英国 Evelyne Sernagor博士 セミナーのご案内

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工学部 中央棟5階 大会議室
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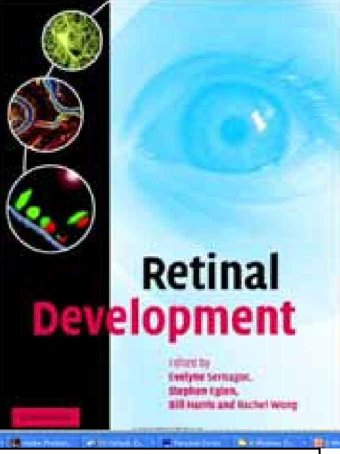

ご著書”Retinal Develpment”**などで知られる、英国**NewCastle**大学の** Dr Evelyne Sernagor**先生は、網膜と中枢を結ぶ視覚神経回路の形成メカニズムについて、網膜で自発的に起こるカルシウムシグナルの同期性や光感受性を観察することにより、解明を進められています。さらに、カーボン･ナノチューブによる多電極アレイを利用した網膜神経活動を調節する試みを含め、最新のご研究についてご講義下さいます。どうぞご参集下さい。**

Plasticity in developing retinal networks in health and disease

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Although retinal neural circuitry is immature in neonates, the developing retina is not “silent” before the emergence of visual experience. Indeed, spontaneous waves of activity spread across the ganglion cell (GC) layer, while visual connections become established. In this talk, I will review our studies on developmental changes in wave dynamics and on how early neural activity influences developing GC dendrites and receptive fields. The maturation of retinal circuitry is controlled by complex interactions between several neurotransmitters. Special emphasis will be given to the maturation of GABAergic inhibition, showing that GABAA responses are initially excitatory, and that the gradual shift to mature inhibition, through upregulation of the anionic transporter KCC2, underlies changes in activity patterns.

I will also introduce recent studies on the transgenic blind Cone-Rod homeoboX (Crx) mouse, an animal model of retinal dystrophy (*retinitis pigmentosa*). I will show that the Crx retina has developed powerful mechanisms to compensate for the lack of visual experience, exhibiting strong spontaneous oscillatory bursting activity throughout the degeneration process as well as widespread intrinsic photosensitivity in GCs. These altered early activity patterns lead to abnormal retinothalamic projections, confirming the crucial role played by early retinal activity in guiding the wiring of visual pathways during a critical period of brain development.

In the last part of my talk, I will present our new studies towards the development of retinal prosthetic devices, concentrating on our work using biocompatible carbon nano-tube multielectrode arrays, demonstrating their superior performance both in terms of coupling to the retina and GC stimulation.