Neuroplasticity

Neuroplasticity refers to changes in the connections between neurons, or the strength of those connections, in response to experience or injury. Neurogenesis is the process of generating new neurons in the brain, which is most commonly observed in certain regions of the brain, such as the hippocampus.

Also known as brain plasticity, is an umbrella term that encompasses both synaptic plasticity and non-synaptic plasticity—it refers to changes in neural pathways and synapses which are due to changes in behavior, environment and neural processes, as well as changes resulting from bodily injury.

Neuroplasticity has replaced the formerly-held position that the brain is a physiologically static organ, and explores how - and in which ways - the brain changes throughout life.

Motor cortex

Plasticity in the motor cortex is important for acquisition and maintenance of motor skills, but how the loss of dopamine in PD leads to disrupted structural and functional plasticity in the motor cortex is not well understood.

Dynamic adaptations in synaptic plasticity are critical for learning new motor skills and maintaining memory throughout life, which rapidly decline with Parkinson's disease (PD).

A conference was held in Magdeburg, Germany on March 4-6 where experts discussed current research in neurotraumatology and neuropsychological rehabilitation. A total of about 60 research projects of a nationwide program project funded by the German Ministry of Education and Research (BMBF) were presented in conjunction with projects from the BMBF-initiative program “Neuropathology” of the Otto-v.-Guericke University of Magdeburg and the Graduate Program in Neuroscience which were funded by the German Research Society (DFG) and the State of Sachsen-Anhalt. The scientific program ranges from molecular, cell biological, anatomical, physiological and behavioral analyses of secondary cell death, regeneration and plasticity to clinical outcome studies and epidemiological evaluations. As such, the conference provides a broad overview of German neuroscience in the areas of neurotrauma, rehabilitation and brain plasticity. The abstracts are part of a special issue of Restorative Neurology and Neuroscience on “Neurotrauma and Neuropsychological Rehabilitation” which was published on the occasion of the conference [1)].

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Sabel BA. Neurotrauma and Plasticity A conference of the German BMBF-research initiative. Restor Neurol Neurosci. 1999;14(2-3):209-236. PubMed PMID: 12671266.