Form 3

Report for Joint/usage program for Endocrine/Metabolism

Date: Apr. 28, 2016

To:

Director of Institute for Molecular and Cellular Regulation

1. Program No.
2. Research title: Regulation of phosphatidylinositol kinases by GTP

3. Objective of the research:

Prof. Sasaki has intriguing biochemical evidence that some phosphatidylinositol kinases can utilize GTP, instead of ATP, to phosphorylate phosphatidylinositol. To test physiological significance of the usage of GTP, we use budding yeast system such that we can readily manipulate cellular concentration of GTP in collaboration with Dr. Yoshida.

4. Period: Apr/2015-Mar/2016

5. Project organization

Name of Applicant: Atsuo T.Sasaki
Position: Assistant Professor
Institution/department: Dept. of Neurosurgery, Brain Tumor Center, University of Cincinnati, College of Medicine

Name of Co-applicant: N. A.
Position:
Institution/department:

Name of Researcher in IMCR: Satoshi Yoshida
Position: Associate Professor

6. Research plans:

Sasaki lab has identified a novel PI(5) 3 kinase (Published in Molecular Cell in 2015). Structural analysis suggested that this novel kinase use GTP, instead of ATP for phosphorylation. Based on the structural analysis, Prof. Sasaki has engineered PI (5) 3 kinase and PI (4) 5 kinase to utilize ATP exclusively or GTP only. By introducing these engineered PI kinases in yeast. We will test if cellular concentration of GTP can affect the production of PI (3, 5) P2 and PI (4, 5) P2.

7. Research results:

We have established yeast strains expressing engineered PI (5) 3 kinase and PI (4) 5 kinase to utilize ATP exclusively or GTP only. Surprisingly these yeast strains were viable and did not exhibit apparent defects in normal growth condition. We are currently combining these mutations with those who affect cellular GTP and/or ATP concentration to clarify our hypothesis.

8. Publications and/or Presentations made through this collaboration

Not yet.

(Please summarize the report in 2 pages)