



Colloquium

From insult to organization: Regeneration of the plant root meristem

Kenneth Birnbaum

New York University

Host: Eva Benkova

Plants are particularly adept at regeneration, with the ability of most plant taxa to replace lost or damaged adult organs by reassembling their adult growth centers known as meristems. The overall question my lab addresses is what makes plant so good at regeneration? Or, in more developmental terms, how does the plant replace lost cell identities and repattern the meristem? The phenomenon of regeneration has helped shed light on the question of what exactly is a stem cell in plants and how is the plant meristem assembled during development. We use the Arabidopsis root as a model for plant regeneration with ability to live image regeneration, employ single cell RNA-seq on regenerating cells, and test models with genetic perturbation. Using these techniques, our current model suggests that the first step in regeneration is not necessarily the activation of stem cells but rather the assembly of mature tissues. We found that regeneration resembles embryogenesis or perhaps more broadly involves a signaling cassette involving cross between the hormones auxin and cytokinin that generates the basic organization of the root. Cell types organize around this tissue “scaffold” and stem cells are eventually recruited from many different existing cells that essentially wind up on the right place. Stem cell behavior only emerges after tissue assembly. Our current model is that the tissue composition and mechanical properties of the meristem together lead to stem cell identity. In this view, the plant’s regenerative capacity arises from the ability to restart tissue patterning on many different types of dividing cells where almost any dividing cell is fully capable of adopting stem cell activity.

Monday, November 13, 2017 04:00pm - 05:00pm

Raiffeisen Lecture Hall, Central Building



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