

stem cells and partly replace those that have been lost. “What’s more, the new nerve cells seem to work better in animals that exercise. Now that we know this, we can come up with treatments,” Blomgren said.