

How is our left brain is different from our right?

17 November 2008

Since the historical discovery of the speech center in the left cortex in 150 years ago, functional differences between left and right hemisphere have been well known; language is mainly handled by left hemisphere, while spatial recognition is more specialized to the right hemisphere. However, the structural differences of synapses underlying left-right difference of the brain remained unknown.

differently", said Prof Shigemoto.
Source: National Institute for Physiological Sciences

Japanese research team, led by Prof Ryuichi Shigemoto in National Institute for Physiological Sciences, Dr Yoshiaki Shinohara and his colleagues found that synaptic size and shape in the center of the spatial memory (i.e. hippocampus) were asymmetrical between synapses receiving input from the left and right hemisphere. Hajime Hirase in Brain Science Institute in RIKEN helped this study, and it was done under Japan Science Technorogy Agency support.

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They investigated the electron microscopic structure of synapses in left and right hippocampus, and found synapses made by terminals from the right hippocampus are large, complex in shape, and rich in the GluR1 subunit of AMPA-type glutamate receptors. In contrast, synapses receiving input from the left hippocampus are small and rich in the NR2B subunit of NMDA receptors. That means, both synaptic structure and synaptic molecules differ between synapses with left and right inputs.

"Long-term potentiaon (LTP), that is known as the cellular mechanism of learning and memory, depends on the allocation of glutamate receptors in hippocampus. According to our present finding, synapses receiving right input may be more suitable to initiate LTP. This finding may help understand how our left and right brains work

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