



東北大学グローバルCOE

Network Medicine

創生拠点

NM高等教育セミナー

井上 尊生 博士

(Johns Hopkins University School of Medicine・Assistant Professor)

「Synthetic Cell Biology: Visualizing and Manipulating Cell Signaling」

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青葉山キャンパス理学部生物棟大会議室

Complexity in signaling networks is often derived from co-opting particular sets of molecules for multiple operations. Understanding how cells achieve such sophisticated processing using a finite set of molecules within a confined space is critical to biology and engineering as well as the emerging field of synthetic biology. We have recently developed a series of chemical-molecular tools that allow for inducible, quick-onset and specific perturbation of various signaling molecules^{1,2}. Using this novel technique in conjunction with advanced fluorescence imaging and microfluidics, we investigated positive-feedback mechanisms underlying the initiation of cellular chemotaxis (known as symmetry breaking). We found that the chemical gradient was sufficient to direct cells towards the chemical source, regardless of their initial direction of polarization or lack thereof. We have also recently developed new chemically inducible system with which we generated two representative logic gates that function on a timescale of just seconds, a timescale that is hundreds-of-times faster than conventional logic gates consisting of gene circuits.

参考文献

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)

本セミナーは医学履修課程特別セミナー等を兼ねています。受講学生は履修簿を持参し、セミナー修了後にサインを受けること。聴講は自由大歓迎です。学部生の皆さんもぜひどうぞ。

拠点リーダー 岡 芳知 / 世話人 水野 健作 (生命科学研究所情報伝達分子解析分野)
問い合わせ先: 022-795-6676