

真菌医学研究センター Monthly セミナー

平成27年3月17日(火) 16:00~17:30
千葉大学真菌医学研究センター 大会議室

Professor Jean-Marc Reichhart

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Title: Inside the Nobel-Prize Winning Research on
Toll-like Receptors

“Drosophila as a model to study the innate immune response”

Abstract: During evolution, the adaptative immune system arose around 500 million years ago in vertebrates. In all invertebrates, the immune system is purely innate and this system represents the most ancient defence mechanism. We have been working since 1985 on the innate immune system, using *Drosophila* as a model. In the fly, an infection provokes the rapid synthesis of powerful antibiotic peptides by the fat body. As an example, the basal level of expression of the antifungal peptide DROSOMYCIN, is increased a thousand fold within 30 minutes of septic injury in larvae or adults. In 1996, we discovered that the Toll signal transduction pathway, which was already known for its role in the setting up of the early dorso-ventral axis in the *Drosophila* embryo, controlled the antifungal response of the adult fly. This work was the breakthrough that led to the discovery of the human homologues of Toll, the Toll-Like-Receptors (TLRs). The paramount role of the TOLL pathway in the host defence of *Drosophila* is illustrated by experiments in which mutant flies are challenged with fungi or bacteria. In TOLL-deficient mutants, survival to fungal, but not to bacterial infection, is severely compromised. In Vertebrates, recognition of microbes by the innate immune system takes place at the cellular level by the TLRs. In *Drosophila* however, these recognition events take place in the open circulatory system via soluble excreted recognition proteins. We will describe the immune system of *Drosophila* in both an evolutionary and historical perspective.

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