

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 22 年 12 月 7 日（火） 17:00～18:30

場所：理学部 3 号館 4 階 412 号室

講師：Dr. Tal Danino

University of California, San Diego

演題：A synchronized quorum of genetic clocks

要旨：

The engineering of genetic circuits with predictive functionality in living cells represents a defining focus of the expanding field of synthetic biology. This focus was elegantly set in motion a decade ago with the design and construction of a genetic toggle switch and an oscillator, with subsequent highlights that have included circuits capable of pattern generation, noise shaping, edge detection and event counting. Here we describe an engineered gene network with global intercellular coupling that is capable of generating synchronized oscillations in a growing population of cells. Using microfluidic devices tailored for cellular populations at differing length scales, we investigate the collective synchronization properties along with spatiotemporal waves occurring at millimetre scales. We use computational modelling to describe quantitatively the observed dependence of the period and amplitude of the bulk oscillations on the flow rate. The synchronized genetic clock sets the stage for the use of microbes in the creation of a macroscopic biosensor with an oscillatory output. Furthermore, it provides a specific model system for the generation of a mechanistic description of emergent coordinated behaviour at the colony level.

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）