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Pharmacological approaches for the neural regeneration; Alzheimer's disease therapies

Despite decades of investigations in both laboratory and clinic, the pathophysiological mechanism of Alzheimer's disease (AD) still remains unknown. Current problem of developing AD research is that many treatments have been found to be very effective in AD animal models but they failed to show significant effects in clinical trials. Thus, establishment of an effective treatment in a model, which represents pathophysiology of AD, is needed. Previously, we were able to show improved cognitive function of aged, memory-impaired animals through the implantation of human neural stem cells (NSCs), which produced much excitement throughout the research world and the overall medical community; given the implication that this could lead to a cure for all neurodegenerative diseases, including AD. However, when we transplanted NSCs to a transgenic animal model produced Amyloid-β (Aβ) plaque formation in the brain by expressing familial AD mutant amyloid precursor protein (APP), mimicking the pathological condition of AD, we did not find any new neuronal development formed from the donor cells. This indicates that transplantation of NSCs by itself may not be a cure for AD. Here, we show that the combination drug therapy of Posiphen (reduce APP level) and NBI-18 (increase endogenous neural stem cell) increased neurogenesis and significantly improved memory in the transgenic AD mouse model. This combination therapy could bring us an effective treatment for AD. I will further discuss the use of iPS cell to confirm this efficacy *in vitro* 3D human AD brain model.

Speaker Biography

Kiminobu Sugaya is a Professor of Medicine in Burnett School of Biomedical Science, College of Medicine, University of Central Florida (UCF) since 2004. He is a Director of Multidisciplinary Neuroscience Alliance of UCF and a Chair of Central Florida Chapter of Society for Neuroscience. He moved from Japan to Mayo Clinic, US as a Post-doctoral Researcher in 1992 when he was a Lecturer in Science University of Tokyo and was promoted to be an Associate Consultant in 1994. Then he moved to University of Illinois at Chicago as an Assistant Professor in 1997 and got promoted to an Associate Professor in 2002. He has been conducting stem cell researches to treat neurodegenerative diseases by the adult stem cells. He recently received National Honor Plaque of Panama for exceptional contribution to neuroscience based on his study on stem cell therapies for neurodegenerative diseases from the President of Panama. His publication regarding improvement of memory in the aged animal by stem cell transplantation was reported in Washington Post, BBC, NBC, ABC and other media in all over the world. He is also a Founder and Chair of Progenicyte, which is a biotech company holding his 67 patent licenses. Among those are a revolutionary process of creating IPS (induced pluripotent stem) cells from a patient's own cells and a novel pharmacological approach to increase endogenous stem cells. With his proprietary technologies covering all aspects of stem cell manipulations, Progenicyte is launching services to include: modified stem cell banking and a commercial product to increase cellular regeneration which fights against aging.

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