JSPS Joint Research Project

Project Title: "Analysis of a new generation antiepileptic drug that interacts with synaptic vesicle 2A protein in presynaptic terminal."

Japanese Lead Scientist: Professor Sumiko Mochida, Dept. of Physiology, Tokyo Medical University, Japan

UK Counterpart: Dr Gary Stephens, School of Pharmacy, University of Reading, UK

Project Duration: April 2012 to March 2014

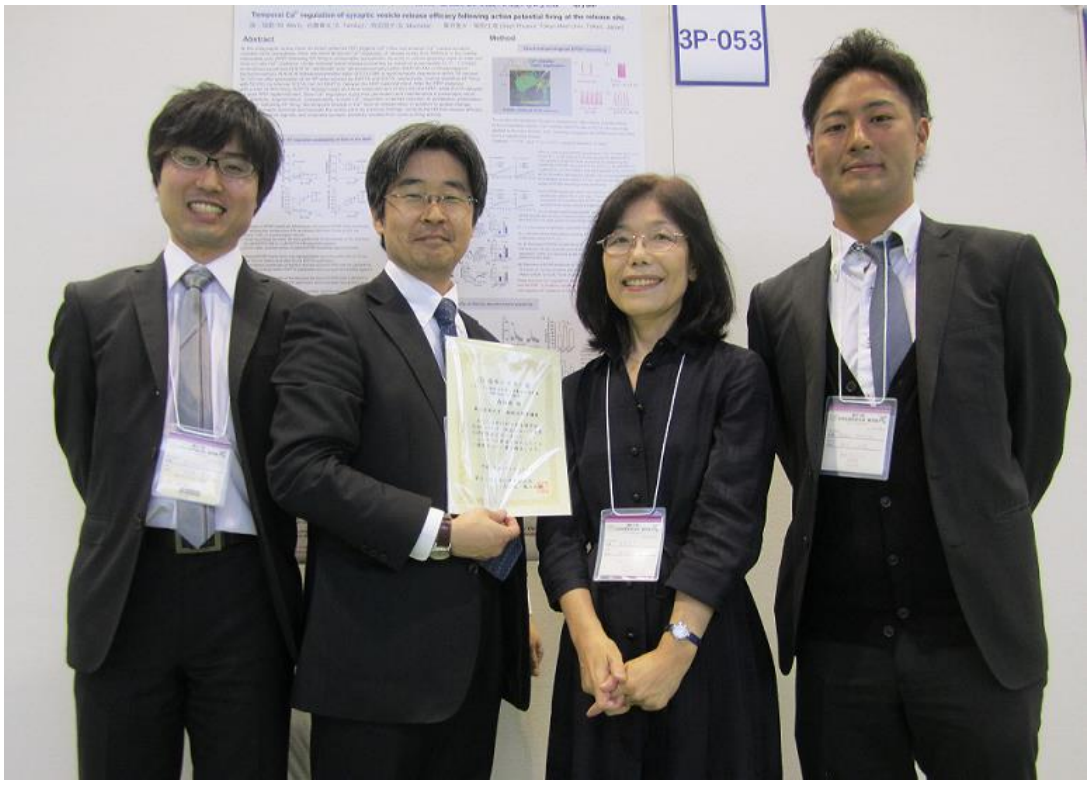
This project followed-up an existing collaboration between Professor Sumiko Mochida (Dept of Physiology, Tokyo Medical University) and Dr Gary Stephens (School of Pharmacy, University of Reading) and built on a JSPS Post-Doctoral Fellowship award to Dr Christian Vogl (supervised by Dr Stephens at University of Reading), who made a research visit to Japan.

The current project investigated a class of antiepileptic drugs (AEDs) that interact with synaptic vesicle 2A protein, the so-called 'SV2A ligands', the archetypal member being the AED levetiracetam. The project looked at the effects of levetiracetam and other SV2A ligands on synaptic transmission and, also, on voltage-gated calcium channels in peripheral superior cervical ganglia (SCG) neurons. This work was extended to investigate how SV2A modulates vesicular release and calcium channel function. The key techniques involved were electrophysiology, using dual microelectrode recording (Tokyo Medical University) and patch clamp recording (University of Reading). The main findings of the project were that SV2A acts to regulate vesicular release and calcium channel activity in SCG neurons. This work was presented at the Biophysical Society meeting, San Francisco, Feb 2014 and a full manuscript is currently in preparation.

The funding allowed Prof Mochida and three PhD students (Shoto Tanifugi, Michinori Mori, and Michikata Hayashida) to make two research visits to University of Reading in July 2012 and Aug 2013. Prof Mochida was supported in writing manuscripts with Dr Stephens, including acting as joint Editors on a book '*Modulation of Presynaptic Calcium Channels'* published by Springer in 2013. The three PhD students also benefitted greatly from the scheme by learning the patch clamp technique whilst at Reading and were integrated into Dr Stephens' group during this time, attending

laboratory meetings and interacting with UK-based researchers, and also attending a JSPS event at the London headquarters.

We were awarded 5,000,000 Yen for two years (for Japanese side; traveling 3,000,000 and experimental materials 2,000,000). At the start of the grant, Dr Stephens applied for reciprocal funding to the JSPS Invitation Fellowship Program for Research in Japan (2012 round), but the application was rejected. In the future, we plan to submit a follow-up application to build on the success of this JSPS funding.



Shoto Tanifugi, Michinori Mori, Sumiko Mochida and Michikata Hayashida

Mori awarded a prize for poster presentation at the Soc. Physiology meeting in March, 2014.