Iconic memory loss linked to onset of Alzheimer’s disease

The decline of iconic memory may be a key to the early detection of Alzheimer’s disease (AD). Elderly people with mild cognitive impairment (MCI)—who commonly develop AD—showed marked deficiencies in iconic memory, according to a recent study. Iconic memory is a very brief snapshot of a visual stimulus, and lasts about 300–500 ms before fading. Lead author Zhong-Lin Lu (University of Southern California, CA, USA) first became aware of the potential link between shortened iconic memory and AD several years ago when studying iconic memory among a group of volunteers. A healthy 58-year-old man, who was not suffering from any type of cognitive decline and who was employed in a very high-profile job, puzzled the researchers by his lack of iconic memory. 2 years later he was no longer able to do his job because of memory decline and was subsequently diagnosed with AD. “This was a chance discovery”, says Lu, “and in this study, we wanted to see if we could replicate the finding”.

Lu and colleagues from the University of California assessed and compared the iconic memory of two groups: 11 elderly adults (average age 84.8 years) with MCI and 16 elderly adults without cognitive decline. Comparisons were also made between the group of people with MCI and a second control group of 23 young adults (Proc Natl Acad Sci USA 2005; 102: 1797–802).

Study participants with MCI scored substantially worse than controls of the same and younger age in many neuropsychological tests. Both groups of elderly participants, however, had equivalent skills in precise or visibility tests and on assays of short-term memory. But the group of participants with MCI had a substantial deficiency in iconic memory duration (0.07 s vs 0.30 s) when compared with the elderly control group.

“The drugs currently used to treat Alzheimer’s can only slow the progression of the disease and cannot reverse its course”, says Lu. “The earlier it [AD] can be detected, the sooner we can treat it.” Although results of this study are highly suggestive, Lu cautions that the study needs to be repeated in a much larger population. “It is clear that AD has been working its mischief in the brain for decades before it is clinically diagnosed”, comments Paul D Coleman (University of Rochester Medical Center, NY, USA); he points out that several studies have shown many precursors of AD. “This paper may be less than meets the eye”, he adds, “because it has been preceded by other studies involving more cases and pushing the limits of detection much farther back than is seen here”.

Roxanne Nelson

New era of transcranial magnetic stimulation

Cortical excitability can be facilitated or suppressed for over 1 h by certain patterns of short duration, repetitive transcranial magnetic stimulation (TMS). Researchers from the Institute of Neurology at University College London (UK) found that low intensity pulses of TMS at 50 Hz for a short duration have a long-lasting after effect on the motor cortex in healthy people (Neuron 2005; 45: 201–06). Hugo Théoret (Université de Montréal, Canada) believes “the discovery of an efficient, short, and safe method of modulating cortical excitability is a great advance that will likely impact cognitive research and therapeutic opportunities”.

Previous attempts to affect the plasticity of people’s brains with repetitive TMS have had limited success; the after effect was generally weak and variable, and the longest after effect produced (lasting about 30 min) required TMS of the same duration. The UCL research group applied the theta burst paradigm—a method of stimulation that has produced long-lasting effects in brain slices after short periods of stimulation—to the motor cortex of nine healthy adults. John Rothwell, one of the researchers, explained, “the theta burst paradigm is a way of spacing out the repetitive TMS pulses so that TMS application is short yet the effect is long and controllable”.

Before and after the researchers delivered the sequence of TMS bursts to the hand area of the motor cortex, they gave a single pulse of TMS to measure the motor evoked potential at the right first dorsal interosseous muscle of the