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New in Cerebrum: The Latest on the Mysteries of Memory

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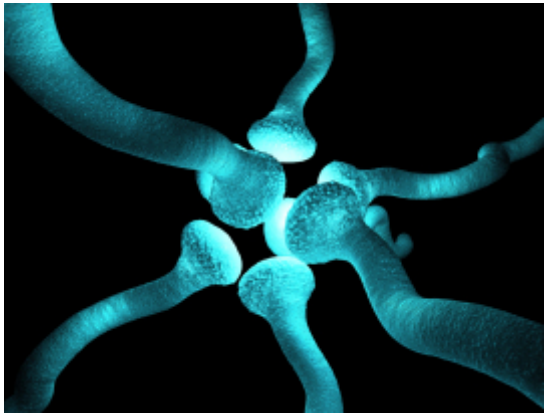
In an article titled "10 Facts About Memory" in psychologyabout.com, Kendra Cherry writes: "Our memory helps make us who we are. From fondly recollecting childhood events to remembering where we left our keys, memory plays a vital role in every aspect of our lives. It provides us with a sense of self and makes up our continual experience of life. It's easy to think of memory as a mental filing cabinet, storing away bits of information until we need them. In reality, it is a remarkably complex process that involves numerous parts of the brain."



Our *Cerebrum* feature for February tackles a topic that has the potential to improve treatments for Alzheimer's disease, traumatic brain injury, drug addiction, and the many other afflictions associated with disrupted memory. In "Solving the Mystery of Memory," our authors, Paul Worley, M.D., and Marshall Schuler, Ph.D., focus on how a single protein in the brain plays a key role in strengthening or weakening processes involved in memory.

Worley, a professor in the Department of Neuroscience at Johns Hopkins School of Medicine, writes that he was fortunate to be in the right place in the 1980s to help develop animal models and molecular techniques to identify a set of genes most critical for memory. “These genes are termed cellular immediate early genes (IEGs), a term that recognizes their rapid and transient increase in cells,” says the article. “One of these IEGs encodes a protein named Homer1a. This small protein is present in the cytoplasm of neurons and enriched in the neurons’ dendrites, which receive electrochemical signals from other neurons.”

Studies over the past 15 years support a model in which the Homer1a protein binds to a neurotransmitter receptor located at the synapse and changes its properties in a way that can enhance active synapses and suppress inactive synapses. The article explains how scientists believe several other elements—neurons, networks, genes, and receptors—tie together and work in a region of the brain known as the hippocampus.

“All these years later, we have made great strides that can be appreciated in the story of a single protein in the brain that plays a key role in strengthening or weakening processes involved in memory,” says the article.

If the Homer1A protein was the focus of a children’s book, it might be called, *The Little Steam Engine That Could*.

–Bill Glovin

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