

Press Release: Embargo to be lifted on May 24, 2010 at 3:00 PM U.S. Eastern time

## Discovery of Mechanism by Which Plant Photosystems Adjust to Variable Sunlight

Research by University of Shizuoka Laboratory of Plant Molecular Improvement published in prestigious journal Proceedings of the National Academy of Sciences\*

### Summary:

Professor Hirokazu Kobayashi and coworkers at the University of Shizuoka's Graduate School of Nutritional and Environmental Sciences have discovered an important mechanism by which plants sense the quantity and quality of light in their environment, and then use this information to fine tune the process of photosynthesis. This work will be published online on May 24, 2010 in the Proceedings of the National Academy of Sciences (PNAS), one of the highest impact science journals in the United States. This work will also be picked up as "Research Highlights" in *Nature Chemical Biology*.

### Article Title:

M. Shimizu, H. Kato, T. Ogawa, A. Kurachi, Y. Nakagawa, and H. Kobayashi: Sigma factor phosphorylation in the photosynthetic control of photosystem stoichiometry. *Proceedings of the National Academy of Sciences of the United States of America*, **107**, 10760-10764, 2010.

### Detailed Summary:

Plants use the process of photosynthesis to convert solar energy and atmospheric carbon dioxide into carbohydrates. Photosynthesis is of great importance to humans not only because it is the ultimate source of all of our food, but also because it can play a key role in combating climate change through the absorption of the "greenhouse gas" carbon dioxide and through the production of biofuels, an alternative form of energy to fossil fuels. The Laboratory of Plant Molecular Improvement at the University of Shizuoka has discovered the way that specialized organelles within plant cells called chloroplasts sense the quantity and quality of light in their environment, and then use this information to fine tune the process of photosynthesis. By using this system, plants prevent the generation of molecules known as reactive oxygen species, which can be very harmful to their cells. In this way, plants protect themselves against the harmful effects of the sun, while at the same time exploiting its rays to aid in the capture of atmospheric carbon dioxide. This research opens the way to methods for improving the efficiency of photosynthesis, which may ultimately enable increased production of food and biofuels, as well as improved methods for absorbing carbon dioxide from the atmosphere.

\*Proceedings of the National Academy of Sciences of the United States of America: PNAS is one of the world's most-cited multidisciplinary scientific serials. Since its establishment in 1914, it continues to publish cutting-edge research reports, commentaries, reviews, perspectives, colloquium papers, and actions of the Academy. Coverage in PNAS spans the biological, physical, and social sciences. PNAS is published weekly in print, and daily online in PNAS Early Edition. The PNAS impact factor is 9.38 and the Eigenfactor is 1.7 for 2008 (From <http://www.pnas.org/site/misc/about.shtml>)

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