

# 9<sup>th</sup> Biotechnology Congress

August 31-September 02, 2015 Orlando, Florida, USA



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## Stem cell based therapies for neurodegenerative diseases under the pathological condition

Advances in stem cell technologies; including the ability to produce pluripotent stem cells from adult stem cells by the over expression of an embryonic stem cell gene and to increase endogenous stem cells by administration of a small molecule may bring a cure for neurodegenerative diseases. However in order for the stem cells to be functional, they have to be differentiated into the proper types of cells and integrated into the proper part of the host brain. Thus, we have to consider the pathological environment that might alter environmental cues for migrate and differentiate of the stem cells. Here we show the effects of amyloid precursor protein (APP) and reelin on neural stem cell (NSC) differentiation and how to regulate this effect to produce desirable cells under pathological conditions. We found that APP increases glial differentiation via the notch and cytokine-signaling pathway, while reelin induces radial glial differentiation followed by neuronal differentiation via increasing phosphorylation of adapter protein disable-1. Since amyloid and reelin are found in the plaques within Alzheimer's disease (AD), these findings may closely associate with NSC biology under its pathology. By regulating these factors in AD, we may be able to not only guide differentiation of transplanted NSCs but also modify progression of disease by guiding differentiation of endogenous NSCs.

## 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, a Chair of Neuroscience Consortium for Central Florida and a Chair of Central Florida Chapter of Society for Neuroscience. He earned BSM and PhD from the Science University of Tokyo. He received a Post-doctoral training from Dr. Ezio Giacobini, who built the base for the current cholinesterase Alzheimer's disease therapies, at the Southern University of Illinois. He moved to the Department of Psychiatry in the School of Medicine at the University of Illinois at Chicago in 1997 where he became Associate Professor. He has further expanded his research area to the use of stem cell. 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.

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