FAU Stroke Discovery Will Be Developed by CHS Pharma, Inc.

Traumatic brain injury (TBI) and stroke-induced neuronal injury is multi-factorial and therefore needs multi-drug therapeutic interventions.

By gisele galoustian | 4/11/2018

Affecting about 795,000 people each year, stroke is the leading cause of disability and the third leading cause of death in the United States. According to the National Institutes of Health (NIH), health care costs to treat stroke exceeds $73 billion in the U.S. each year.

Approximately 87 percent of all strokes are ischemic strokes, where blood flow to the brain is blocked. Despite extensive research, efforts to develop medicines for stroke based on the known mechanisms such as glutamate pathways and calcium channel blockers, have been disappointing. This is due in part because the underpinning mechanism of traumatic brain injury (TBI) and stroke-induced neuronal injury is multi-factorial and therefore needs multi-drug therapeutic interventions.

To address the challenges of treating TBI and stroke, researchers from Florida Atlantic University's Charles E. Schmidt College of Medicine have developed and patented a novel approach combining three distinct classes of drugs to create a multi-drug combination therapy. They have joined forces with CHS Pharma, Inc., a South Florida-based biotechnology development company that has an intellectual property portfolio for potential treatments related to ischemic stroke, dry macular degeneration as well as other age-related disorders such as Alzheimer's disease, to further develop and commercialize this promising technology.

The multi-drug approach developed by Jang-Yen (John) Wu, Ph.D., professor of biomedical science, and Howard Prentice, Ph.D., professor of biomedical science, both in FAU's College of Medicine, combines granulocyte colony-stimulating factor (G-CSF), a stem cell enhancer and facilitator, S-methyl-N, N-diethylthiolcarbamate sulfoxide (DETC-MeSO), a NMDA (N-methyl-D-aspartate) receptor partial antagonist and anti-excitotoxicity agent, and sulindac, a potent catalytic anti-oxidant.

Jang-Yen (John) Wu, Ph.D., professor of biomedical science

Howard Prentice, Ph.D., professor of biomedical science

G-CSF is a growth factor known to stimulate the proliferation and survival of hematopoietic cells and was shown to protect against neurodegeneration in a number of neurological disease study models such as Parkinson's disease, Huntington's disease and cerebral ischemia. DETC-MeSO, an active metabolite of disulfiram, has been widely used for more than 50 years to treat alcohol use disorder. Sulindac, an FDA-approved drug that is used as an anti-inflammatory agent shows promise as another novel neuroprotective agent.

In their studies, Wu and Prentice identified an important role for DETC-MeSO, G-CSF and sulindac in reducing cell injury/death and enhancing cell survival/regeneration by the ability to selectively inhibit different combinations of endoplasmic reticulum (ER) stress pathways in parallel with eliciting an increase in cell survival/regeneration pathway – resulting in a decrease in infarct size and an improvement in behavioral outcome in the middle cerebral artery occlusion in a rodent stroke model. They also discovered that each agent individually produced potent pro-survival responses. Furthermore, the combination of these three drugs also resulted in strong neuroprotection even when the agents were employed at low doses compared to the respective standard drug doses.

"Suffering from stroke or any traumatic brain injury can be devastating for the individual as well as their family, and rehabilitation following a stroke can be extremely demanding," said Stephen Chakoff, director and founder of CHS Pharma, Inc., who has been working with scientists from FAU for almost a decade. "CHS Pharma is fortunate to be working with outstanding scientists like Drs. Wu and Prentice to help us advance much needed therapies to minimize the dramatic effects from a stroke and potentially even prevent it from happening in the first place."

Wu and Prentice, who serve as scientific advisors for CHS Pharma, are at the forefront of basic and translational research and have made many contributions in neuroscience. Wu and his team have developed several mechanism-based treatments for neurodegenerative diseases including Parkinson's disease, ischemic stroke, Alzheimer's disease and epilepsy. Wu has several patents to this credit. Prentice's research is focused on tissue hypoxia and ischemia and in molecular pathways of neuroprotection in stroke therapy.

The potential goes beyond the United States. The World Health Organization (WHO) estimates that 15 million people suffer stroke worldwide each year. Of these, 5 million die and another 5 million are permanently disabled. High blood pressure contributes to more than 12.7 million strokes worldwide. Europe averages approximately 650,000 stroke deaths each year.

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