

## Memories are made of this: New study uncovers key to how we learn and remember

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(PhysOrg.com) -- New research led by the University of Leicester and published in a prestigious international scientific journal has revealed for the first time the mechanism by which memories are formed.

The study in the Department of Cell Physiology and Pharmacology found one of the key proteins involved in the process of memory and learning. The breakthrough study has potential to impact drug design to treat Alzheimer's disease.

The discovery was made in the University of Leicester laboratory of Professor Andrew Tobin, Professor of Cell Biology, who is a Wellcome Trust Senior Research Fellow.

The work was done in collaboration with other scientists and published online ahead of print in *PNAS*- the <u>Proceedings of the National</u> <u>Academy of Sciences</u>.

Professor Tobin said: "The work is focused on the mechanisms by which we form memories. We found one of the key proteins involved in the process of memory and learning.

"This protein is present in the part of the brain in which memories are stored. We have found that in order for any memory to be laid down this protein, called the M3-muscarinic receptor, has to be activated.

"We have also determined that this protein undergoes a very specific



change during the formation of a memory - and that this change is an essential part of memory formation. In this regard our study reveals at least one of the molecular mechanisms that are operating in the brain when we form a memory and as such this represents a major break through in our understanding of how we lay down memories.

"This finding is not only interesting in its own right but has important clinical implications. One of the major symptoms of Alzheimer's disease is <u>memory loss</u>. Our study identifies one of the key processes involved in <u>memory</u> and learning and we state in the paper that drugs designed to target the <u>protein</u> identified in our study would be of benefit in treating Alzheimer's disease."

Professor Tobin said there was tremendous excitement about the breakthrough the team has made and its potential application: "It has been fascinating to look at the molecular processes involved in <u>memory</u> <u>formation</u>. We were delighted not only with the scientific importance of our finding but also by the prospect that our work could have an impact on the design of drugs for the treatment of Alzheimer's disease."

The work was funded by the Wellcome Trust.

**More information:** "The M3-muscarinic receptor regulates learning and memory in a receptor phosphorylation/arrestin-dependent manner" appeared in the Proceedings of the National Academy of Sciences (PNAS) 2010 Vol 107 pages 9440-5. www.pnas.org/content/107/20/9440.long

Provided by University of Leicester

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