

Overview: CRISPR-Cas9 has recently emerged as a powerful tool for genome editing in organisms ranging from bacteria to monkeys. This course will review the attributes and natural roles of CRISPR-Cas systems and how they are applied to specifically edit DNA sequences. At the conclusion of this course, students will be comfortable designing, performing, and evaluating targeted gene editing with CRISPR-Cas9 in bacteria and in mammalian cells.



Lectures:

1. Introduction to genome editing and CRISPR
2. Attributes of Cas9 and small guide RNAs
3. Genome editing with CRISPR-Cas9
4. Evaluating editing efficiency, off-target effects
5. Predicting and mitigating off-target effects
6. CRISPR technologies
7. The commercialization of CRISPR

Labs:

1. Designing CRISPR RNAs for DNA targeting. (weeks 1)
2. CRISPR-based genome editing in bacteria. (week 2-3)
3. CRISPR-based genome editing in mammalian cells. (weeks 3-4)
4. CRISPR-based gene regulation. (week 5-6)