Multiple Sclerosis: Functional change in brain as cause of cognitive disorders

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Over the course of the disease, multiple sclerosis is very often combined with a deteriorating memory and attention deficits. Researchers at the University Department of Radiology and Nuclear Medicine at the MedUni Vienna have now demonstrated by means of a meta-analysis of functional image data that increased activations in the involuntary attention system in the brain are responsible for these disorders in MS patients.

MS patients generally often have problems with fading out what is unimportant. Says head of the study Veronika Schöpf: "They are

practically in continuous alarm mode." The attention system is too highly activated and also notices – for example when watching the television or when talking to someone – completely unimportant extraneous noises. Because of this, concentrating on what is important is completely impossible or only possible to a limited extent. In addition, MS patients find it difficult to look for one specific thing and also find it. This high activation thus also leads to a poor memory and at the same time adversely affects the ability to take in new things.

In a meta-analysis in the top journal *Neuroscience & Biobehavioral Reviews* (Impact Factor 9.44) it has now been possible to prove that functional changes in the brain are responsible for these disorders and that these can also be depicted by means of functional imaging.

"In most people the centre for these activities lies in the right half of the brain, in many MS patients however it lies in the left side of the brain, as it does in many epilepsy patients," says the PhD student and primary author Kathrin Kollndorfer. This knowledge could now feed into the development of personalised treatments for people with multiple sclerosis in order to counteract these cognitive disorders in good time.

With this, the working group at the MedUni Vienna has also achieved a better generalisability of the research results so far with regard to working memory and attention in patients with multiple sclerosis. "Most studies that have so far dealt with this question by means of functional imaging have mostly examined only very small and heterogeneous samples, which clearly differ with regard to age, gender or duration of illness. We have included in our evaluation everything in studies so far," explains Veronica Schöpf.

Multiple sclerosis is an incurable, chronic inflammatory disease of the central nervous system, which develops slowly at first and in later stages leads to greater and greater physical and mental handicaps. According to

figures of the Austrian Multiple Sclerosis Society (ÖMSG) about 12,500 people suffer from this disease.

More information: Kollndorfer, K. et al. Altered likelihood of brain activation in attention and working memory networks in patients with multiple sclerosis: An ALE meta-analysis, *Neuroscience & Biobehavioral Reviews*.

Provided by Medical University of Vienna