

DEPARTMENT OF BIOLOGICAL SCIENCES  
COLLEGE OF ARTS AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2022

PROJECT TITLE: Cell signaling in trypanosomes

Noelia Lander  
College of Arts and Sciences  
318 College Dr  
422QD Rieveschl Hall  
Cincinnati, OH 45221  
noelia.lander@uc.edu  
Phone: (513) 556-9798

**Project Description**

Research in the Lander Lab focuses on the study of signal transduction pathways in trypanosomes, flagellated protozoan parasites that belong to the Kinetoplastida order. Integrating cellular, biochemical and genetic approaches we investigate the mechanisms by which *Trypanosoma cruzi*—the etiological agent of Chagas disease—senses microenvironmental changes and triggers specific cellular responses that lead to differentiation among the main stages of the parasite's life cycle. In this specific research project, the student will generate and characterize *T. cruzi* mutant cell lines where the expression pattern of genes involved in calcium and/or cAMP signaling have been modified. The aim of the project is to study the function of *T. cruzi* proteins involved in metacyclogenesis and host cell invasion. During this training opportunity, the student will learn cutting edge molecular biology and microbiology techniques such as CRISPR/Cas9-mediated genome editing, PCR, gene cloning, overexpression, heterologous gene expression, recombinant protein purification, cell culture and in vitro differentiation. Results from this research project will contribute to better understanding *T. cruzi* signal transduction pathways that lead to parasite survival within its insect and mammalian hosts, as well as unravelling important metabolic processes in eucaryote biology. We seek an excellent undergraduate student, passionate about science and laboratory research, preferably with the following skills:

- Bench work experience in basic molecular biology techniques (such as PCR, DNA extraction, gel electrophoresis, western blot analysis).
- Bench work experience in basic microbiology techniques (cell culture under sterile conditions, bacterial growth, transformation).
- Basic knowledge on statistical analysis, photo editing and DNA sequencing analysis software.
- Having taken the following courses will be highly valued in the student's

profile: Cellular Biology, Biochemistry and Genetics.