

Biology 4026: Chromosomes and the Cell Cycle

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Life depends on the propagation of genetic material from one generation to next through cycles of genome replication and cell division. We will focus on chromosomes as discrete entities, rather than collections of genes, that are inherited between cell cycles and across generations. By reading selected primary literature covering several decades, we will build an understanding based on key experiments and insights, focusing on chromosomes and their associated molecular machinery. Topics may include kinetochores and microtubule dynamics, centromeres, the mitotic checkpoint, chromosomal instability and cancer, genetic conflict, chromosome evolution, and artificial chromosomes.

Class Structure

- In this seminar course, students will present and discuss papers from the primary literature. During class, students will be asked to:
 - Provide a brief introduction that puts the paper in context. What is the biological question and why is it an important question? What was known about the topic before this paper?
 - Present individual figures. Explain the motivation for the experiment, the experimental strategy and methods, the data, and the interpretation. Are the data convincing?
- The overall course goals are to develop skills for critically reading the literature, thinking like a scientist, and presentation.
- The class will meet in person at the scheduled times and will not be recorded.
- The professor will hold weekly office hours, and additional meetings can be scheduled by request.

Assignments & Assessments

- Students are expected to read the assigned papers before class and come prepared to discuss them in detail.
- The final project is a proposal to be written on a topic of your choice related to the class. The general idea is to pick a problem or a question and design an experiment (or experiments) to provide some insight and advance our knowledge. For example, one approach it is to develop a hypothesis and design an experiment to test the hypothesis.
- Grading will be based on class participation (50%) and the final project (50%).

Essential Course Policies

- The course is intended for advanced biology students who have taken BIOL 2010 (Cell Biology). It is also open to graduate students.
- There is no required textbook, but one of the standard cell/molecular biology textbooks (e.g., Alberts et al. Molecular Biology of the Cell) is useful for background knowledge.