HOKKAIDO UNIVERSITY

AMBITIOUS LEADER'S PROGRAM

Fostering Future Leaders to Open New Frontiers in Materials Science

Ambitious 物質科学セミナー

A molecular spectroscopy of living cells to map genetic and environmental origins of disease traits to molecular mechanisms

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2019年12月9日（月）14：30～

北海道大学 理学部本館N-308室

Variations in the genome sequences of individuals suffering from specific diseases provide clues for identifying genes that could be targets for drugs against the disease. Finding a good path to a drug target has not, however, proven easy or even possible for most diseases. We have recently discovered that a path from gene variation to potential drug targets can be determined by analyzing the dynamics of cellular protein interaction networks in response to stresses applied to a cell. We have developed reporter assays that allow us to simultaneously detect the dynamics of thousands of protein–protein interactions. We examine which protein–protein interactions change together under a series of chemically–induced perturbations. We demonstrate with the example of the biguanide antidiabetic drug metformin how we gain novel insight into a drugs mechanism of action. Surprisingly, we show that we can also predict in this way, genes whose DNA sequence variants increase or decrease susceptibilities to human diseases.

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