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Subjects at risk of Alzheimer's may now be able to delay the onset of their first symptoms

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For elderly subjects at risk of developing Alzheimer's disease, research shows that hope may lie in brain plasticity.

The human brain loses 5 to 10% of its weight between the ages of 20 and 90 years old. While some cells are lost, the brain is equipped with two compensatory mechanisms: plasticity and redundancy. Based on the results of her most recent clinical study published today in the online version of *Brain: A Journal of Neurology,* Dr. Sylvie Belleville, PhD in neuropsychology, the principal author of this study and Director of Research at the Institut universitaire de gériatrie de Montréal (IUGM), which is affiliated with the Université de Montréal, has found that for elderly subjects at risk of developing Alzheimer's disease, hope may lie in brain plasticity.

"Brain plasticity refers to the brain's remarkable ability to change and reorganize itself. It was long thought that brain plasticity declined with age, however, our study demonstrates that this is not the case, even in the early stages of Alzheimer's disease", declares Sylvie Belleville.

These findings open countless new avenues of research including the possibility of improving the plasticity of affected areas of the brain, and slowing the decline in plasticity through pharmacological means or lifestyle changes, thereby allowing subjects with Alzheimer's disease to enjoy several more symptom-free years.

The hypothesis behind this research was that certain cells traditionally

involved in other brain processes could, through a simple memory training program, temporarily take over since they themselves are not yet affected. According to Dr. Belleville: "Our research has validated our hypothesis. Not only were we able to use functional imaging to observe this diversification, but we also noted a 33% increase in the number of correct answers given during a post-training memory task by subjects with mild cognitive impairment (MCI) who, incidentally, are ten times more likely to develop Alzheimer's disease".

The training program that was used was designed to help elderly subjects with MCI develop strategies, such as the use of mnemonics, for example, and promote encoding and retrieval, such as word lists, for example, using alternative areas of the brain. "The hypothesis had already been raised, but our team was the first to provide scientific support, using a functional neuroimaging protocol", added Sylvie Belleville.

Researchers worked with thirty elderly subjects: 15 healthy adults and 15 with MCI. Magnetic resonance imaging was used to analyse brain activity in the two groups 6 weeks prior to memory training, one week prior to training and one week after training. Before the memory training , magnetic resonance imaging in both the healthy elderly subjects and those with MCI showed activation in areas of the brain traditionally associated with memory. As expected, decreased activation was observed in subjects with MCI. After training, brain areas in elderly subjects with MCI showed increased activation in areas typically associated with memory, but also in new areas of the brain usually associated with language processing, spatial and object memory and skill learning.

According to Dr. Belleville: "Analysis of brain activity during encoding as measured before and after the training program, indicates that increased post-training activation in the right inferior parietal gyrus is

associated with post-intervention improvement. The healthy area of the brain has taken over for the area that is compromised."

Provided by University of Montreal