

Injection of human umbilical cord blood helps the aging brain

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When human umbilical cord blood cells (UCBC) were injected into aged laboratory animals, researchers at the University of South Florida (USF) found improvements in the microenvironment of the hippocampus region of the animals' brains and a subsequent rejuvenation of neural stem/progenitor cells.

Published online at *BMC Neuroscience*, the research presented the possibility of a cell therapy aimed at rejuvenating the aged brain.

"Brain cell neurogenesis decreases dramatically with increasing age, mostly because of a growing impoverishment in the brain's microenvironment," said co-author Alison Willing, PhD, of the USF Center of Excellence for Aging and Brain Repair. "The increase in neurogenesis we saw after injecting UCBCs seemed to be due to a decrease in inflammation."

According to lead author Carmelina Gemma, Ph.D., of the James A. Haley Veterans Administration Medical Center (VA) and USF, the decrease in neurogenesis that accompanies aging is a result of the decrease in proliferation of stem cells, not the loss of cells.

"In the brain, there are two stem cell pools, one of which resides in the hippocampus," explained graduate student and first author Adam Bachstetter. "As in other stem cell pools, the stem cells in the brain lose their capacity to generate new cells. A potent stressor of stem cell proliferation is inflammation."

Prior to this study, the research team led by Paula C. Bickford, Ph.D., of the VA and USF found that reducing neuroinflammation in aged rats by blocking the synthesis of the pro-inflammatory cytokine IL1B rescued some of the age-related decrease in neurogenesis and improved cognitive function.

"We think that UCBCs may have a similar potential to reduce inflammation and to restore some of the lost capacity of stem/progenitor cells to proliferate and differentiate into neurons," said Dr. Bickford.

The study found that the number of proliferative cells increased within 24 hours following the UCBC injections into the aged laboratory rats and that the increased cell proliferation continued for at least 15 days following a single treatment.

"We have shown that injections of UCBCs can reduce neuroinflammation," concluded co-author Paul R. Sanberg, Ph.D. D.Sc. director of the Center of Excellence for Aging and Brain Repair. "Our results raise the possibility that a cell therapy could be an effective approach to improving the microenvironment of the aged brain and restoring some lost capacity."

Link: www.biomedcentral.com/1471-2202/9/22

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