UC RIVERSIDE

BCH 252 Seminar Series

Dr. Astrid Haase, Stadtman Investigator, National Institute of Diabetes and Digestive and Kidney Disease (NIDDK)

Seminar Title: "A small RNA perspective on genome integrity"

Biography: Defense against genome invaders universally relies on RNA-guided immunity. Prokaryotic CRISPR/Cas and eukaryotic RNA interference pathways recognize targets by complementary base-pairing, which places the sequences of their guide RNAs at the center of self/nonself discrimination. Here, we explore the sequence space of PIWI-interacting RNAs (piRNAs), the genome defense of animals, and establish functional priority among individual sequences. Our results reveal that only the topmost abundant piRNAs are commonly present in every cell, while rare sequences generate cell-to-cell diversity in flies and mice. We identify a skewed distribution of sequence abundance as a hallmark of piRNA populations and show that quantitative differences of more than a thousand-fold are established by conserved mechanisms of biogenesis. Finally, our genomics analyses and direct reporter assays reveal that abundance determines function in piRNAguided genome defense. Taken together, we identify an effective sequence space and untangle two classes of piRNAs that differ in complexity and function. The first class represents the topmost abundant sequences and drives silencing of genomic parasites. The second class sparsely covers an enormous sequence space. These rare piRNAs cannot function in every cell, every individual or every generation but create diversity with potential for adaptation in the ongoing arms race with genome invaders.

ZOOM Link: https://ucr.zoom.us/j/91539734730
Meeting ID: 915 3973 4730
Passcode: 360452

Tuesday, November 29th, 2022
12:00 p.m. - 12:50 p.m. PST

Host: Dr. Sihem Cheloufi