

UROP Project Opening

Fall/IAP/Spring/Summer

Department/Lab/Center: Whitehead Institute

Faculty Supervisor: David Page

Project Title: Regulation of meiosis in mammalian germ cells

Project description:

Meiosis is the specialized cell division that halves the parental genome and packages it to be transmitted to the next generation. The first step of meiosis, prophase I, is dramatically prolonged relative to its mitotic counterpart: while mitotic prophase occurs within minutes, meiotic prophase I takes weeks in men and can extend for years in women. This extended length of meiotic prophase I occurs through meiosis-specific modifications to the cell cycle. However, the exact modification varies among organisms, and the mammalian-specific mechanism remains poorly characterized. Failure to sufficiently prolong meiotic prophase can inhibit the completion of chromosomal events and disrupt recombination and chromosome segregation during meiosis. Such defects lead to aneuploidy, which is the most common genetic abnormality in pregnancies and the leading cause of miscarriage and congenital birth defects in humans.

Based on mouse studies from the Page lab and other groups, two interacting protein, MEIOC and YTHDC2, prolong meiotic prophase I in mammals. Currently, we are using a combination of genetics, biochemistry, and bioinformatics to determine how MEIOC and YTHDC2 modify the cell cycle to establish an extended meiotic prophase I. You will work closely with a postdoctoral fellow on ongoing projects. Several projects are available, and the nature of your exact project will depend on your interests and experience.

Prerequisites: You must be highly motivated and detail oriented. Prior research experience is a plus, but not required. A minimum commitment of 2 semesters required. A minimum commitment of 10 hours per week during the school year is preferable, but there is flexibility. Multiple positions are available.

Contact: Please contact Maria Mikedis (mikedis@wi.mit.edu) with your CV and availability during the Fall semester.