

CA-R32-03 Lee_Moellering Research Summary

This is a high-risk/high-reward collaborative project between a neurobiologist Dr. Lee (Assistant Professor) from Northwestern and a chemist Dr. Moellering (Associate Professor) from UIC. The goal of the project is to identify the long sought after circulating factors that trigger motion sickness in mammals. This will be done in the mouse as a model using a combination of microproteomics and metabolomics from cerebrospinal fluid to identify novel factors that accumulate during motion sickness, and an in vitro imaging assay to identify which substances activate nausea-sensitive neurons from the brainstem. The neurobiological and chemosensory basis for nausea is not only an emerging and fascinating area of study, but highly relevant to health and disease.

Aim 1 is to analyze the cerebrospinal fluid of mice that are motion sick vs controls. While mice do not vomit, they exhibit nausea-like symptoms. The Lee lab has shown that their nausea-inducing mouse shaker induces these nausea associated behaviors and activates neurons in the Area Postrema that are sufficient to induce nausea in other species. The investigators will look for proteins/peptides/small molecules that are increased in the cerebrospinal fluid of nauseated vs control mice using a cutting edge proteomic/metabolomics pipeline proposed by the Moellering group.

Aim 2 is to screen for and confirm the identity of candidate nausea-inducing molecules using in vitro calcium imaging from primary neurons. The investigators will culture genetically identified neurons from the Area Postrema and use them as biosensors to detect relevant nausea inducing cues. The idea is that they will use calcium imaging to screen metabolites that activate nausea neurons.