

# Data Studio

1:30–3:00pm, Wednesday, October 9, 2019

Conference Room X393, Medical School Office Building, 1265 Welch Road, Stanford, CA

**Investigator:** Laurel Crosby Research Engineer, Stanford Genome Technology Center

**Title:** Impact of Organic Mercury Exposure on Selenium Bioavailability in Chronic Fatigue Syndrome

## Abstract:

Organic forms of mercury (Hg) are ubiquitous contaminants in fish, but the toxic health effects of mercury are mitigated by binding with the essential trace metal selenium. Selenium (Se) is also a required cofactor for enzymes that manage oxidative stress and for thyroid hormone metabolism. However, functional deficiency in these enzymes may not be apparent by measuring selenium concentrations or using comprehensive thyroid hormone assessment panels. Chronic Fatigue Syndrome, also known as Myalgic Encephalomyelitis (ME/CFS), is a complex multi-system disorder that is characterized by increased levels of oxidative stress, neuroinflammation, disturbances in energy metabolism, and other non-specific markers of illness. We have identified a subset of ME/CFS patients with elevated levels of mercury in hair and a molar ratio of Se:Hg less than 1, possibly indicating lowered bioavailability of selenium in vivo. Our findings may explain the recent report of a *Low Free T3 Syndrome* in a subset of ME/CFS patients, as free T3 levels are dependent on selenium for thyroxine (T4) deiodinase activity.

We need help with the study design and statistical analyses needed to address the following scientific questions.

1. ME/CFS patients
  - (a) Does the Se:Hg ratio correlate with selenoenzyme activity?
  - (b) Does selenoenzyme activity correlate with phenotypes defined by two different diagnostic standards?
2. Non-ME/CFS controls
  - (a) Does the Se:Hg ratio correlate with selenoenzyme activity?
3. Is there a way to tease apart the causal direction between diet and a subgroup of ME/CFS patients?

**For more information about Data Studio:**

<http://med.stanford.edu/dbds/cool-tools/data-studio.html>