

DATE: Day 15 Month May Year 2018

SUMMARY of
2017 RESEARCH RESULTS REPORT
For International Collaborative Research with IPR, Osaka University

Research Title		Three-dimensional asymmetric reconstruction of viruses using coherent diffractive imaging and electron cryo-microscopy.
Applicant	Name	Janos Hajdu
	Affiliation	The laboratory of Molecular Biophysics, BMC, Uppsala University
	Present Title	Professor
Research Collaborator (Host PI)		Atushi Nakagawa (Professor)
<p>Summary</p> <p>Our collaboration with respect to establishing methods of determining structure of various viruses using coherent X-ray diffractive imaging (CXDI) and cryo-EM single particle analysis (SPA) has been initiated since 2014. Within this collaboration, we have got benefits of continuous support from both sides to deal with sample preparations, and data collection and analysis. The obtained results have been stably published in scientific journals every year.</p> <p>In 2017, we focused on determining an atomic model of OmRV and PR772 particles using cryo-EM SPR. We have previously analyzed structure of these viruses in our collaboration (Okamoto et al., Sci Rep 2016; Reddy, et al., Sci Data 2017). Last year, we achieved to reconstruct the OmRV and the PR772 particles at 3.9-Å and 8.2-Å resolution respectively. However, we could not determine an atomic model of these viruses at the achieved resolution. Hence, we collected more particles images with a higher magnification to improve the resolution in 2017. Currently, we have improved the OmRV and PR772 cryo-EM reconstructions at a resolution of 3.2-Å and 2.3-Å. First atomic model of these viruses was successfully built using the improved cryo-EM reconstructions. These atomic models have shown critical amino acid residues that are involved in their capsid functions, and thereby further molecular analyses such as mutagenesis of the capsid proteins are planning to elucidate the so-far unclear survival strategies of these viruses such as cell entry, viral genome synthesis and particle formation.</p>		

***Deadline: May 18, 2018**

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