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個人簡介：

林士傑博士目前於陽明大學神研所擔任教授。他在 2017 年返台之前，於美國國家衛生研究院(NIH)擔任長聘資深研究員。他的研究領域是系統神經科學，專長是活體多通道細胞外電生理記錄。透過訓練大小鼠進行認知行為模式，記錄不同腦區神經細胞的電生理訊號，來理解認知功能背後的神經機轉。同時並透過光遺傳學的方法來控制活體神經元的活性，以測試神經元活性與各種行為及認知功能因果關係。在過去幾年的研究當中，他的研究團隊發現基底前腦區的非膽鹼性神經元在注意力的神經機轉中，扮演一個前所未知的關鍵角色。

Topic:

Reward prediction error signal in the basal forebrain

Abstract：

Reward prediction error (RPE), which refers to the difference between received reward and expected reward, has been proposed as the key driving force for learning from both animal learning theories and from reinforcement learning models. While the discovery of RPE neural correlates in midbrain dopamine (DA) neurons has been highly influential, extensive preliminary data from my lab support the existence of a similar RPE signal in another major neuromodulatory system in the basal forebrain (BF), particularly among a special group of noncholinergic neurons which we refer to as BF bursting neurons. In this talk, I will describe how we use the BF RPE signal to gain insights on the decision making process during new associative learning. By tracking the temporal evolution of this BF RPE signal during new learning, we observe that the BF RPE signal temporally backpropagates from the time of reward to the reward-predicting stimulus in discrete steps. The dynamics of BF RPE backpropagation reveals how animals establish their internal reward prediction models during the early phase of new learning, and how such models undergo stepwise expansion to incorporate new reward predictors. These results will also add to the functional significance of the poorly understood noncholinergic BF neurons, which have been recently demonstrated to play key roles in top-down attention and reward-based decision making.