

Implementing environmentally responsible biomedical laboratory practices and developing a model for use in student-faculty research at Seattle University

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I came to recognize the amount of waste generated in our lab, and I hypothesized that taking environmentally sensitive actions would not only improve the lab's environmental sustainability, but also produce time and cost-savings that would improve overall lab productivity. The ultimate goal of this project is to model time, material, chemical, energy, and cost-savings using a sustainably focused framework, then engage Seattle University's academic and research labs in meaningful dialogue in order to empower mindful, sustainable student research leaders for a just and humane world.

I began my project by familiarizing myself with standard lab practices, researching the nucleotide dependency of endogenous hsp90 chaperone protein machinery and its association with baculovirally expressed glucocorticoid receptor. After establishing my own procedures, I examined other lab project procedures to determine the basal level of the Murphy Lab's environmental stewardship. Next, I developed a simple sustainability slogan and accompanying acronym: "EESI [ee-zee] lab practices for sustainable research" – educate, evaluate, simulate, and integrate. This serves as a framework for self-auditing the sustainability of lab practices and critically thinking about ways to address subsequent findings.

Then, I applied "EESI lab practices" to my own experimental procedures. Behavioral changes to a typical series of five medium pressure liquid chromatography experimental processes yielded significant tangible gains in sustainability while reducing time and cost. Sustainable thinking reduced approximately 43% of material waste generated, measured by the average item quantity savings per step of procedure. This material savings consequently leads to cost savings. Total energy use was also reduced, but not quantified.

My next steps:

- Apply EESI lab practices to other experimental processes in the Murphy Lab.
- Collaborate with Dr. Murphy to develop a sustainable research curriculum to supplement Murphy Lab research training.
- Investigate piloting a case study measuring lab equipment energy usage before and after employing simple energy saving techniques. Techniques include sticker and lab manager reminders.
- Work with Dr. Murphy to refine the ideas of "EESI lab practices for sustainable research." Collaboratively draft an 8"x11" poster with a Seattle University design student to potentially issue to all university labs.