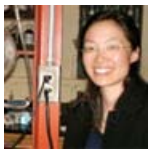
Genome Sciences Seminar

Wednesday, 11.30.16 | 3:30 | Foege Auditorium



Dr. Irene Chen

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https://labs.chem.ucsb.edu/chen/irene/Chen_lab_at_UCSB/Home.html

"Evolution in the prebiotic RNA World"

Chen Lab Research Overview:

Imagine the space of all possible sequences. Each sequence has a fitness for any particular activity, which defines a 'fitness landscape'. Evolution is the process of moving around on the landscape, usually up toward high fitness peaks.

What do these landscapes look like for biomolecules? We find out by 'evolving' a huge population of molecules containing nearly all possible sequences of a given length. Massive sequencing gives us a first look into the comprehensive structure of molecular fitness landscapes.

Unlike you and me, some molecules can replicate without enzymes. RNA does this by templating the polymerization of chemically activated nucleotides. This process mimics an early stage of life, one that existed even before enzymes evolved more than 3.5 billion years ago.

How did these early RNAs evolve? We study the spontaneous occurrence of mutations, the raw material of evolution. Mutations enable evolvability but simultaneously degrade genetic information. Studying the mechanisms and consequences of mutations could help us understand how early life dealt with this dynamic tension.

Before antibiotics were discovered, healthy people routinely succumbed to common bacterial infections. Now, decades of antibiotic use have put immense selective pressure on bacterial populations, and resistant strains are increasingly abundant.

Bacteria have natural enemies. Phages have evolved numerous techniques to subvert and destroy bacteria. We are interested in learning from their tactics. For example, we study how some phage prevent bacteria from spreading antibiotic resistance genes.

Refreshments served outside the Auditorium at 3:20pm
Questions? Contact Brian Giebel at bgiebel@uw.edu or visit the Seminar website at http://www.gs.washington.edu/news/seminars.htm