

分子生物学科・環境科学研究センター共催セミナー

## Photoinhibition of photosystem II – Old ideas and new concepts

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場所:理学部 3 号館 11 番教室

Although light is the driving force of photosynthesis, light also damages the photosynthetic machinery. The damage is called photoinhibition of photosystem II (PSII). Only one photon in ten million damages PSII but this rate would be fast enough to kill all plants in one sunny day if PSII was not actively repaired. The molecular mechanism of photoinhibition is under active research. Some models suggest that singlet oxygen ( $^1\text{O}_2$ ) is the cause of the damage, but these models do not take into account the light response and action spectrum of photoinhibition. On the other hand, the manganese model that is based on these basic photophysical features of photoinhibition, has not considered the importance of  $^1\text{O}_2$ . I wish to show that the two models can be brought together to build a mechanism conforming with all experimental data. I propose that photoinhibition starts with inhibition of the manganese complex by light. An inhibited manganese complex promotes recombination between the primary donor and the first quinone acceptor of PSII.  $^1\text{O}_2$  production due to this recombination may inhibit protein synthesis or spread the photoinhibitory damage to another PSII centre.  $^1\text{O}_2$  is produced only transiently because a conformational change in PSII soon lowers  $^1\text{O}_2$  production.

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