Memories can be produced by kidney cells, but only in a molecular sense.

In contrast to neurons, kidney cells have the capacity to retain information and recognize patterns in a similar fashion, as noted by researchers in a publication in Nature Communications on November 7.

Neuroscientist Nikolay Kukushkin, from New York University, says, "We're not saying these things do help you learn trigonometry, we don't even remember how you got on bikes, we don't remember how you remember your family, and all of that stuff."

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During these experiments, the kidney cells showed symptoms of what psychologists refer to as the "massed-space effect," a well-established feature of memory that allows information to be stored in smaller, more manageable chunks over time.

The retention of information by cells of all types outside the brain is facilitated by CREB, a protein that is involved in memory processing. Although CREB and other memory components are common in both neurons and nonneuronal cells, the researchers questioned whether the cells functioned in the same way.

CREB in neurons is triggered by a chemical signal, causing the cell to produce more of its own protein and subsequently altering the molecular memory machine. Kukushkin and his team are currently exploring whether CREB in nonneuronal cells also responds to incoming signals in the same manner.

Researchers attached an artificial gene to human embryonic kidney cells, which largely corresponds to the natural DNA stretch that CREB activates through ligating, and also contained instructions for producing a protein that glows in fireflies.

The memory machinery in neurons is activated by artificial chemical pulses, which the team monitored and learned the intensity of the stimulus produced by the memory gene based on the intensity of the light produced by the glowing protein, according to Kukushkin.

Different pulse timing patterns resulted in different reactions. For instance, the light intensity was significantly greater in cells where four three-minute chemical pulses were applied, separated by 10 minutes, than in cells where the researchers applied a "massed" pulse, which was only applied once.

Kukushkin suggests that the mass-spaced effect on memory has always been a property of neurons in the brain, but it could be created by nonbrain cells by performing complex tasks.

Ashok Hegde, a neuroscientist from Georgia College & State University in Milledgeville, believes that the study's investigation into nonneuronal cell gene expression is noteworthy, as it is applying a neuroscience principle. However, he believes that it is not clear how the results could be applied to other cell types. Nonetheless, he believes that this research may have the potential to pave the way for future drugs to treat human diseases, including those with memory loss.

According to Kukushkin, the body has the capacity to store information, which could be beneficial for one's well-being.