＊平成 27 年度医学・生命科学セミナー / D1 Medical and Life Science Seminar, 2015＊

Complex neural networks from neuronal individuality

- Lecturer: Prof. Takeshi YAGI
  (Graduate School for Frontier Biosciences, Osaka University)
- Date: September 16th (WED) from 17:30.
- Place: Lecture room 2, Medical Education & Library Building 3F.

○ 講師：八木 健 教授（大阪大学大学院生命機能研究科 心生物学研究室）
○ 日時：平成 27 年 9 月 16 日（水）17:30
○ 場所：医学教育図書棟 3 階 第 2 講義室

The brain possesses complex neural networks. To address the complex brain system, we need to realize how to generate the complex neural networks in the brain during development. Recent physiological approaches reveal that the neural networks in the brain are complex small-world networks between regular and random, and also possess high clustered neuron groups. However, we have not yet understood mechanisms how to generate the complex small-world neural networks in the brain. In 1998, we discovered diverse genes encoding cadherin related-neuronal receptors (*CNR*s) from the mouse brains. The *CNR*s belong to clustered protocadherins (*Pcdh*s) that are constituted by 58 members in mice (53 in humans). Approximately 50 members of the clustered Pcdhs are stochastically expressed in individual neurons in distinct combinations, and induces cell-adhesion between the cellular membranes. Namely distinct combination Pcdhs provide distinct cell-adhesion activities in individual neurons. In simulation analyses, when their cell-adhesion activities make specific neural networks between individual neurons, the complex small-world neural networks spontaneously generate. Recent physiological approaches also revealed that the high clustered neural networks prepare during development. In this lecture, I would like to discuss the complex neural networks and approaches for the complex brain system by using genetic codes.

- Inviter: Prof. N. Tamamaki (Dept. of Morphological Neural Science)
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