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## The Life Cycle of Memories: A New Way to Extend Them

The enormous capacity of the human brain to learn and remember is one of life's greatest mysteries. Memory deficits are devastating and untreatable symptoms of neurodegenerative disorders. Exactly how memories are made and can be restored remains an enigma—one that motivated two neuroscientists with different areas of expertise to team up.

Franck Polleux specializes in probing the molecular mechanisms [underlying the function of brain cells](#). Attila Losonczy has developed [new ways](#) to visualize and control cells in the brains of living animals with light. [Working together](#), the duo can generate new memory cells at will, figure out the roles these cells play in the brain's memory circuit and then explore the consequences in a live animal. This collaboration, developed over the course of six years, made it possible to uncover new hidden layers of how memories are formed.

"This kind of science cannot take place in isolation," said Dr. Losonczy. Building on the discovery that brain cells store memories of the environment as we move around, the researchers showed that by implanting a single memory cell of a location, this memory trace can grow to a larger group of cells, making it stronger and long-lasting. This finding has important implications for understanding how memories are formed and what happens when they are damaged by neurodegenerative diseases such as Alzheimer's disease.

"If you asked me six years ago if we could ever do this experiment, I would have said that this sounds more like science fiction. Today it is possible thanks to this unique collaboration," said Dr. Polleux. "That's the magic of the Zuckerman Institute."