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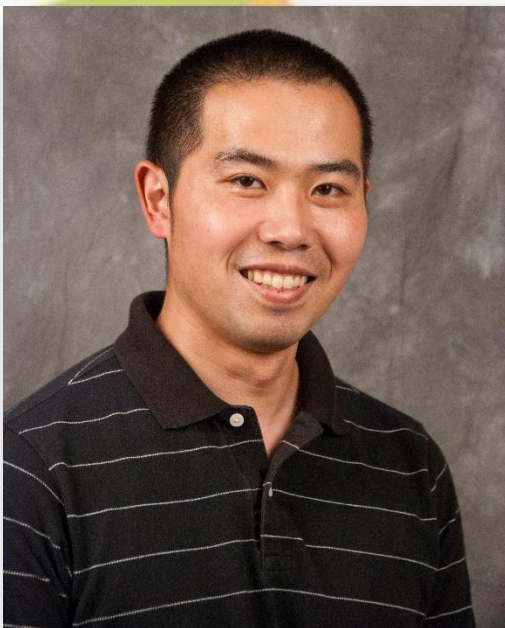
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The Auditorium (Level 1)

Flexibility of G-protein network architecture during evolution

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Dr. Daisuke Urano is a postdoctoral fellow in Alan Jones's laboratory at the University of North Carolina. He obtained his bachelor's degree in agricultural engineering at the University of Tokyo, and doctoral degree at the Nara Institute of Science and Technology, where he trained in biochemistry and cell biology in animal G protein science. He is currently developing an evolutionary approach to elucidate G protein regulations in animals, plants and other eukaryotes.

We know a considerable amount about signaling networks in model species, but we know very little about the flexibility of these networks during evolution. Both the animal and plant genomes encode heterotrimeric G-protein genes, however the two evolutionary clades have constructed distinct network architectures. In the animal G protein paradigm, activation of the G-protein complex is rate limited by active G protein-coupled receptors (GPCRs). This canonical regulation does not exist in plants, as we discovered that plant G proteins spontaneously activate without GPCRs. Instead of GPCRs, Arabidopsis has a 7TM-Regulator of G protein Signaling (RGS) to control the activation state of the "self-activating" G-protein. This deviation is inherited by dicots and gymnosperms, but it is excluded in cereals and bryophytes, which lack a 7TM-RGS. The "self-activating" properties and the lack of regulatory genes implied an unidentified component to regulate G protein in cereals and bryophytes. I will talk about (1) a fundamental biochemical property that makes animal and plant G-protein regulations different, (2) a novel mechanism to modulate plant G protein activity in vivo, and (3) flexibility of G protein regulatory systems within the plant kingdom. I will also discuss the current issues and future directions in plant G protein science.

Recent Publications:

1. Urano D, Jones JC, Wang H, Matthews M, Bradford W, et al. (2012) PLoS genetics 8: e1002756
2. Urano D, Phan N, Jones JC, Yang J, Huang J, et al. (2012) Nature cell biology 14: 1079-1088
3. Bradford W, Buckholz A, Morton J, Price C, Jones AM, Urano D (2013) Science signaling 6: ra37.