

SOLS Seminar: The SOLS' Outstanding Young Alumni Award

"Adaptation of photosynthetic carbon metabolism to changing environmental conditions: Insights Past, Present, and Future"

Rubisco is one of the most abundant proteins on the Earth and is an essential component of using solar energy to fix inorganic carbon (CO_2) into organic carbon (sugars) during photosynthesis. However, terrestrial plants use only a small percentage of the total radiation incident on the earth's surface for photosynthesis. This inefficiency is in part due to the inability of Rubisco to distinguish between the substrate (CO_2) and product (O_2) of photosynthesis. Rates of photosynthesis are inhibited by the oxygenation reaction of Rubisco, which decreases the energy efficiency of net CO_2 assimilation. In fact, the oxygenation rate is about 20% the rate of net CO_2 assimilation in most plants under current climatic conditions. In response, terrestrial plants have evolved a number of complex metabolic pathways to recycle some of the carbon potentially lost by the oxygenation reaction (photorespiration) and CO_2 concentrating mechanisms (C_4 photosynthesis) to reduce the rates of the oxygenation reaction. These complex metabolic pathways do not function in isolation but rely on the inter-conversion of energy and metabolites between various organelles and cell types within a leaf. Understanding the regulation and flux of carbon and energy between these metabolic pathways and organelles is important for determining: 1) How plants respond to environmental stress, 2) How future climatic conditions will influence plant carbon assimilation, and 3) How to maximize photosynthetic productivity to help meet our current and future food and energy requirements. During this presentation I will discuss research that I am involved with, looking at the flexibility of photorespiratory carbon metabolism, the efficiency of C_4 photosynthesis in response to changing environmental conditions and efforts to engineer C_4 photosynthesis into a C_3 crop species.



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Friday, February 17, 2012

2 p.m. - 3 p.m.

LSE 104

Host: Andy Webber

Refreshments at 1:35

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