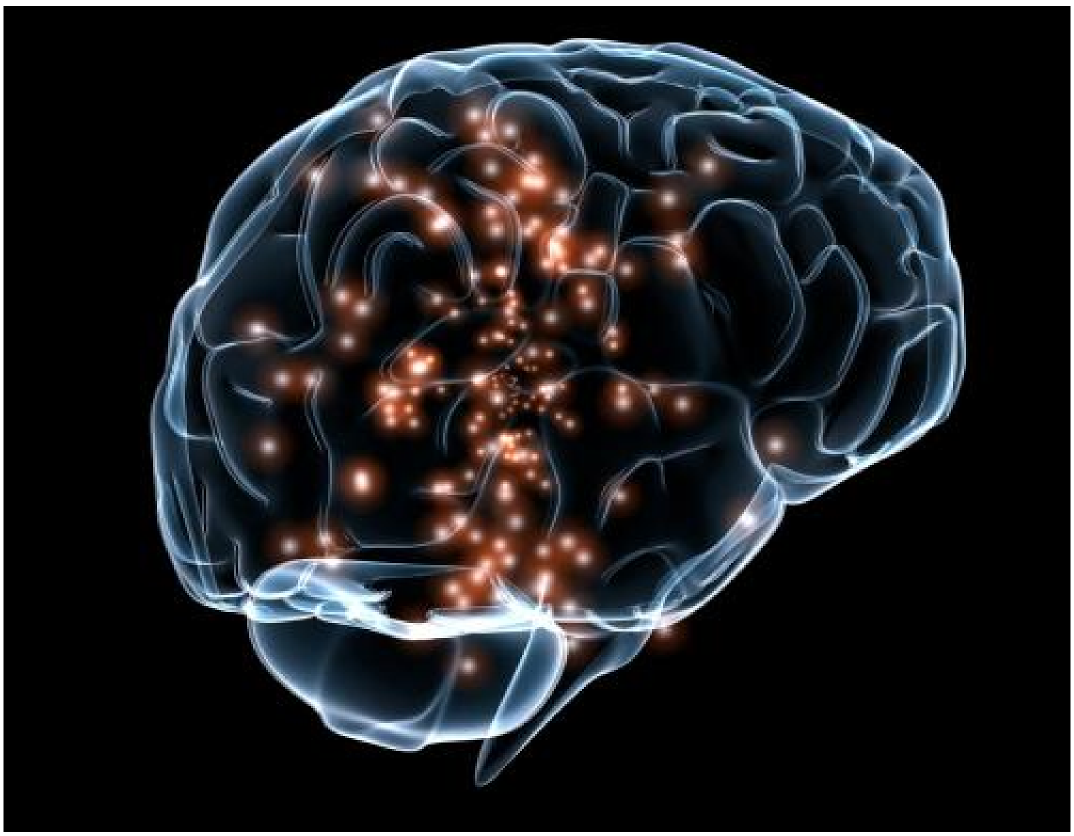
Medical Xpress

Researchers question what happens in the brain when we think

June 25 2015



Credit: Wikimedia Commons

New research from Lund University in Sweden questions the prevailing doctrine on how the brain absorbs and processes information. The idea that the brain has a mechanism to maintain activity at the lowest possible level is incorrect.

What happens in the brain when we think and which components make up a thought? Researchers in Lund have taken a major step towards understanding this central issue.

Since the 1980s, there has been a general consensus among neuroscientists that the brain has a system to maintain brain activity at the lowest possible level while retaining function. This is known as sparse coding. Anton Spanne and Henrik Jörntell question this doctrine in a recently published study in Trends in Neurosciences.

"We show that previous findings indicating that the brain has a sparse coding mechanism are wrong", says Henrik Jörntell, Associate Professor at Lund University. "Our conclusions are controversial and will certainly be debated".

The researchers' most important observation is that the brain instead has a very large number of connections between nerve cells, which can be activated when we take in and process impressions. The Lund researchers drew these conclusions partly on the basis of previous research publications and partly from their own experiments.

"If sparse coding were to apply, it would entail a series of negative consequences for the brain. The largest and most significant consequence is that the brain would not be able to generalise, but only learn exactly what was happening on a specific occasion. Instead, we think that a large number of connections between our nerve cells are maintained in a state of readiness to be activated, enabling the brain to learn things in a reasonable time when we search for links between various phenomena in the world around us. This capacity to generalise is the most important property for learning", continues Henrik Jörntell.

In addition, the study shows that a previously neglected group of nerve cells, various types of inhibitory neurons, is of major significance for high memory capacity.

Finding out more about how the brain works allows us to see more precisely how various diseases disrupt its function. The findings can be used to provide a detailed understanding of what goes wrong in the case of dementia or amnesia and learning difficulties, and may also be significant in the search for new avenues of treatment after a stroke, for example.

More information: "Questioning the role of sparse coding in the brain," *Trends in Neurosciences*, Available online 17 June 2015, ISSN 0166-2236, dx.doi.org/10.1016/j.tins.2015.05.005

Provided by Lund University