

Joshua Currie, Ph.D.

Center for Regenerative Therapies
Dresden, Germany

“Unlocking our inner salamander: The path from scarring to perfect regeneration”

I am fascinated by how injury is resolved. What are the molecular and cellular events that occur after injury and how do these events lead to either perfect regeneration or imperfect scar-formation? In mammals like humans and mice, injury is most often resolved by the formation of a fibrotic scar. This stands in stark contrast to animals such as the Mexican axolotl, where amputation of the limb culminates in the restoration of patterned tissue and skeleton. Using high-resolution live imaging and ex vivo analysis I answered several longstanding questions as to how axolotls can create, de novo, a progenitor mass to perfectly reconstitute lost tissue. Specifically, I found 1) which cells regenerate lost skeleton and connective tissue, 2) the spatial and temporal requirements for cells to be able to pattern regenerating tissue, and 3) a molecular signal that is essential to recruit progenitor-forming cells into the regenerate. In parallel to my work in the axolotl, I have also set up transgenic mouse models, which also form fibrotic scar to resolve injury, to identify molecular mechanisms that underlie differences to axolotl wound repair (manuscript in preparation). Ultimately I will use these models as a foundation for translational applications to improve wound healing.

Currie J.D., Kawaguchi A., Moreno Traspas R., Schuez M., Chara M., Tanaka E.M. "Live imaging of axolotl digit regeneration reveals spatio-temporal choreography of diverse connective tissue progenitor pools," *Developmental Cell*. 39(4), 411-423, 2016.

- Highlighted in Faculty of 1000 and in *Current Biology*: <http://doi.org/10.1016/j.cub.2016.11.022>
- Science Sketch video abstract: <http://www.sciencesketches.org/single-post/2017/01/11/How-are-cells-coordinated-to-regenerate-the-salamander-limb>

Murawala P., Tanaka E.M., **Currie J.D.** "Regeneration: The Ultimate Example of Wound Healing," *Seminars in Cell and Developmental Biology*, 23(9), 954-962, 2012.

Monday, June 19, 2017 at 1:00 p.m.

Ramsay Wright Building, Room 432

Host: Prof. Vince Tropepe <v.tropepe@utoronto.ca>
Refreshments will be served. All are welcome!

*This seminar will be recorded to be accessible within 24 hours after the event.
Ramsay Wright is a wheelchair accessible building.*