第 508 回学内セミナー（大学院セミナー）

日　時：平成 27 年 7 月 2 日（木）*19:00～20:00*

会　場：院生棟 1 階　セミナー室

演　者：Jeff Wickens　先生

(Okinawa Institute of Science and Technology Graduate University, Professor)

演　題：Neural mechanisms for reinforcement learning in the striatum

【要　旨】

Positive reinforcement is a controlling factor in the acquisition of learnt behaviours. Many pieces of evidence indicate that dopamine mediates the effects of positive reinforcement and that the striatum of the basal ganglia is a crucial substrate for dopamine's actions in reinforcement learning. The striatum is the input nucleus of the basal ganglia, and links sensory, cognitive, and motor information from the cerebral cortex and thalamus with reward signals transmitted by midbrain dopamine neurons. Dopamine-dependent plasticity in the corticostriatal synapses connecting the cerebral cortex to the striatum may play a key role in reinforcement learning by translating the dopamine signal into changes in synaptic efficacy. We previously showed that corticostriatal synapses exhibit dopamine dependent plasticity according to a "three factor rule" for synaptic modification. In particular, a conjunction of presynaptic cortical input and postsynaptic striatal output results in long-term potentiation when associated with dopamine inputs, but long-term depression in the absence of dopamine. Thus, dopamine may facilitate selection of particular pathways among the matrix of corticostriatal input-output possibilities. However, the striatal output neurons differentially express dopamine D1 or D2 receptors and it is important to ask how the rules for synaptic plasticity differ between D1 and D2 cells. Moreover, the precise timing of input activity is important in synaptic plasticity and may play a role in the selection of specific synapses for modification. In particular, timing of the dopamine signal may be crucial for plasticity. Therefore, the biophysical mechanisms that integrate synaptic activity at the level of individual dendritic spines on striatal projection neurons, and the modulation of these mechanisms by dopamine requires further study. I will report ongoing research into these questions and how these different aspects are integrated into mechanisms for learning. The implications of these mechanisms for treating diseases in which dopamine function is altered, such as Parkinson's disease and attention-deficit hyperactivity disorder, will be discussed.

References

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（必修科目「医科学基礎総論」「医科学特論」「先端応用医学概論」の出席回数にカウントされます）
また、学内の研究者間の交流をはかることも目的としていますので、多数の御来聴をお願い致します。
大学院セミナーは、福和会・白翁会・本学医学部名誉教授からのご援助を受けています。

〔子どものこころの発達研究センターAge2 企画、大学院セミナー企画部会〕