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12th FENS FORUM OF NEUROSCIENCE

https://forum2020.fens.org/

PRESS RELEASE
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WEAKENING MEMORIES TO OVERCOME POST-TRAUMATIC STRESS

The fearful and emotional memories for people with post-traumatic stress disorder (PTSD) are very hard to forget and the intensity of the flashbacks is psychologically damaging. How can a person overcome those fears to enable them to return to a fulfilling life? **Professor Jonathan Ploski from the University of Texas** has been looking at how to weaken these traumatic emotional memories.

Speaking at the FENS Virtual Forum of Neuroscience today (Sunday 12 July) Dr Ploski explained that that if a person remembers the traumatic memory, and then receives a drug to block the reconsolidation – or reformation - of that memory, the memory can be weakened which could be beneficial to the patient. However, some long-term, stronger memories are resistant to modification.

"We know this approach could potentially help people who suffer from pathological memories. But we also know that traumatic memories are very difficult to modify. So, we need to study the cells and the connections in the brain that store these memories and identify ways that are capable of changing these cells when they are activated during memory retrieval," he said.

Working with rats in his laboratory, Dr Ploski's team has been studying the neurons in a region of the brain called the amygdala, which is involved in generating emotions. The amygdala becomes more active when a traumatic event is recalled. This increased activity, he hypothesised, may render these cells – and therefore, the memories – more amenable to being altered during the reconsolidation process.

The rats were taught to fear a harmless tone by exposing them simultaneously to a tone and a shock. The animals quickly learned to associate the tone with the footshock.

Dr Ploski used a harmless virus to deliver a gene that codes for a receptor that can make the neurons hyper-excitable when activated with a specific drug. The drug was administered to the rats 10 minutes before giving the rats a reminder of the fearful memory. The rats then received a drug called anisomycin (a reconsolidation blocker) immediately after the memory was recalled.

"What we found surprised us," said Dr Ploski. "The dose of the harmless virus was critically important to the result. At the highest dose of the virus we used, we were able to erase the strong fearful memory and remarkably this result did not depend on the action of the reconsolidation blocker. Just rendering these amygdala neurons hyperexcitable was sufficient. At lower doses of the virus we saw memory strengthening and this strengthening was inhibited by anisomycin. We are still determining if we can identify a dose of the virus that can be used

to weaken the memory when coupled with anisomycin – more research is needed. These findings are remarkable because of how well memories can be erased."

Further research is needed to establish how this happens, but this approach seems promising because it could help people whose lives have been wrecked by traumatic experiences.

"These types of approaches are a long way off from the clinic, Dr. Ploski said, but the long-term goal would be able to weaken the emotions associated with traumatic memory – not the memory of the event itself."

END

Symposia S11: The transience of memory: mechanisms underlying memory destabilisation and updating
Abstract: Enhancing the modifiability of strong reconsolidation-resistant fear memories

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NOTES TO EDITORS

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The 12th FENS Virtual Forum of Neuroscience
As a consequence of the COVID-19 pandemic, the FENS Forum 2020 will be held entirely virtually.

The FENS Forum of Neuroscience is the largest basic neuroscience meeting in Europe, organised by the Federation of European Neuroscience Societies and hosted by the British Neuroscience Association. It will attract around 5,000 international delegates. FENS was founded in 1998. With 44 neuroscience member societies across 33 European countries, FENS as an organisation represents 20,000 European neuroscientists with a mission to advance European neuroscience education and research.