



HARVARD

MEDICAL SCHOOL

Title: Investigating the role of neuromodulation in the lateral habenula during learning behavior

Location: Bernardo Sabatini Lab, Harvard Medical School, Boston, USA

Dear master student:

I would like to let you know about a new internship opportunity in the lab that involves investigating the role of neuromodulators- dopamine, serotonin, and norepinephrine- in the lateral habenula. The lateral habenula is a brain region highly implicated in mood disorders and learning behavior, yet the role and potential interactions of neuromodulators during these behaviors remain largely unknown. In the past few years, our lab has developed exciting new techniques to assess the effect of neuromodulators on lateral habenula activity, both in vitro and in vivo in freely moving mice. This project will seek to answer the following questions:

1. Which neuromodulators are most relevant or necessary for learning?
2. What receptors in the lateral habenula are activated by neuromodulators, and how do these receptors interact intracellularly?
3. What brain regions are responsible for neuromodulator release into the lateral habenula?

This internship involves answering the questions above and learning essential, cutting-edge techniques in systems neuroscience. Techniques taught in this internship include mouse stereotaxic surgery, in vitro experiments (acute slice imaging), fluorescence lifetime photometry, in vivo optogenetics, DREADDs manipulation, drug testing, mouse behavioral analysis, and brain extraction and/or histological analysis. In addition, depending on the student's interests, we can teach programming/data analysis and additional in vitro techniques. Beyond teaching these techniques, we are dedicated to mentoring students and encouraging the development of skills essential for a starting scientist, such as critical thinking, discussing science, independence, experimental planning, and career planning. Finally, our lab environment and the wider neuroscience community at Harvard Medical School offer many opportunities for students, such as journal clubs, excellent department talks, and symposia.

I am looking for a biology/neuroscience master student to tackle this project with me for 10-12 months, starting in early spring 2027. No previous mouse experience is required to apply for this internship; enthusiasm and motivation are enough!

Please don't hesitate to reach out to me (email: ella_cho@g.harvard.edu) if you have any questions or are interested in the internship.

Best,

Ella Cho

Neuroscience PhD Candidate in the lab of Bernardo Sabatini