



Cell Biology Unit

Overview

The Cell Biology Unit brings together leading specialists in the research of cells, the basic units of life, from both inside and outside of Tokyo Tech. The unit aims to establish fundamental technology to *visualize* the structures and functions of cells, *analyze* cells through molecular mechanism analysis, and *manipulate* cells through the editing and restructuring of cells. The unit seeks to understand molecular mechanisms — from gene expression and editing to synthesis, modification, and resolution of proteins — and to elucidate the dynamics of cellular functions. Through advances in cutting-edge research, the unit's overall goal is to clarify vital phenomena at the cellular level and feed fundamental research results back to society through contributions in the field of medicine.

Research goals

The unit places priority on becoming a center for cellular research by focusing on the achievement of the following three goals:

- 1 *Visualizing*: Visualization and analysis of intracellular structures and molecular activity utilizing next-generation imaging
- 2 *Analyzing*: Analysis of the mechanisms of molecules in major intracellular biological phenomena
- 3 *Manipulating*: Restructuring intracellular reactions and advanced biological phenomena, and completion of cytoarchitecture with cellular editing technology utilizing semi-intact cell resealing*

*Semi-intact cells are generated when bacterial toxins permeabilize the plasma membrane. Resealing is the refilling of pores with cytosolic components and proteins from outside of the cell.



Research Unit Leader

Yoshinori Ohsumi

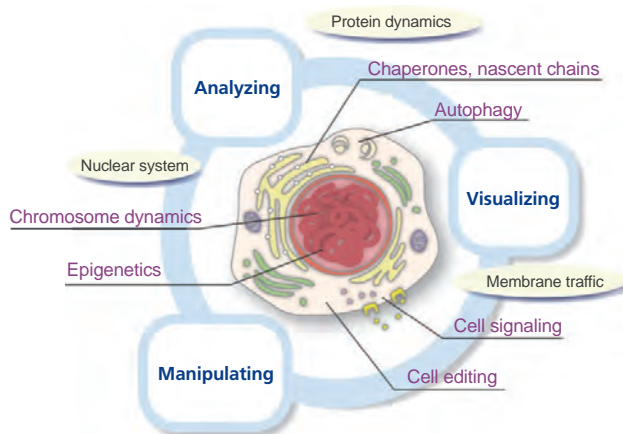
Profile

- 2014 Honorary Professor, Tokyo Institute of Technology
- 2009 Adjunct Professor, Tokyo Institute of Technology
- 2004 Professor, Department of Cell Biology, National Institute for Basic Biology
- 1996 Professor, Department of Cell Biology, Okazaki National Research Institute
- 1988 Associate Professor, College of Arts and Sciences, University of Tokyo
- 1986 Lecturer, Faculty of Science, University of Tokyo
- 1977 Research Associate, Department of Biology, Faculty of Science, University of Tokyo
- 1974 Postdoctoral Fellow, Rockefeller University
- 1974 Doctor of Science, Graduate School of Science, University of Tokyo
- 1969 Master of Science, Department of Biochemistry, Graduate School of Science and Faculty of Science, University of Tokyo
- 1967 Bachelor of Arts, Department of Basic Science, College of Arts and Sciences, University of Tokyo

Unit members

- Professor Hideki Taguchi
- Professor Hiroshi Kimura
- Professor Masayuki Murata
- Assistant Professor Tatsuya Niwa
- Assistant Professor Daiki Nakatsu
- Professor Masayuki Komada
- Professor Hiroshi Iwasaki
- Associate Professor Fumi Kano
- Assistant Professor Yasuto Murayama
- Assistant Professor Tomoko Horie

Research concept



- Clarification of vital phenomena at the cellular level
- Application in the field of medicine

Creating a world-leading base for the promotion of life sciences research where outstanding researchers and students gather

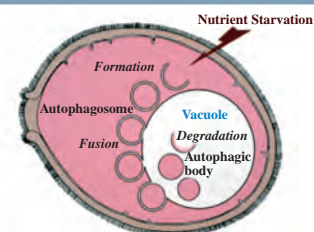
Q Why was this research unit established?

Members of this research unit have already achieved excellent results in their individual fields, and further deepening this individual research will hopefully lead to the discovery of new viewpoints and methods in the field of cellular research. The unit expects to continuously present high-quality research findings and gain recognition as a world-leading base for the promotion of life sciences research where outstanding researchers and students gather.

Q What are the strengths of this research unit?

Professionals in the field of cellular research exercise their individual strengths to the fullest, achieving new results through collaboration with specialists in different fields. Cutting-edge research equipment, such as confocal microscopy capable of high-resolution imaging and 3D reconstruction, a cell collection system, and an intracellular protein analysis system are available to accelerate research progress. Cooperation with external researchers, the establishment of a consortium, and the creation of new systems of effective collaboration with companies are also being pursued.

The process of autophagy in yeast



Q What is the path to achieving the unit's goals?

The research unit aims to become a global base for cellular research in the next five to ten years. Each group in the Cell Biology Unit is engaged in a wide range of projects. Research Unit Leader Yoshinori Ohsumi conducts research on autophagy, a natural process by which cellular components are disassembled in response to starvation. Other members work on the overall characteristics of proteins, the kinetics of nuclear proteins and DNA, and the processes of extracellular protein intake. By utilizing cell control technology achieved through research on fundamental biology, the unit will contribute to society by promoting drug discovery and uncovering novel applications in the field of medicine, demonstrating the importance of basic research for the development of science and technology.

Contact us

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