Planarian Head Shape Control Regeneration Recapitulates Phylogeny

Meeting Abstract

111-1 Tuesday, Jan. 7 08:00 – 08:15 **Planarian Head Shape Control: Regeneration Recapitulates Phylogeny** *GAWNE, R*; LEVIN, M; Tufts University; Tufts University* richard.gawne@tufts.edu

Planarian flatworms are important model systems for understanding regeneration because many species are able to reconstitute their entire body from small tissue fragments. Contemporary research on these animals has tended to focus on the mechanisms responsible for establishing head/tail polarity, and accordingly, we know a great deal about the factors that determine which end of a wounded body fragment will regenerate a head, as opposed to a tail. Comparatively little is known about how head shape is established, and why regeneration ceases when a specific head shape is achieved. The shapes of planarian heads vary significantly across species, ranging from rounded, to triangular, to square-like, and often change significantly over the course of regeneration. Using techniques from geometric morphometrics, we construct a morphospace for planaria head

shapes, and show that species with complex head morphologies go through regenerative stages that resemble the fully formed heads of other species. In light of these, and other findings, we suggest that complex head shapes have evolved by a process of terminal addition. To better obtain a better understanding of how head shape is produced during regeneration, we experimentally inhibited cell-cell communication through the application of a gap junction blocker. This treatment was found to have different effects on the regenerative process in different species, indicating a potential role for non-genetic physiological mechanisms in the evolution of head shape.