FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

Project Title: Development of super-resolution microscopy for visualization of biological functions	
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1. Background of research

Because of soft interactions between light and biological molecules, optical microscopes allow us to observe biological functions in live condition. However, the wave nature of light limits the spatial resolution up to around a half of light wavelength (=400nm). This spatial resolution is not high enough to observe and analyze biological functions in a small area in a cell and tissue.

2. Research objectives

The aim of this research is development of optical microscopy that allows us to observe small structures in a cell or biological tissue beyond the diffraction limit of light. Developments of new optical technologies and probe molecules for labeling samples are also the targets of the research, which will open the door of the next generation optical imaging technologies.

3. Research characteristics (incl. originality and creativity)

Optical imaging technologies to be developed in the project are for observation of biological molecules that are functioning in a living cell or tissues. Unlike electron microscopy, sample can be place in air or water, approach with optical technologies allows us to activities of biological molecules in living conditions without giving a significant damage.

4. Anticipated effects and future applications of research

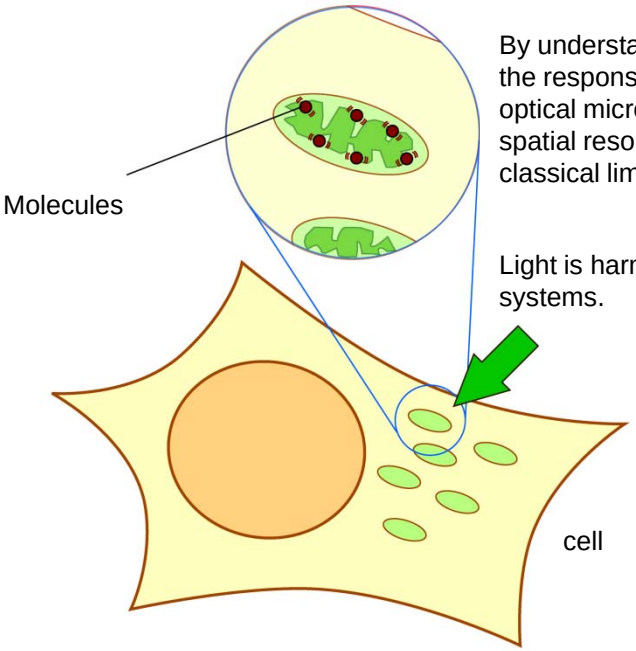
The technologies to be developed in the project will be used to observe varieties of biological phenomena, which helps us to understand the mechanism of biological systems. These results will be useful to both fundamental biology and medicine and can be applied to understand the cause of disease and development of new drugs.

“Super resolution microscopy for visualization of biological functions”

Katsumasa Fujita, Osaka University

Aim of the project

Development of super resolution optical microscopy for real-time observation of biological cell and tissues.



The results of the project will be useful to both fundamental biology and medicine and can be applied to understand the cause of disease and development of new drugs.

The concept

Simple and easy

The simple principle and mechanism of imaging will allow super resolution technique to be applied in a varieties of applications.

Control of optical phenomena

Manipulation of molecular responses to light exposure and new probe design are the keys for the development of new technologies.

New methodology

A new way of using optical phenomena will realize new applications in optical imaging technology.

Homepage

http://lasie.ap.eng.osaka-u.ac.jp/ap1g1kat/index.html

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