ADVANCED TOPICS IN CELL BIOLOGY
MCB6772 Section 0001, Spring – 2025
1 credit

Time: Tuesdays and Thursdays; 8:00 AM to 10:00 AM EST
In-person meetings in MCS room 1044

Instructors: Peter Kima (pkima@ufl.edu) & Zhonglin Mou (zhlmou@ufl.edu)

Course Description: Specific topics about cell structure and function published in recent journal articles with microbiological interest animal and plant systems will be studied. The specific topic for this semester will be organelle targeting in the context of infection. We will discuss how pathogens target or regulate the biology of organelles in animal and plant cells.

Course Objectives:

- To develop an understanding of current advances and approaches in the study of the cell biology of eukaryotes.
- To gain insight on differences between plants and animals pertaining particularly to their susceptibility or capacity to resist or to be exploited by microbial pathogens.

Student Responsibilities:

You are expected to read the research articles and upload questions and/or comments under Assignments in Canvas (do not send to the instructor) before each virtual class meeting. At least 3 questions or comments on each paper are required. Class attendance is **required** to achieve the objectives of this course. Each student (working in a team) will present at least twice.

Students will take quizzes in Canvas on the topics that will be discussed. The quizzes will be extracted from the research articles that we will discuss.

A written paper of 1-2 pages (11 point) will be expected from each student no more than 1 week after the end of the course. The paper will be in response to questions that will be made available before the end of the course.

Course Schedule:

The course schedule will be discussed in the first meeting of the course. Each student is expected to present at least twice in this course.

Student Evaluation:

Oral presentations will be worth 25% of grade; quizzes will be worth 25% of grade; class participation will be worth 25% of grade; final paper will be worth 25% of grade.

Final grades will be based on the following performance standard (100 points total):

92 - 100 %	=	**A**
85 - 91.9 %	=	**B+**
80 - 84.9 %	=	**B**
75 - 79.9 %	=	**C+**
70 - 74.9 %	=	**C**
60 - 69.9 %	=	**D**
Less than 60 %	=	**E**

Course Schedule:

(Quiz questions will be from the papers **highlighted in bold**)

2/4
Topic: *Introduction to the course & organelle targeting in animal immunity and pathogenesis I*
Presenters:
Articles:

1) **Hein et al. 2024. Global organelle profiling reveals subcellular localization and remodeling at proteome scale. Cell 188, 1-19.**

2/6
Topic: *organelle targeting in animal immunity and pathogenesis II*
Presenters:
Articles:

1) Okumoto et al. 2020. Peroxisome: Metabolic functions and biogenesis. Advances in Experimental Medicine and Biology 1299, 3-17 (Review).
2) **Raj et al. 2024. *Salmonella Typhimurium* effector SseI regulates host peroxisomal dynamics to acquire lysosomal cholesterol. EMBO Reports**

2/11
Topic: *organelle targeting in animal immunity and pathogenesis III*
Presenters:
Articles:

1. Delgado and Pernas 2024. Mitochondria as sensors of intracellular pathogens. Trends in Endocrinology & Metabolism (Review).
2. **Zmuda M, et al, 2024. The Bordetella effector protein BteA induces host cell death by disruption of calcium homeostasis. mBio 15, e0192524.**

2/13
Topic: *organelle targeting in animal immunity and pathogenesis IV*
Presenters:
Articles:

1. Masone et al. 2019. Illuminating the membrane contact sites between the endoplasmic reticulum and the trans-Golgi network. FEBS Letters 593, 3135-3148 (Review).
2. **Wang et al. 2024. *Anaplasma phagocytophilum* effector EgeA facilitates infection by hijacking TANGO1 and SCFD1 from ER-Golgi exit sites to pathogen-occupied inclusions. PNAS 121, e2405209121.**

2/18
Topic: *organelle targeting in plant immunity and pathogenesis I*
Presenters:
Articles:

1. Liu et al. 2024. Chloroplast immunity: A cornerstone of plant defense. Molecular Plant 17, 686-688 (Review).
2. **Qi et al. 2024. Chloroplast elongation factors break the growth-immunity trade-off by simultaneously promoting yield and defence. Nature Plants 10, 1576-1591.**

2/20
Topic: *organelle targeting in plant immunity and pathogenesis II*

Presenters:
Articles:

1. Liu. 2025. Endoplasmic reticulum homeostasis in plant-pathogen interactions: new scenarios for an old story. Journal of Experimental Botany 76, 277-284 (Review).
2. **Breeze. 2021. A tell tail signa: a conserved C-terminal tail-anchor domain targets a subset of pathogen effectors to the plant endoplasmic reticulum. Journal of Experimental Botany 74, 3188-3202.**

2/25
Topic: *organelle targeting in plant immunity and pathogenesis III*
Presenters:
Articles:

1. Wang et al. 2022. Mitochondrial functions in plant immunity. Trends in Plant Science 27, 1063-1076 (Review).
2. **Pan et al. 2024. The *Puccinia striiformis* effector Pst11215 manipulates mitochondria to suppress host immunity by promoting TaVDIP1-mediated ubiquitination of TaVDAC1. New Phytologist 244, 1961-1978.**

2/27
Topic: *organelle targeting in plant immunity and pathogenesis IV*
Presenters:
Articles:

1. Su et al. 2019. Dynamics of peroxisome homeostasis and its role in stress response and signaling in plants. Frontiers in Plant Science 10, 705 (Review).
2. **Cao et al. 2024. The RXLR effector PpE18 of Phytophthora parasitica is a virulence factor and suppresses peroxisome membrane-associated ascorbate peroxidase NbAPX3-1-mediated plant immunity. New Phytologist 243, 1472-1489.**