Research May Hold Promise for Treating Alzheimer's

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A compound similar to the components of DNA may improve the chances that stem cells transplanted from a patient's bone marrow to the brain will take over the functions of damaged cells and help treat Alzheimer's disease and other neurological illnesses.

A research team led by University of Central Florida professor Kiminobu Sugaya found that treating bone marrow cells in laboratory cultures with bromodeoxyuridine, a compound that becomes part of DNA, made adult human stem cells more likely to develop as brain cells after they were implanted in adult rat brains. The findings will be included in the next issue of the Restorative Neurology and Neuroscience journal, which is scheduled to be published in late February.

Sugaya and his colleagues at UCF's Burnett College of Biomedical Sciences hope to eventually show that stem cells transplanted from a patient's blood or bone marrow will be an effective treatment for Alzheimer's and other neurological diseases because they can replace cells that die from those ailments. The researchers are working with a $1.4 million grant from the National Institutes of Health.

"By using a patient's own stem cells instead of embryonic stem cells, we're able to avoid the ethical concerns many people have about stem cell research," Sugaya said. "We also don't have to worry about the immune system rejecting the new cells."

Stem cells hold promise for the treatment of many diseases because they are capable of dividing endlessly and developing into many different types of cells in the human body. The researchers at UCF and the University of Illinois at Chicago, where Sugaya taught before moving to UCF last summer, are the first to demonstrate improved memory in adult animals after transplanting neural stem cells into their brains.

Sugaya and his colleagues used bromodeoxyuridine to improve the chances that the stem cells taken from adults' bone marrow would have the potential to develop more efficiently into neural cells.

In the same experiments, they reported successes in taking stem cells from bone marrow and getting them to become retinal cells after they were implanted in rats. Improving the chances of implanted cells functioning as retinal cells is an encouraging sign for the treatment of glaucoma and other diseases that cause patients to lose their vision.

Sugaya hopes further studies at UCF will lead to researchers gaining more control over ensuring that cells develop properly as brain cells once implanted in brains and as retinal

cells when implanted in eyes. His research group also is testing the ability of stem cells taken from adults' bone marrow to become other types of cells, such as heart muscle cells, after they have been treated with bromodeoxyuridine. Many more tests using cell cultures and animals need to be conducted before any trials on humans can be done.

Sugaya's colleagues include Jose Pulido, formerly a professor at the University of Illinois at Chicago's School of Ophthalmology and Visual Sciences, and Sugaya's wife, Ikuko, a research associate in his UCF lab.

Technologies from the research project are licensed to NewNeural LLC, a company funded by Sugaya and two other founders. NewNeural works to develop and commercialize products that improve the brain's ability to repair and replace damaged brain cells.