

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 21 年 12 月 7 日（月）13：30～

場所：理学部 3 号館 3 階 327 号室

講師：William R. Schafer

MRC Laboratory of Molecular Biology (Cambridge, England)

演題：Neuroimaging studies of *C. elegans* pain circuits

要旨：Elucidating the mechanisms by which nervous systems process information and generate behaviour is among the fundamental problems of biology. Ultimately, it is desirable to understand these processes at the most basic level, that of molecules and cells. We are investigating these questions using the nematode *Caenorhabditis elegans*, which has an anatomically simple and well-defined nervous system and is tractable to molecular and classical genetic analysis. Using recently developed methods for in vivo optical neuroimaging, we are investigating how the activities of individual neurons correlate with behaviour, and how genes with interesting behavioural phenotypes affect the activities of individual neurons in defined neural circuits. We are particularly interested in sensory circuits that mediate responses to noxious stimuli. *C. elegans* contain polymodal neurons that, like mammalian pain-sensing nociceptors, respond to aversive mechanical, chemical, and thermal stimuli. The responses of these neurons are modulated by monoamines as well as opioid signaling. We used these neurons to investigate molecular mechanisms involved in the sensation of harsh touch and extreme cold. In addition, we have identified interneurons that integrate convergent sensory information and allow nociceptive and mechanosensory neurons to modify each other's response properties. We anticipate that these studies will reveal basic conserved principles of sensory transduction and neural circuit function.

最近の主な論文

2009:

Walker DS, Vázquez-Manrique RP, Gower NJD, Gregory E, Schafer WR, Baylis (2009) "Inositol 1,4,5-trisphosphate signalling regulates the avoidance response to nose touch in *Caenorhabditis elegans*" *Plos Genetics* 5: e1000636

2008:

Suzuki H, Thiele T, Faumont S, Ezcurra M, Lockery S, Schafer WR. (2008) "Functional asymmetry in *C. elegans* salt taste neurons and its computational role in chemotaxis behaviour" *Nature* 454: 114-117.

2007:

Kindt KS, Quast KB, Giles AG, De S, Hendrey D, Nicastro I, Rankin CH, Schafer WR (2007) "Dopamine mediates context-dependent modulation of sensory plasticity in *C. elegans*" *Neuron* 55: 662-676.

Kindt KS, Viswanath V, Macpherson L, Quast K, Hu H, Patapoutian A, Schafer WR (2007) "Caenorhabditis elegans TRPA-1 functions in mechanosensation." *Nature Neurosci* 10: 568-577.