

# 東京大学グローバル COE 特別セミナー

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## 理学系研究科 生物化学専攻セミナー

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演題：**Organization of Mitral Cell Connections to the Cortex  
Revealed by Retrograde Mono-transsynaptic Labeling**

日時：平成 22 年 4 月 20 日（火）17：00 ～18：00

場所：東京大学理学部 3 号館 4 階 416 号室

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In the mouse olfactory system, each of the >1,000 classes of the olfactory receptor neuron sends convergent axonal projections into a pair of specific glomeruli in the olfactory bulb (OB), creating a space map for odor detection. Projection neurons in the OB, the mitral/tufted cells, receive ORN inputs from individual glomeruli and send their axons to the olfactory cortex. How the olfactory map in the OB is represented in the cortex is largely unknown. Here we combine a recently developed retrograde mono-transsynaptic labeling technique (Wickersham et al., *Neuron* 53, 639, 2007) with mouse genetics for *in vivo* tracing of synaptic connections. We restrict spatial location of ‘starter’ populations to a few neurons of a specific type, and visualize their presynaptic partners with single-cell resolution. Using this method, we systematically mapped mitral cell connections to different olfactory cortical structures. We found single cortical cells in olfactory cortices on average receive inputs from mitral cells representing at least 3-14 different glomeruli, demonstrating a direct convergence of discrete glomerular inputs in individual cortical cells. Small areas of the olfactory cortex can receive a broad array of glomerular inputs. However, quantitative examination reveals different degrees of topographic organization in the anterior olfactory nucleus, amygdala and piriform cortex with respect to the distribution of their presynaptic mitral cells. These results indicate that the space map in the OB is differentially represented in different parts of the olfactory cortex. This genetically regulable transsynaptic labeling technique can be widely applied to probe connections at a single neuron resolution in many parts of the nervous system in mice.

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