
グローバル COE 特別セミナー

生物化学専攻セミナー

日時：平成 24 年 1 月 27 日（金） 16:30～18:00

場所：理学部 3 号館 4 階 412 号室

講師：Dr. Andre Levchenko

Department of Biomedical Engineering, Institute of Cell Engineering, Johns Hopkins University, Baltimore, MD, USA

演題：**Individual Signal Processing in *D. discoideum* cells Revealed by Imaging within a Microfluidic Device and Computational Modeling**

要旨：

The complex transition from a single-cell to multi-cellular lifeforms during the formation of a fruiting body by the amoebae *Dictyostelium discoideum* is accompanied by a pulsatile collective signaling process that triggers chemotaxis of the constituent cells. Although the cells used for the analysis of this phenomenon are normally isogenic, it is not clear whether they are equally responsive to the waves of the signaling stimulus, and how responses across the population influence collective cell behavior. We found that isogenic amoebae cells display a highly divergent sensitivity to the chemoattractant cAMP presented in a variety of complex, dynamic, spatially uniform patterns, and that the resulting signaling responses are well explained by a model that postulates a strong amplification of the signaling output, with the amplification threshold varying across the cells in the population. We further find that this pathway structure can also explain intracellular amplification of the chemoattractant gradient during cell migration. The new model predicts that diverse cell responsiveness can facilitate collective cell behavior, specifically due to the presence of a small number of cells in the population with hyper-responsive characteristics that aid in propagating the initial cAMP signaling wave across the cell population.

世話人：理学系研究科生物化学専攻生物情報科学科 黒田真也（内：24697）