平成26年度医学・生命科学セミナー／D1 "Medical & Life Science Seminar, 2014"

＊このセミナーは７月に開催を予定していたものが変更になった分です。

We will held the following seminar, which was postponed in July.

Behavior control using optogenetics and pharmacogenetics

- **Prof. Akihiro Yamanaka** 山中 章弘 教授（名古屋大学環境医学研究所・神経系分野Ⅱ）

Research Institute of Environmental Medicine (RIEM), Nagoya University

- **Date: September 2nd (TUE), 2014 from 17:30.** 平成26年9月2日（火）17:30
- **Place: Lecture Room 2, Medical Education & Library Building 3rd Floor.**

医学教育図書棟3階 第2講義室

Neurons form complex network which work as functional circuit to regulate behavior in the brain. Little is known about how these circuit functions to regulate behavior since it had been impossible to control the activity of specific type of neurons among them. Recently developed techniques, optogenetics and pharmacogenetics (chemicogenetics) enables control the activity of specific type of neurons in the brain using light or chemical substances. These new techniques allow us to study the function of these network and behavior using the whole animal. Especially, instinctive behaviors such as feeding, drinking and sleep/wakefulness behaviors are exhibited only in the whole animal. To reveal its regulatory mechanism, *in vivo* study using whole animal is essential. I developed a series of transgenic mice line which allow us to easily apply optogenetics. These instinctive behaviors are regulated by neuropeptide containing neurons in the hypothalamus. The activity of these peptidergic neurons was acutely manipulated using optogenetics or pharmacogenetics to control instinctive behaviors. In this seminar, I will discuss about neural regulatory mechanism of these instinctive behaviors using our recent results.

Recent Publications: (*Corresponding Author)

1. Tsunematsu T, Ueno T, Tabuchi S, Inutsuka A, Tanaka KF, Hasuwa H, Kilduff TS, Terao A, *Yamanaka A (2014) Optogenetic Manipulation of Activity and Temporally Controlled Cell-Specific Ablation Reveal a Role for MCH Neurons in Sleep/Wake Regulation. **J Neurosci** 34:6896-6909.
2. Tabuchi S, Tsunematsu T, Black SW, Tominaga M, Maruyama M, Takagi K, Minokoshi Y, Sakurai T, Kilduff TS, *Yamanaka A (2014) Conditional ablation of orexin/hypocretin neurons: a new mouse model for the study of narcolepsy and orexin system function. **J Neurosci** 34:6495-6509.
3. Ohmura Y, Tanaka KF, Tsunematsu T, *Yamanaka A, Yoshioka M (2014) Optogenetic activation of serotonergic neurons enhances anxiety-like behaviour in mice. **Int J Neuropsychopharmacol:1-7.**
4. Tanaka K F, Matsui K, Sasaki T, Sano Hiromi, Sugio S, Fan K, Hen R, Nakai J, Yanagawa Y, Hasuwa H, Okabe M, Deisseroth K, Ikenaka K, Yamanaka A (2012)
   Expanding the repertoire of optogenetically targeted cells with an enhanced gene expression system. **Cell Reports** 2(2):397-406.
5. Tsunematsu T, Kilduff TS, Boyden ES, Takahashi S, Tominaga M, *Yamanaka A (2011)
   Acute optogenetic silencing of orexin/hypocretin neurons induces slow wave sleep in mice. **J Neurosci** 31:No.29, 10529-10539.

- Inviter: Prof. Song (Department of Sensory & Cognitive Physiology) 担当:/宋教授 知覚生理学分野
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