東京大学 グローバル COE 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

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演題：Membrane proteins, from the cell to the crystal：

1. Amphipols and hemifluorinated surfactants:
   novel tools for membrane biologists;
2. X-ray structure of a multi-subunit membrane protein,
   the cytochrome b_6f complex

日時：平成 24 年 2 月 16 日（木）15:00〜16:00

場所：東京大学理学部 3 号館 3F 303 号室

Abstract

Two topics will be covered in this seminar.

First, the general problem of handling integral membrane proteins in solution will be discussed. Membrane proteins classically are handled in aqueous solutions as complexes with detergents. The dissociating character of detergents, combined with the need to maintain an excess thereof, frequently results in more or less rapid inactivation of the protein under study. Over the past decade, we have endeavored to develop two novel families of surfactants, dubbed 'amphipols' (APs) and 'hemifluorinated surfactants' (HFSs), respectively. APs are amphiphilic polymers that bind to the transmembrane surface of the protein in a non-covalent but, in the absence of a competing surfactant, quasi-irreversible manner. Membrane proteins complexed by APs are in their native state, stable, and they remain water-soluble in the absence of detergent or free APs. The molecular structure of HFSs resembles that of classical detergents, but their hydrophobic moiety comprises a perfluorinated section. Because of the poor miscibility of hydrocarbons and perfluorocarbons, HFSs behave as extremely mild detergents. An update will be presented of the current knowledge about these two classes of compounds and their demonstrated or putative uses in membrane biology.

Second, a new membrane protein X-ray structure, solved recently using classical approaches, will be briefly presented and some of its implications discussed.

References

● Tribet, C., Audebert, R., & Popot, J.-L. (1996) Amphipols：polymers that keep membrane proteins soluble in aqueous solutions. *Proc. Natl. Acad. Sci. USA* **93:** 15047-15050.

● Gohon Y., & Popot, J.-L. (2003) Membrane protein-surfactant complexes. *Curr. Opin. Colloid Interface Sci* **8:**15-22.

● Popot, J.-L., Berry, E. A., Charvolin, D., Creuzenet, C., Ebel, C., Engelman, D. M., Flötenmeyer, M., Giusti, F., Gohon, Y., Hervé, P., Hong, Q., Lakey, J. H., Leonard, K., Shuman, H. A., Timmins, P., Warschawski, D. E., Zito, F., Zoonens, M., Pucci, B. & Tribet, C. (2003). Amphipols：polymeric surfactants for membrane biology research. *Cell. Mol. Life Sci.* **60:**1559-1574.

● Breyton, C., Chabaud, E., Chaudier, Y., Pucci, B. & Popot, J.-L. (2004). Hemifluorinated surfactants: a non-dissociating environment for handling membrane proteins in aqueous solutions? *FEBS Lett., in the press*.

● Stroebel, D., Choquet, Y., Popot, J.-L., & Picot, D. (2003) An atypical haem in the cytochrome b_6f complex. *Nature* **426:**413-418.

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