

東京大学グローバル COE『統合生命学』特別セミナー

東京大学 大学院理学系研究科 生物化学専攻セミナー

演者: **Dr. Urs Albrecht**

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演題: **Clocks, brain function and dysfunction**

日時: 平成 20 年 11 月 13 日 (木) 15:30~17:00

場所: 東京大学理学部 3 号館4階 416 号室

It is estimated that about 20% of the population in industrialized countries are affected by mood disorders such as depression and eating disorders. One of the hallmarks of industrialized countries is the fact that the natural day/night regime is largely ignored due to the availability of artificial light sources. As a consequence activity well beyond the borders given by nature have become possible. Therefore synchronization of the circadian system by natural cues has become inefficient leading to a misalignment of periodic physiological processes, which can hamper normal brain function. This derailment of the circadian system is probably one of the reasons for the increased incidence of depression, excessive alcohol consumption and over-eating in modern society. Apart from its function in the clock mechanism in the suprachiasmatic nuclei, the clock gene *Per2* appears to have additional functions in other areas of the brain. It is postulated that a food entrainable oscillator (FEO) resides in the brain, which is responsible for anticipatory activity in expectation of regularly scheduled meals. A mutation in *Per2* leads to loss of food anticipatory activity in mice suggesting an important role of *Per2* in the FEO. Interestingly, several studies have found that feeding behavior shares neurobiological mechanisms with the addictive properties of drugs of abuse. Because *Per2* not only affects food anticipatory behavior but also modulates the effects of drugs of abuse we postulate that this gene and its protein influences the neurobiological circuitry that is common to feeding signals and drugs, both of which affect the reward system. Evidence will be presented highlighting a role of *Per2* in alcohol consumption and cocaine addiction indicating an influence of the clock on glutamatergic as well as dopaminergic signaling. These findings provide a base for development of new approaches in medical treatment of neuropsychiatric disorders.

Spangel, R. *et al.* (2005) The clock gene *Per2* influences the glutamatergic system and modulates alcohol consumption. *Nat. Med.* **11**, 35-42

Hampp, G. *et al.* (2008) Regulation of Monoamine oxidase A by circadian-clock components implies clock influence on mood. *Curr. Biol.* **18**, 678-683

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