Adult brain cells rediscover their inner child

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You may not be able to relive your youth, but part of your brain can. Johns Hopkins researchers have found that newly made nerves in an adult brain's learning center experience a one-month period when they are just as active as the nerves in a developing child. The study, appearing this week in Neuron, suggests that new adult nerves have a deeper role than simply replacing dead ones.

Song and his colleagues tracked the chemical signals received by newly made nerve cells in the adult mouse hippocampus, a brain structure dedicated to learning and memory, by injecting virus particles to light up nerve progenitor cells. Any freshly made nerves glowed green and become permanently marked for later identification.

"In essence, we stamped a birth date on new adult nerve cells," says Hongjun Song, Ph.D., assistant professor of neurology at Johns Hopkins' Institute for Cell Engineering. "The brief heightened activity we saw may help explain how adults continue to adapt to new experiences even though adult brains are more hardwired than children's brains," he adds. The slow and gradual addition of new nerve cells may be like a fine-tuning system, allowing adults to incorporate fresh information without altering our basic brain circuitry.

When they looked at brains from these mice, the researchers noticed that hippocampal nerves that were between 1 and 2 months old could dramatically increase or decrease the amount of signaling chemicals they receive from neighboring nerves. This ability of nerves to modulate their chemical inputs, known as synaptic plasticity, is especially high in

developing brains but tends to become less intense in adults.

While the exact contribution adult-born neurons make to overall learning and memory remains mysterious, Song notes that these results are promising for any future nerve stem cell therapy. "If we can implant or stimulate these adult stem cells in damaged areas, it's possible we can do more than fill in lost nerve connections," he says. "We might be able to rejuvenate an aging brain."

Source: Johns Hopkins Medical Institutions