

Single-molecule biophysics of ATP synthase



◆ Lecturer: Professor Hiroyuki Noji

(Department of Applied Chemistry, The University of Tokyo)

◆ Date: July 8th (WED) from 17:30.

◆ Place: Conference room, Institute of Molecular Embryology & Genetics 1F.

★Lecture room has been changed. 会場を変更しておりますのでご注意ください。★

◆ 講師：野地 博行 先生（東京大学大学院工学系研究科 応用化学専攻 教授）

◆ 日時：平成 27 年 7 月 8 日（水）17:30

◆ 会場：発生医学研究所 1 階 カンファレンス室

The unique feature of ATP synthase that distinguishes from other molecular motor proteins is high reversibility of chemo-mechanical coupling reaction; when the mechanical motion of ATP synthase, that is rotation of the innersubunit (the shaft subunit) complex, is reversed, chemical reaction is also reversed, synthesizing adenosine triphosphate (ATP) from adenosine diphosphate (ADP) and inorganic phosphate against the large chemical potential of ATP hydrolysis. In this presentation, I will introduce our single-molecule experiments conducted with an aim to elucidate how catalytic reaction is coupled with mechanical rotation in ATP synthase. I also like to discuss the prospectives of molecular machine-based technology for highly efficient energy conversion.

1. Watanabe R, Noji H. Chemomechanical coupling mechanism of F1-ATPase: Catalysis and torque generation (2013) *FEBS Letters* 587: 1030-1035. (Review)
2. Watanabe R, Matsukage Y, Yukawa A, Tabata KV and Noji H. Robustness of the rotary catalysis mechanism of F1-ATPase (2014) *J Biol Chem* 289: 19331-19340.
3. Watanabe R, Okuno D, Sakakihara S, Shimabukuro K, Iino R, Yoshida M, Noji H. Mechanical modulation of catalytic power on F1-ATPase (2011) *Nature Chemical Biology* 8: 86-92.

- ◆ Inviter: Prof. T. Ogura (Dept. of Molecular Cell Biology) / 分子細胞制御学分野 小椋 光 教授
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