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Major Professor: Francisco Pelegri

Degree Objective: Ph.D. in Endocrinology and Reproductive Physiology

Background: BS Biology, Bridgewater State University

Current Research Project:

Homozygosity for maternal-effect mutations results in phenotypically normal mothers that exhibit a mutant phenotype in their offspring despite sperm-derived DNA. This is because early developmental processes rely on genes active during oogenesis, which deposit products in the oocyte. Many of these mutations have been found in zebrafish such as *janus, nebel, ichabod,* etc. Two, *futile cycle* (*fue*) and *motley* (*mot*), affect pronuclear dynamics at fertilization.

fue embryos do not undergo pronuclear congression, but undergo cell division. Past work identified the gene required for pronuclear congression as *lymphoid restricted membrane protein* (*lrmp*), also called *jaw1*. This nucleotide is highly conserved among vertebrates. Lrmp protein and *lrmp* mRNA localize to the spindle in cell cycle-dependent patterns that suggest coordination of translation and protein transport to the nuclear envelope. To learn how this protein is translationally regulated in early embryos, antibodies designed against various regions of Lrmp will be monitored in early development. Also, a yeast two-hybrid screen will be performed to find Lrmp protein interactors. Lastly, Lrmp homologues are found in all vertebrates except for rodents and we are exploring the expression of this protein in other vertebrate species. We will in particular study the role of Lrmp in mammalian species that, like zebrafish and humans, and in contrast to rodents, bring centrioles through the sperm.

mot embryos cannot undergo cell division. This prevents the extrusion of the polar body during meiosis II, which occurs in zebrafish post-fertilization. Past work identified the mutated gene as *birc5b,* a homolog of mammalian Birc5/Survivin. In wild-type, the polar body DNA condenses, but the oocyte DNA decondenses in anticipation of pronuclear fusion. However, in *mot* mutants, both polar body and oocyte DNA undergo condensation; suggesting that DNA condensation signals exist and are improperly segregated in the absence of polar body extrusion. Using immunofluorescence and electron microscopy we will analyze polar body and female pronuclei condensation in wild-type and mutant embryos. Also, markers for the midbody complex will be used to study the formation and the segregation of this structure during meiosis.

National Presentations

Poster Presentation: Baldo AA, Pelegri FJ (2014) Analysis of the Maternal-Effect Mutations that Affect Nuclear Dynamics at Fertilization. 11th International Conference on Zebrafish Development and Genetics. Madison, WI.

Teaching and Mentorship

Teaching Assistant for Zoology 555; Developmental Biology. Fall 2014