Cognitive disorder after traumatic brain injury treatment

Attention process training and tasks for attention deficits, compensatory strategies and errorless learning training for memory deficits, pragmatic language skills and social behavior guidance for cognitive-communication disorder, meta-cognitive strategy, and problem-solving training for executive disorder are the mainstay of therapy for cognitive deficits in persons with TBI

Traumatic brain injury (TBI) can result in progressive cognitive decline occurring for years after the initial insult, and for which there is currently no pharmacological treatment.

Cell transplantation has been linked to enhanced cognitive function after experimental traumatic brain injury, yet the mechanism of recovery is poorly understood. Since the hippocampus is a critical structure for learning and memory, supports adult neurogenesis, and is particularly vulnerable after TBI, we hypothesized that stem cell transplantation after TBI enhances cognitive recovery by modulation of endogenous hippocampal neurogenesis. We performed lateral fluid percussion injury (LFPI) in adult mice and transplanted embryonic stem cell-derived neural progenitor cells (NPC). Our data confirm an injury-induced cognitive deficit in novel object recognition, a hippocampal-dependent learning task, which is reversed one week after NPC transplantation. While LFPI alone promotes hippocampal neurogenesis, as revealed by doublecortin immunolabeling of immature neurons, subsequent NPC transplantation prevents increased neurogenesis and is not associated with morphological maturation of endogenous injury-induced immature neurons. Thus, NPC transplantation enhances cognitive recovery early after LFPI without a concomitant increase in neuron numbers or maturation [1)].

1)
Ngwenya LB, Mazumder S, Porter ZR, Minnema A, Oswald DJ, Farhadi HF. Implantation of Neuronal Stem Cells Enhances Object Recognition without Increasing Neurogenesis after Lateral Fluid Percussion Injury in Mice. Stem Cells Int. 2018 Feb 6;2018:4209821. doi: 10.1155/2018/4209821. eCollection 2018. PubMed PMID: 29531536; PubMed Central PMCID: PMC5818962.