Research Assignment - 2009

Title of research assignment

Genetic regulation of cell migration

Principal Investigator	Dr. Erin Cram		
Title	Assistant Professor		
College/Department	Biology		
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Research abstract

We are using nematode C. elegans (worm) as a model system to investigate the conserved processes that control cell migration (movement of cells to new locations in the body) and cell contractility in vivo. These processes are important for normal animal development and are disrupted in human diseases such as metastatic cancer. In previous work, we have identified hundreds of genes required for cell migration. We are now systematically characterizing the role of selected genes in cell migration and worm development. The teacher will participate in a project investigating the role of worm memo. Memo is a protein that regulates cell cytoskeletal dynamics in mammalian cells, but not much is known about its molecular function. The teacher will generate transgenic worms expressing fluorescent memo and characterize the in vivo cell migration defects caused by inhibition of memo gene expression. This study will provide insight into the function of worm memo and potentially elucidate mechanisms by which all animal cells migrate.

Research activities/experience

Research experience: The study will involve molecular genetics techniques such as polymerase chain reaction (PCR) amplification of DNA, molecular cloning, gene disruption by RNA interference (RNAi), differential interference contrast (DIC) and fluorescence microscopy, and standard genetic crosses using C. elegans nematodes as a model organism.

Teachers will gain an understanding of both classical (Mendelian) genetics and modern molecular genetics techniques, and learn to conduct rigorous, controlled experiments. It will also be fun - my lab group is very friendly.

Expectations of RET

I expect the teacher to participate fully in my lab within the time constraints of the program, to keep a comprehensive lab notebook, and to do some reading in the primary literature. I would also like to discuss pedagogical techniques with him/her and therby improve my own teaching practice. The teacher should expect me to provide clear guidance and explanation for the theory and practice required to execute the experiments, and to serve in the future as a resource for his/her own teaching.

Special skills or interests that would help a RET participant with this assignment (i.e., an interest in physics, experience with specific laboratory equipment, etc.)

An interest in genetics or cell biology. Basic knowledge of chemistry.

Lab safety/issues unique to this laboratory. A general Lab Safety Overview will be presented by Environment Health and Safety to both RET and YSP participants prior to the beginning of lab assignments.

Chemical hygeine and safety is the most important.

Suggested literature to be reviewed prior to beginning this research assignment.

"A biochemist's guide to Caenorhabditis elegans" by Ann Corsi, doi:10.1016/j.ab.2006.07.033

Research/Lab Summer Hours 9:00 a.m. – 7:00 p.m. ☐ Monday through Thursday ☒ Monday through Friday

Scheduled Research/Lab Meetings : p.m. – : p.m. ☐ Daily ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☒ To be determined

Lab/research project URL

http://nuweb.neu.edu/ecram/research.html

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