

## Scientists reveal more about how memories are formed

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Researchers at the University of Leicester working alongside colleagues in the US, have found that nerve cells in a brain region called the medial temporal lobe play a key role in the rapid formation of new memories about personal experiences and life events.

Thoughts and recollections are the result of complex networks of <u>nerve</u> cells activating or 'firing' in the <u>brain</u>. There are different kinds of memory that involve different systems of nerve cells in various parts of the brain. Episodic memory is memory for events experienced through life and allows people to recall information like where they first met a friend. It is usually this type of memory that is first affected by Alzheimer's disease, leaving people unable to recall events from their recent past even when they can remember abstract facts and other information.

This study involved fourteen people with severe epilepsy, who were fitted with electrodes to monitor 600 individual nerve cells in the medial temporal lobe. While the electrodes were implanted to determine what surgery might help them, they also volunteered to take part in a simple experiment.

To begin with, the participants viewed separate images of familiar people, such as family members or celebrities, and famous landmarks, such as the Eiffel Tower and the Pyramids of Giza. Using the electrodes the researchers could see different nerve cells respond to different images. A nerve cell that fired when a participant saw a picture of a



celebrity like Clint Eastwood wouldn't fire when the person saw a landmark like the Pyramids.

Next the researchers showed the volunteers a series of pictures which included both a familiar person and a place, digitally combined to create the impression of a photograph of the person taken at the landmark. After showing the combined picture to the participants only a very few times, they learned to associate the person and place, such as Clint Eastwood at the Pyramids. This kind of association is part of <u>episodic</u> <u>memory</u>. Once the participant learned the link, nerve cells which had previously responded only to Clint Eastwood, would fire when the participant saw a picture of just the Pyramids and vice versa. This finding reveals more about the mechanism used by the brain to create <u>new memories</u>, knowledge which could also provide insights into how this process can break down in disease.

Dr Laura Phipps of Alzheimer's Research UK said:

"Associating different aspects of a life experience is crucial for the formation of new memories and this research sheds new light on the biology underlying this process. While this study did not investigate memory in people with dementia, problems with the formation of new memories are characteristic of diseases like Alzheimer's. These symptoms can be extremely distressing for the person experiencing them as well as for those around them. Understanding more about the way our brains form and retrieve memories is an important step towards understanding how diseases like Alzheimer's affect the brain and what might be done to help those living with these conditions.

"The human brain is the most complex structure known to man and we need to better understand the way it works so that we can develop strategies to intervene when things go wrong. With 850,000 people affected by dementia in the UK, and that number on the rise, we need to



make sure basic research into the way the brain works continues so that this work can inform the hunt for new treatments."

Provided by Alzheimer's Research UK

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