Biology Seminar

12:30 - 1:30 pm
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BGS 0165

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Metabolic Growth Signaling in Photosynthetic Organisms & Its Utilization to Enhance Crop Productivities.

The evolutionarily conserved target-of-rapamycin (TOR) kinase coordinates cellular and organismal growth in all eukaryotes. Amino acids (AAs) are known as key upstream signals for TOR activation in various eukaryotic organisms. Interestingly, the time-resolved metabolomic analysis elucidated the high accumulation of amino acids (and derivatives) immediately after TOR inhibition in the photosynthetic model Chlamydomonas. Using the rapamycin-sensitive photosynthetic model green alga Chlamydomonas reinhardtii we elucidated the molecular causes of the amino acid accumulation that occurs after rapamycin-induced inhibition of TOR. Moreover, since the amino acid (/derivatives) act as upstream signals for TOR in plants, we are currently investigating their potential utilization to enhance growth and productivities in the crop models. Besides, plants also release various metabolites (amino-, organic acids and secondary metabolites) in their root exudates that serve the function of intra- and inter-specific communications among plants as well as plants to microbes. The secreted metabolites can not only be consumed as nutrients by the surrounding microbes but also act as molecular signals for the formation of the specialized microbial communities. This talk will elaborate on how plants respond to different metabolic signals that eventually determines their yields.