Animal Science-2013

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference on
Animal & Dairy Sciences

July 23-24, 2013 Embassy Suites Las Vegas, USA

# Semaphorin7A as a potential target for treating flaviviral infections

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## Abstract

Semaphorin 7A (Sema7A) is a membrane-associated (GPI-anchored)/secreted protein that plays an essential role in connecting the vertebrate neuronal and immune systems. Although, some of the DNA viruses encode Sema7A homolog in its genome, role of vertebrate Sema7A has not been elucidated in viral pathogenesis. RNA viruses such as West Nile virus (WNV, a mosquito-borne flavivirus that caused recent epidemic meningoencephalitis and death)does not encode sema7A homolog in its genome. In a recent study using a mouse model of infection, we have assessed whether Sema7A is involved in a fatal neurotropic WNV pathogenesis. Mice lacking Sema7A showed increased survival, reduced viral burden and less blood-brain-barrier permeability upon WNV infection. Sema7A was elevated in murine tissues,murine cortical neurons and primary human macrophages upon WNV infection.Relative to controls, Sema7A deficiency or antibody-mediated inhibition significantly increased mice survival and reduced WNV infection in murine cortical neurons and primary human macrophages.Furthermore, Sema7A positively regulated TGF-β1 and Smad6 production to facilitate WNV pathogenesis. Our current effortsexplore the mechanistic insights of host Smad transcriptional signaling inhost anti-viral/inflammatory responses during viral pathogenesis. This importantrole of Sema7A during WNV pathogenesis, further suggests investigation of this molecule as aputative receptor and potential therapeutic targetfor WNV. Collectively, these data elucidate the role of Sema7A in shared signaling pathways used by the immune and nervous systems that may lead to the development of Sema7A blocking therapies for WNV and possibly other flaviviral infections of medical importance.

## Biography

Dr. Sultana was graduated from Bangalore University, India with Bachelor of Science and Master of Science Degrees in the field of Biology and Applied Genetics, respectively. She then moved to University of Cologne, Germany to pursue her doctoral dissertation research in Medical Biochemistry. Dr. Sultana completed her PhD degree at the age of 27. After her Ph.D,shemoved to Yale University School of Medicine to study vector-borne diseases. She was initially recruited as postdoctoral associate but later promoted as Associate research Scientist. Currently, she is a tenure track Assistant professor in the Center for Molecular Medicine, Department of Biological Sciences, Old Dominion University and pursuing her research in the field of infectious diseases. Dr. Sultana has been awarded with numerous awards that include but not limited to international PhD dissertation fellowship from University of Cologne, Germany, Bridge-gap postdoctoral fellowship award from Yale University,

Research associate fellowship from Howard Hughes medical institute and RO3 award from NIH/NIAID. Dr. Sultana has published several high impact journals in the field of infectious diseases, cell signaling and cytoskeletal dynamics. She serves as a peer-reviewer for many microbiology journals and currently serves as an editorial board member of “Microbiology Insights” journal.