

プログラム名： セレンディピティの計画的創出による新価値創造

PM名： 合田 圭介

プロジェクト名： 細胞刺激技術開発

委 託 研 究 開 発

実施状況報告書(成果)

平成28年度

研究開発課題名：

Developing Novel Optical Probes to Understand Biological Activities

研究開発機関名：

Columbia University

研究開発責任者：

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Abstract

1. Activities, Accomplishment and Findings

An existing of major problem in the fields of biology and biomedical research is the difficulty to monitor and quantify biological activities in live cells. To address this challenge, in order to monitor cellular activities particularly metabolic state, we developed novel biosensors, genetically encoded fluorescent indicators, to measure metabolic substrates such as lactate and pyruvate in live cells. In addition, to control cellular and molecular activities precisely spatio-temporarily, we developed multiple new technologies to regulate gene expression and protein activity using light. Interdisciplinary approaches have been used with our experts in human stem cell biology, biochemistry, molecular biology, physiology, pharmacology, imaging, optogenetics and bioengineering. In addition, taking advantage of novel tools and outcomes in this study, we have conducted collaborative projects with Project 8 Team 2 organized by Dr. Hasunuma in order to apply metabolic imaging for *Chlamydomonas*. Next year, we will test recombinant proteins and mouse models to conduct metabolic imaging *in vivo*.

2. Outreach, Events and Other Activities

n/a