# 分子生物学科・環境科学研究センター共催セミナー

（第 8 回分子生物学科分子細胞生理学研究グループ合同セミナー・
大学院集中講義生命科学特別講義）

## Proteins and carotenoids are bricks and mortar for constructing functional photosystem II complex architecture

Prof. Zoltán Gombos
Institute of Plant Biology, Biological Research Center,
Hungarian Academy of Sciences

日時：平成 23 年 11 月 18 日（金）18：00～20：00

場所：理学部 3 号館 11 番教室

PSII supercomplex of the electron transport chain governs the energy transfer using harvested light energy that is transformed to biochemical energy. Carotenoids can assist in assembly of photosynthetic complexes of both in higher plants and cyanobacteria. Carotenoids are protective agents, which prevent photosynthetic complexes from degradation caused by reactive oxygen species. There are several specific carotenoids in cyanobacteria and also in higher plants with individual roles in photosynthetic reactions. They guard molecules and can protect proteins against free-radical attack generated by surplus of light exposition. A carotenoid-less *Synechocystis* PCC 6803 mutant was generated in which the *crtB* gene encoding phytoene synthetase was inactivated. Consequently, no carotenoid synthesis was observed. In mutant cells the synthesis of determinative proteins involved in the assembly of PSII was blocked together a concomitant block in the assembly of PSII structure. However, PSI was assembled and it was functional. Phosphatidylglycerol (PG) and sulfoquinovosyl diacylglycerol, the anionic lipids of photosynthetic organisms, together with a neutral lipid, digalactosyldiacylglycerol (DGDG), assist in the assembly of photosynthetic complexes. These lipids and carotenoids serve as mortar for the proteins that act as bricks in the construction of the active photosynthetic machinery, and they have determinative roles in the oligomerization of protein subunits. X-ray crystallographic localization of glycerolipids and carotenoids revealed that they are present at functionally and structurally important sites of both the PSI and PSII reaction centers. PG is involved in the formation of the reaction-center oligomers and controls electron transport at the acceptor site of PSII. DGDG, together with PG, is involved in the electron transport at the donor site. PG and carotenoids are needed to glue CP43 to the reaction center core.

問い合わせ先：西山佳孝（分子生物学科 ext. 4317）