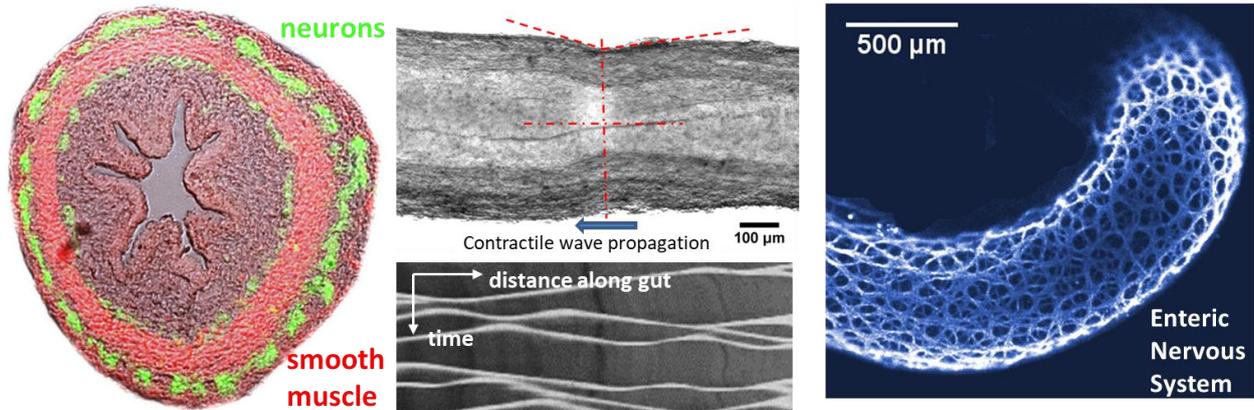


Physical Organogenesis of the Gut



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Lab interests, project description :

We work on physical embryogenesis, which is the study of how mechanical or electrical fields generated within the embryo influence, guide and control its development. This line of research is strongly interdisciplinary, it involves physics, developmental biology, physiology, genetics and medicine. We work on the development of a particular organ, the gut, a phenomenological gold mine. Our work is experimental and carried out mostly on chicken embryos, although we also use mice for genetic purposes.

Current topics developed in the lab include 1°) how physical forces [1,2] and bioelectricity [3] affect embryonic gut growth and regeneration, 2°) how the intrinsic innervation of the intestine (the enteric nervous system) wires up during embryonic development and controls digestive peristaltic movements [4–6], 3°) how neural crest cells [7] migrate in the embryonic gut to give rise to the enteric nervous system [8] – migration defects result in an ill-understood pathology, Hirschsprung disease, 4°) dysmotility of uterine peristaltic activity in a very wide-spread disease, endometriosis [9]

We are currently looking for motivated students to join us in this research venture. This internship will offer the possibility to develop strong experimental and analytical skills in biophysics and embryology: dissection, biomechanical testing, organ culture, electrophysiology, tissue staining, biochemistry (WB, PCR), microscopy (optical, time-lapse, confocal, second harmonic generation etc.), image analysis (ImageJ), computational methods (Matlab, finite-element modeling). Applications from students with various backgrounds will be considered (e.g. medicine, physics, physiology, biology...).

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