Untargeted Metabolomics using Marine Sponges

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Metabolomics is the large scale study of the totality of small molecules, or metabolites, produced by a biological specimen. Within recent decades, the field of metabolomics has been used to yield biochemical insights with broad implications, from drug discovery to toxicology to nutrition.

**WHAT IS METABOLOMICS?**

Metabolomics is just a single discipline in the much larger field of “Omics”. The suffix “ome” means “all constituents considered collectively.” Therefore fields such as genomics, transcriptomics, and proteomics attempt to holistically characterize the collective gene, RNA, and protein activity within biological samples.

**OTHER “Omics” STRATEGIES**

**WHY SPONGES?**

Marine sponges are structurally diverse, prolific sources for a wide variety of natural products. Up to 35% of the biomass of a marine sponge is comprised of microbial life, which make it a prime specimen for the study of the microbial interactions that produce metabolites.

**UNTARGTEED METABOLOMICS**

My project took an untargeted approach to characterizing the metabolome of the sponge. Untargeted metabolomics is hypothesis generating, and is solely focused on the large scale identification the full diversity of metabolite compounds from the sample.

**RUNNING LC-MS**

Liquid Chromatography-Mass Spectrometry is a technique that involves the separation of biological extracts into individual compounds and the analysis of the mass to charge ratio of each compound.

Using samples of sponge extract collected within the lab, I set up a column to separate the extract into samples of different polarities and colors. The flasks of separated sponge extract had the solvents removed and were scaled down into smaller vials. These different samples were then placed into the mass spectrometer for the analysis of the mass to charge ratios of the ions within the samples.

**DATA ANALYSIS**

**GNPS**

**Cytoscape**

**Some Discoveries**

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