



Department of Cellular and Molecular Pharmacology,
Graduate School of Medicine, The University of Tokyo

Cellular and Molecular Pharmacology SEMINAR

演者 : 井上 尊生 博士 (Ph.D.)

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Johns Hopkins University School of Medicine

演題 : Synthetic Cell Biology of Primary Cilia

日時 : 平成24年6月21日(木) 15:00~16:00

場所 : 医学部教育研究棟13階 第8セミナ一室

Primary cilium is a small, ubiquitous organelle that functions as a sensory antenna for surrounding physical and chemical stimuli. To do this, primary cilia must accumulate specific signaling molecules. Defects in protein trafficking to primary cilia cause a plethora of disorders, collectively termed ciliopathies, which include loss of smell and sight, polycystic kidney or liver disease, obesities, and developmental defects. However, these protein trafficking mechanisms, which are fundamentally significant to cell biology and pathophysiology, are poorly understood, mainly due to the lack of techniques to specifically probe and visualize dynamic protein diffusion to the primary cilia. We integrate expertise in organic chemistry, biophysics, cell biology, biochemistry, advanced imaging and computational modeling, and deploy newly developed chemically-inducible molecular probes to unravel ciliary protein trafficking mechanisms at the molecular level. Our multidisciplinary research will provide a powerful technology that extends conventional techniques in ciliary biology, and offer far-reaching insights into ciliopathies.

1. Komatsu T, Kukelyansky I, McCaffery JM, Ueno T, Varela LC and Inoue T. "Organelle-Specific, Rapid Induction of Molecular Activities and Membrane Tethering" *Nature Methods* 7, 206-208 (2010)
2. Umeda N., Ueno T., Pohlmeier C., Nagano T. and Inoue T. "A photocleavable rapamycin conjugate for spatiotemporal control of small GTPase activity" *Journal of American Chemical Society* 133(1), 12-14 (2011)
3. Ueno T., Falkenburger B.H., Pohlmeier C., and Inoue T. "Triggering Actin Comets Versus Membrane Ruffles: Distinctive Effects of Phosphoinositides on Actin Reorganization" *Science Signaling* 4(203), ra87 (2011)
4. DeRose R., Pohlmeier C., Umeda N., Ueno T., Nagano T., Kuo S., and Inoue T. "Moving molecules by light; Spatio-temporal manipulation of small GTPase activity at subcellular level and on timescale of seconds in living cells" *Journal of Visualized Experiments*, e3794 (2012)
5. Miyamoto T., DeRose R., Suarez A., Ueno T., Chen M., Sun T.-p., Wolfgang M.J., Mukherjee C., Meyers D. and Inoue T. "Rapid and Orthogonal Logic Gating with a Gibberellin-induced Dimerization System" *Nature Chemical Biology* 8, 465-470 (2012)