PANEL SESSION 1
2:30-3:30pm, Friday, October 2
https://meet.google.com/hhq-ncva-cqn

Panel Chair: **Emma Rossow '23**

Madison Tooker '23 – "Isolation and Characterization of PfGCN5 Protein"

The bromodomain of the Plasmodium falciparum GCN5 protein (PfGCN5) was expressed and isolated from BL21 E. coli cells transformed with PfGCN5 wild-type, codon-optimized, or W1379F codon-optimized mutant plasmids and metabolically labelled with 5-fluorotryptophan. Proteins expressed in E.Coli were isolated and purified by nickel affinity and buffer exchange chromatography. Gel electrophoresis and mass spectrometry confirmed the identity of the desired PfGCN5 proteins. Protein-Observed Fluorine (PrOF) NMR was utilized to verify proper fluorine labelling of the protein. Comparison of the signals in the PrOF NMR spectra of PfGCN5 W1379F mutant with the wild-type protein was used to assign the signals to specific tryptophan residues in the protein.

Christen Gibson '23 – "Fragment Based Ligand Design"

Several tetrahydroquinone-based structures were identified in a computer screen to bind to the bromodomain of the Plasmodium falciparum GCN5 protein (PfGCN5), a protein important in the regulation of gene expression. A general synthesis for these kinds of molecules was developed that allows for easy substitution in two positions. Using the newly developed general synthesis, N-Acyl-7-(4-chlorobenzamido)-tetrahydroquinoline was prepared in good yield and tested against the PfGCN5 bromodomain using Prof NMR.

Jenna Kotz '21 – "Understanding the Epigenetics of Malaria: Solid-Phase Peptide Synthesis"

Epigenetics is the regulation of transcription and subsequent translation of genes. One major contribution to this regulation is modifications to histone tails to "open" or "close" regions of DNA for transcription. PfGCN5 is one protein in malaria that reads these modifications, and it has been shown that knockout of this protein kills the organism. This project's goal is to determine which of these modifications PfGCN5 reads by using solid-phase peptide synthesis to make analogs of these histone tails to test binding with the protein, which will indicate which marker is read.

Tessa Dethlefs '21 – "Differential Plasticity and Sex-Specific Resource Allocation in Response to Nitrogen Availability in a Dioecious Forb, *Silene latifolia*"

Dioecious plant species, those with male and reproductive structures on separate individuals, are uncommon. The innate reproductive roles of males and females incur different costs on the sexes which lead to trade-offs in resource allocation. Anthropogenic nitrogen (N) deposition imposes large ecological consequences, and soil N availability has the potential drive differential plasticity, in which dioecious individuals allocate resources in a sex-specific manner relative to soil nutrient conditions. We asked if male and female *Silene latifolia*, a dioecious forb, alter biomass allocation to vegetative and reproductive structures differently in response to N availability, thus displaying differential plasticity. *S. latifolia* seeds were planted in early-June 2020 (n=1355) and transplanted post-germination in mid-July (n=315). Plants were randomly assigned to N fertilization treatments: unfertilized control, medium N (5 g/m2) or high N (10 g/m2). Growth and number of reproductive structures (i.e., flowers) were measured throughout the study period. There was a general increase in plant height and leaf number with N fertilization. Mean flowers produced per day differed significantly between males and females in each treatment ($p<0.05$), and males produced approximately twice as many flowers as females under both medium and high N treatments. However, while males produced more flowers, they were on average 42% shorter and had 17% fewer leaves under high N; this trend suggests that males were preferentially investing in reproduction as opposed to aboveground vegetative growth compared to females under increased N treatments.