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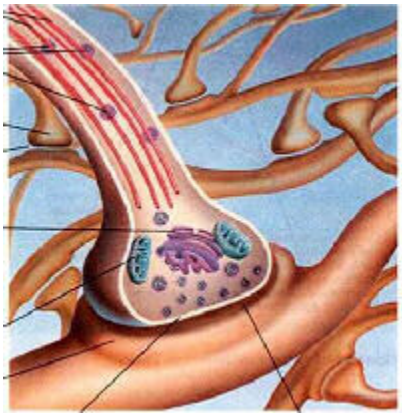
Adult Brain Retains Childlike Capability

By Steven Edwards ✉May 23, 2007 | 7:26:50 PMCategories: Brain, Neuroscience



Neuroscientists only (relatively) recently learned that the adult human brain can create new neurons. Now a Johns Hopkins' team shows that newly formed neurons have a "critical period" where they retain the ability to form new connections with each other.

The new study offers great hope for sufferers of neurodegenerative diseases such as Parkinson's disease, where the degeneration causes loss of neural connections. Doctors could inject newly formed neurons into affected areas of the brain and, provided with the proper stimulation, the transplanted cells may be able to reform lost connections.

Neurons exchange information by creating synapses -- brief junctures between the nerve fibers (axons and dendrites) of connecting neurons. The developing brain forms new connections relatively easily based on stimulation. (e.g., exposure to light creates and optimizes synapses in the visual cortex.) Today's finding demonstrates that new neurons in the adult brain share this function.

A note, and then a caveat.

This study was performed on mice, whose timescale is different than that of humans. The critical period in mice begins about one month after new neurons are connected and lasts for two weeks. One month in mice is, I believe, equal to three months in humans. The critical period in humans should, therefore, last for about six weeks.

The caveat: neurogenesis -- the "genesis" of new neurons -- only happens in certain areas of the brain. To get neurons to areas where neurogenesis doesn't occur would require injections or major improvements in understanding and controlling neural migration.

On a positive note, neurogenesis does occur the hippocampus, which is involved in learning and memory. Stimulating neurogenesis through, say, exercise should improve your ability to learn new things. Given the time needed for the critical period to begin, exercising throughout the summer should help students out during the fall semester.

This same ability may exist in the spinal cord, which would be useful in neurodegenerative diseases that affect it. Benefits for conditions that create scar tissue, like spinal cord injury, may manifest on a smaller scale -- if at all -- due to the scar's inhibitory nature.

New Neurons in Old Brains Exhibit Babylike Plasticity [Scientific American]