

Internship Proposal

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Project Title:

Actin regulation in muscle functioning 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 one important actin regulator in the muscle of *C. elegans* by investigating how its inhibition affects muscle sarcomere structure by live-imaging of fluorescent muscle reporters, and animal movement by motility assays through a biocompatible thermoreversible hydrogel. Approaches to be used include: genome editing using CRISPR/Cas9 technology, RNA interference, advanced confocal microscopy, genetic crosses, and motility assays.

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.
<https://pubmed.ncbi.nlm.nih.gov/34666005/>

AM Silva, MJ Norman, AF Sobral, E Zanin, R Gassmann, JM Belmonte, AX Carvalho

(2022) -heavy-spectrin stabilizes the constricting contractile ring during cytokinesis, J Cell Biol 222 (1): e202202024. doi:10.1083/jcb.202202024.
<https://pubmed.ncbi.nlm.nih.gov/36219157/>



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