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USF receives patent for technology to improve treatment for neurodegenerative diseases

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The University of South Florida's Department of Neurosurgery and Brain Repair has been granted a patent for a cell transplantation procedure combining human umbilical cord blood (HUCB) cells and a sugar-alcohol compound called "mannitol" that may make a big difference in treating life-threatening neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, multiple sclerosis and stroke, among others.

The technology administers the neuroprotective effect of umbilical cord blood cells along with mannitol to permeabilize the blood-brain barrier, allowing for the increased entry of therapeutic growth factors. Saneron CCEL Therapeutics, Inc., a biotechnology R&D USF spin-out company located at the Tampa Bay Technology Incubator, has licensed the technology.

"Approximately 750,000 strokes occur every year in the United States, and nearly one third of them are fatal," said Saneron's President and COO, Nicole Kuzmin-Nichols, MBA. "Given the devastating effects of stroke, it is imperative that we develop new therapies to minimize damage to the brain as well as repair the damage. We are excited about this new technology and its potential to help us develop a variety of new products and therapies to do just that."

While transplanted HUCB cells may benefit several neurological

diseases, getting them past the blood-brain-barrier has presented a problem. The blood-brain barrier separates circulating blood and cerebral spinal fluid in the central nervous system. The newly patented technology is based on mannitol acting as a blood-brain barrier permeabilizer to help get the therapeutic substances secreted by HUCB cells past the blood-brain barrier and into the central nervous system. Mannitol, which temporarily shrinks the tight cells that make up the barrier, allows HUCB cells, via their secreted factors, to reach the site of injury or disease.

"Human umbilical cord blood contains a high percentage of stem cells that when intravenously administered can survive and differentiate into neurons in the damaged brain. Equally appealing is their ability to secrete beneficial molecules that potentially promote behavioral recovery," said Dr. Cesar Borlongan, co-inventor and a USF neuroscientist and professor and consultant for Saneron. "Because the blood-brain barrier regulates the entry of many blood-borne substances into the brain, it may exclude potentially therapeutic substances."

"The use of stem cell therapy as a treatment for neurodegenerative disorders shows exciting promise, though several hurdles must be overcome and getting the cells correctly positioned is one of those," said Nicole Kuzmin-Nichols. "This technology provides the means to deliver the HUCB cells directly to the damaged brain to maximize their effect."

Provided by University of South Florida (USF Health)