

Regulation of attention and concentration in brain unravelled

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(Medical Xpress) -- The prefrontal cortex of the brain is involved in memory processes and the ability to concentrate attentively.

Neuroscientists from VU University Amsterdam have shown how and where this occurs in the prefrontal cortex. The research provides insight into how the brain regulates attention and concentration and gives new clues for the treatment of memory problems in elderly people. The results will be published tomorrow in the scientific journal *Science*.

Memory and concentration will decline during aging in over one in three people. That is partly because the amount of the [neurotransmitter acetylcholine](#) in the brain decreases. Acetylcholine transmits signals from one nerve cell to another. Memory and concentration may improve by stimulating the receptor in the brain that captures and recognizes acetylcholine. This improves the transmission of signals in the brain, resulting in improved concentration and memory. The researchers demonstrated in their study that a specific component of the [acetylcholine receptor](#) is essential for optimal concentration. In addition, they showed in which part of the brain this process occurs.

The researchers performed their study with mice in which that specific component of the receptor had been 'turned off'. A special attention test showed that these mice were not able to concentrate. Then the researchers used a virus to replace the receptor component in a specific part of the [prefrontal cortex](#), the prelimbic cortex. The result was that the mice were now able to concentrate well. Replacement of the receptor component in a different part of the brain, the anterior cingulate cortex,

did not recover concentration. The researchers have therefore shown which component of the receptor is responsible for attention and concentration, and also where in the brain this occurs.

The results of the study provide an important contribution to our understanding of how attention and concentration in the brain is controlled at the molecular level. This knowledge also gives new clues for further research that may lead to improved treatment of problems with concentration and memory that occur during aging.

More information: The article Nicotinic acetylcholine receptor $\beta 2$ -subunits in the medial prefrontal cortex control attention will be published on August 12 in *Science*.

Provided by VU University Amsterdam

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