NEUROPROTECTION AND NEUROPLASTICITY – A DUALISTIC VISION OF A CONTINUOUS PROCESS

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Neuroprotection and neuroplasticity, processes that are apparently independent, with different control, represent in fact two sequences of the same process.

Every lesion triggers a neuroprotective endogenous reaction, after a latency period. A reparatory endogenous process (known as endogenous neuroplasticity) follows this answer also.

Continuously understanding the nature of both forenamed processes, and the manner of switching from neuroprotection to neuroplasticity, will lead to the improvement of specific pharmaceutical strategies.

This presentation analyzes, on one hand, the fundamental biological processes that are continuously going on in the nervous system (neuroprotection, neuroplasticity, neurotrophicity and neurogenesis), and, on the other hand, the molecular pathophysiological mechanisms (excitotoxicity, inflammation, misfolding proteins, apoptosis like processes, free radicals, etc.). Another goal of this presentation is to present and analyze the perspectives of basic and clinical researches in this field.

Although there is an increasing number of available treatments, only a very few molecules had some positive outcomes.

The causes of the unsatisfactory results of the clinical studies are divided in two major categories: the first category is directly related with the complexity of the pathophysiological cascades that cannot be controlled with a single molecule that targets a single mechanism (wrong strategy). The second category is related with the transfer modality from the experimental research in clinical research and with the incorrect design of the clinical studies.

Neurotrophic factors are among the few active molecules that positively control both processes.

Because neurotrophic factors manage to control the sensitive balance of the two named processes, their chances of large-scale applicability as a treatment in different neurological disorders are highly significantly.