

# Molecular & Cellular Biology Faculty Search

*“Embracing change:  
somatic plasticity as a  
strategy for host defense  
and reproduction”*

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Hosted By: Justina McEvoy



Somatic tissue turnover is a conserved strategy of preservation through change that is differentially utilized throughout organs and organisms. Study of organisms with a high degree somatic turnover across multiple tissues has the potential to shed light on fundamental mechanisms relevant for our understanding of wound healing, tissue regeneration, chronic inflammatory disorders, and tumorigenesis. The planaria *Schmidtea mediterranea*, maintains all adult tissues through controlled somatic turnover. Their unrestricted growth, immortality, and regenerative abilities arise from an enduring pool of totipotent adult stem cells that divide and differentiate to replace lost cells during homeostasis and injury. This somatic plasticity underlies the planarians' approach to host defense and asexual reproduction. In response to pathogenic challenge planaria increase their rate of cell turnover via TAK1 pathway mediated cell death and stem cell proliferation. Strategic utilization of somatic tissue is also key to their propagation. Planaria reproduce asexually by physically tearing off a portion of their posterior tissue that will regenerate into clonal progeny. This process requires careful integration of indeterminate growth and behavior mediated by the Wnt and TGF-Beta signaling pathways. Collectively, these attributes position planaria as a uniquely advantageous model for dissecting the regulation of cell turnover, size-dependent pattern formation, and coordinated tissue growth.

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