

Internship Proposal

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Project Title:

Actin regulation during embryonic cell division in vivo

Level:

Master Student

Project Summary:

We study how alterations in actin regulators, often mutated in disease, affect the actin cytoskeleton, and how they impact fundamental cellular processes like cell division, embryo development and tissue morphogenesis in vivo. Our experimental model organism of choice is the *C. elegans*, which can be easily manipulated in the laboratory, where major actin regulators are very similar to those in humans, whose genome can be edited by CRISPR/Cas9 to generate mutants of the gene of interest, and whose proteins are straightforward to fluorescently tag for direct live-imaging.

Work to be developed by the student:

In this project the student will characterize the function of a major actin regulator, known to be essential for life, in the process of cell division during embryo development in vivo. Defects caused by mutations generated by direct genome editing using CRISPR/Cas9 will be assessed in *C. elegans* embryos expressing fluorescent reporters for chromosomes, mitotic spindle and cytokinetic contractile ring. Approaches to be used include: genome editing using CRISPR/Cas9 technology, RNA interference, advanced confocal microscopy, and genetic crosses.

References:

AF Sobral, FY Chan, MJ Norman, DS Osório, AB Dias, V Ferreira, DJ Barbosa, D Cheerambathur, R Gassmann, JM Belmonte, AX Carvalho (2021). Plastin and spectrin cooperate to stabilize the actomyosin cortex during cytokinesis. *Current Biology*, 31, 5415-5428. doi: 10.1016/j.cub.2021.09.055.
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