

BIOL-UA 926.002 Advanced Microbiology – The Bacterial Spore

Instructor:

Patrick Eichenberger

Course Description:

In this course, students will investigate the functional and structural properties of bacterial spores, which are among the most resistant organisms on Earth. The spore-forming bacterium *Bacillus subtilis* is readily amenable to genetic manipulation and is a well-established model system for molecular and cellular biology. Students will get the opportunity to conduct hands-on experiments in the Eichenberger laboratory, thus learning classic molecular microbiology techniques and familiarize themselves with fluorescence microscopy. Each student will select a group of 3 genes from a list of sporulation genes (usually one poorly characterized sporulation gene, one gene encoding a coat protein and one gene encoding a crust protein) and perform a detailed phenotypic characterization of the corresponding deletion mutants.

Pre-requisite:

Principles of Biology II (BIOL-UA 12)

Molecular and Cell Biology I & II (BIOL-UA 21 & BIOL-UA 22)

Textbook and Required Materials:

N/A

Grading:

Presentations	40%
Final report	30%
Midterm report	25%
Lab notebook	5%

Topics:

Introduction to *B. subtilis* and sporulation

Bacterial growth in liquid cultures and on plates

Bacterial genetics, transformation of competent cells

Sporulation

Introduction to phase contrast and fluorescence microscopy

Function properties of spores, measuring spore hydrophobicity

Gene expression