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U. South Florida: U. South Florida study: Umbilical blood could reverse aging's effects

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By Emma Sylvester, The Oracle (U. South Florida)

TAMPA, Fla. -- University of South Florida researchers were pleasantly surprised when they injected human umbilical cord blood mononuclear cells (UCBMC) into laboratory animals and found that the cells rejuvenated the animals' brains.

A study published online at BMC Neuroscience in February shows the possibility of rejuvenating the brains of the elderly with umbilical cord cells. According to the study, UCBMC could improve the neurogenesis process in the brain.

Neurogenesis is the brain's ability to make neurons, a process that dramatically decreases with age, leading to memory loss and other age-related deficiencies, said study co-author Paul Sanberg, director of the Center of Excellence for Aging and Brain Repair and distinguished university professor.

Adam Bachstetter, first author and USF graduate student in molecular pharmacology and physiology, said the research potentially gives stem cell therapy a new direction.

Laboratory rats given intravenous injections of UCBMC showed an increase in neurogenesis lasting 15 days, said senior author Carmelina Gemma of the James A. Haley Veterans Administration Medical Center, an assistant professor in the Center for Aging-Neuroscience, molecular pharmacology and physiology at USF.

Stem cells taken from other locations are often rejected when transferred, but UCBMC were not, Gemma said. She said the convenience of IV administration is good for future medical applications.

"This single injection is able to partially restore the environment of the aged brain," Gemma said.

The goal of the study was to use the properties of UCBMC to help the aged brain restore its microenvironment and thus far, their work has made aged animals healthier, Gemma said. The animals will be able to heal more easily after a brain injury and their memory and cognitive function should improve.

"It's been a very interesting point, being in a center for aging, of how do we try to restore things that happen to us as we age," Sanberg said. "Specifically, in the brain, how do we restore loss of memory, enhance our perceptual abilities, enhance our ability to move, our reflexes? All those decrease as we age ... and so it would be nice to find ways to help them."

Sanberg said most people looking at cell therapy are looking at diseases such as Parkinson's or Alzheimer's, and this research is unique because it looks at the normal aging process.

Human brains have neuroplasticity, meaning their neurons have the ability to make new connections. Aging decreases that ability, along with the ability to make new neurons.

At this point, researchers don't know why UCBMC works but their data seem to show the success is related to the microenvironment.

"What would be interesting next is to look at the effect of cord blood and the effect on the memory function in the aged animals and see



if we can improve the memory retention, which is of course dropped or impaired in aging," Gemma said.

She said this is only the beginning of their research, and that there's still a lot to examine.

"We can make a change in the brain. Now we need to know: Can we use this change in the brain to make healthier people?" Gemma said.

UCBMC research is pivotal because it can potentially be applied to many neurodegenerative diseases, she said.

"It has huge potential, depending on which field you apply it," Gemma said.

This research is part of a new field of medicine that gives doctors a way to regenerate organs to maintain health, not just treat symptoms, Sanberg said.

"That's a whole area of why stem cell research is so important," he said. "What this is showing is that it's not just the new cells that you're putting in ... the new cells are somehow interacting with the brain to cause the brain's own processes for regeneration to enhance."

##30##

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