

LOCAL AND SYSTEMIC FUNCTIONS OF THE ADULT INTESTINE IN HEALTH AND DISEASE



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Research in our laboratory aims to elucidate the mechanisms by which intestinal stem cells (ISCs) adapt and respond to changes in their micro- and macro-environment, how the intestine senses and controls whole-body homeostasis, and how intestinal dysfunction can lead to broader organismal instability.

We use the fruit fly *Drosophila melanogaster* as a primary research model system due to its unparalleled genetic power and amenability for multi-organ *in vivo* studies combined with experiments in mammalian systems.

The adult intestine is a major barrier epithelium and coordinator of multi-organ functions. Stem cells constantly repair the intestinal epithelium by adjusting their proliferation and differentiation to tissue intrinsic, as well as micro- and macro-environmental signals. How these signals integrate to control intestinal and whole-body homeostasis is largely unknown. Addressing this gap in knowledge is central to an improved understanding of intestinal pathophysiology and its systemic consequences.

Combining *Drosophila* and mammalian model systems the laboratory has discovered fundamental mechanisms driving intestinal regeneration and tumourigenesis and outlined complex inter-organ signalling regulating health and disease. We have three interrelated areas of research in the lab.

- 1 Identify and characterise stem cell intrinsic adaptations underpinning intestinal regeneration and tumourigenesis.
- 2 Elucidate interactions between the intestine and its microenvironment influencing intestinal regeneration and tumourigenesis.
- 3 Characterise how long-range signals from the intestine impact whole-body function in health and disease.

Publications listed on page 104

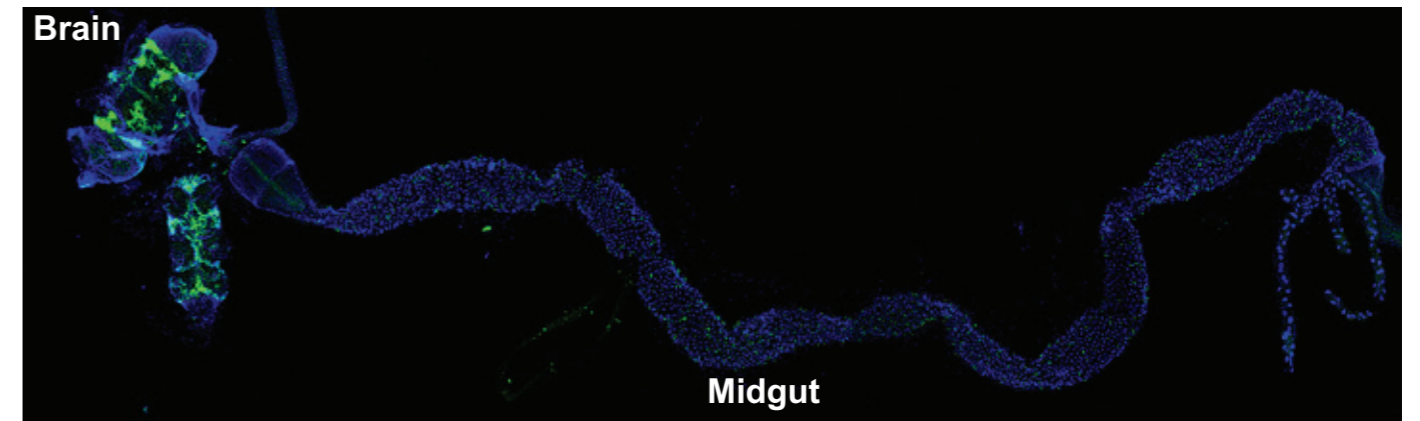


Figure 1
Image of the adult *Drosophila* brain midgut. Hormone secretory cells (green), all cell nuclei (blue).

Image by Andre Medina