

Science and Technology Group Annual Report FY2017

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1 Introduction

Cellular wounding and repair of local plasma membranes occurs constantly in our bodies. Plasma membrane damage can be induced by various triggers ranging from physical disruption and pathogen invasion to physiological cellular activities, such as muscle contraction, cell division, and the secretion of vesicles. Accumulating evidence suggests the involvement of cellular wound healing in various diseases. However, the detailed molecular mechanisms and physiological consequences of plasma membrane repair are poorly understood. We recently discovered that plasma membrane damage activates a cell cycle checkpoint, resulting in transient or permanent arrest of the cell cycle during plasma membrane repair (Kono et al., Proc. Natl. Acad. Sci. U. S. A., 2016). Furthermore, we found that the damaged site memories the membrane damage as a small tubular bud on the outer surface of plasma membrane, and it affects cell cycle transient or prominent arrest depending on the plasma membrane damage quantities. I am now focusing on this permanent cell cycle arrest without DNA damage nor telomere shortening, trying to start observing the tiny buds (diameter: ~120nm, length: 100-1000nm) with light and electron microscope. The short-term goal of this project is to find the specific molecules and the lipids on these buds.

2 Activities and Findings

In FY2017, I moved to OIST as an STG member, from Fujita health University since Jan 2018. The first three months (the last three month of FY2017) at OIST was spent on building up the lab, gathering equipment, and evaluating new circumstances of cell culturing and observation. At the end of March 2018, human and Yeast cell cultures were stably maintained. Then I am preparing the methods for observing the membrane shapes and the localization of some lipids under the light and electron microscope. This will be the achievement of FY2018.

3 Collaborations

- Kono Unit, OIST
- Hiroki Kawai, LPixel Inc

4 Publications and other output

Nothing to report