ADVANCED TOPICS IN CELL BIOLOGY
MCB6772 Section 5731, Spring – 2022
1 credit

Time: Tuesdays and Thursdays; 8:00 AM to 10:00 AM EST
Virtual meetings through Zoom (meeting ID: 949 525 0208, passcode: MCB6772)

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 cytoskeleton 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**)

2/8
Topic: *Introduction to the course & cytoskeleton in animal immunity and pathogenesis I*
Presenters:
Articles:

1. Rottner et al. 2017. Actin assembly mechanisms at a glance. J Cell Sci 130, 3427-3435. (Review)
2. **Pierrat et al. 2021. The mammalian membrane microenvironment regulates the sequential attachment of bacteria to host cells. mBio 12, e01392-21.**

2/10
Topic: *Cytoskeleton in animal immunity and pathogenesis II*
Presenters:
Articles:

1. Demeure et al. 2019. *Yersinia pestis* and plague: an updated view on evolution, virulence determinants, immune subversion, vaccination, and diagnostics. Genes Immun 20, 357-370. (Review)
2. **Connor et al. 2018. *Yersinia pestis* Targets the Host Endosome Recycling Pathway during the Biogenesis of the *Yersinia*-Containing Vacuole ToAvoid Killing by Macrophages. mBio 1, e01800-17.**

2/15
Topic: *Cytoskeleton in animal immunity and pathogenesis III*
Presenters:
Articles:

1. Rastogi et al 2019. Translocation of effector proteins into host cells by *Toxoplasma gondii*. Curr Opin Microbiol 52, 130-138. (Review)
2. **Sangare et al. 2019. *In vivo* CRISPR screen indentifies *Tg*WIP as a *Toxoplasma* modulator of dendritic cell migration. Cell Host Microbe 26, 478-492.**

2/17
Topic: *Cytoskeleton in animal immunity and pathogenesis IV*
Presenters:
Articles: Marshall Jaroch, Patricia Turpin, Paula Glusberger

1. Liss and Hensel 2015. Take the tube: remodeling of the endosomal system by intracellular *Salmonella enterica*. Cell Microbiol 17, 639-647. (Review)
2. **Kehl et al. 2020. A trafficome-wide RNAi screen reveals deployment of early and late secretory host proteins and the entire late endo-/lysosomal vesicle fusion machinery by intracellular *Salmonella*. PLoS Pathog 16, e1008220.**

2/22
Topic: *Cytoskeleton in plant immunity and pathogenesis I*
Presenters:
Articles:

1. Park et al. 2017. Plant-microbe interactions: organelles and the cytoskeleton in action. New Phytol 217, 1012-1028. (Review)
2. **Guo et al. 2016. A bacterial effector co-opts calmodulin to target the plant microtubule network. Cell Host & Microbe 19, 67-78.**

2/24

Topic: *Cytoskeleton in plant immunity and pathogenesis II*
Presenters:
Articles:

1. Li & Staiger. 2018. Understanding cytoskeletal dynamics during the plant immune response. Annu Rev Phytopathol 56, 513-533. (Review)
2. **Lu et al. 2020. Arabidopsis calcium-dependent protein kinase 3 regulates actin cytoskeleton organization and immunity. Nat Commun 11, 6234.**

3/1
Topic: *Cytoskeleton in plant immunity and pathogenesis III*
Presenters:
Articles:

1. Li & Day 2019. Battlefield cytoskeleton: turning the tide on plant immunity. MPMI 32, 25-34. (Review)
2. **Ma et al. 2021. Formin nanoclustering-mediated actin assembly during plant flagellin and DSF signaling. Cell Rep 34, 108884.**

3/3
Topic: *Cytoskeleton in plant immunity and pathogenesis IV*
Presenters:
Articles:

1. Bhandari & Brandizzi 2020. Plant endomembranes and cytoskeleton: moving targets in immunity. Plant Biol 58, 8-16. (Review)
2. **Qin et al. 2021.The ARP2/3 complex, acting cooperatively with class I formins, modulates penetration resistance in Arabidopsis against powdery mildew invasion. Plant Cell 33, 3151-3175.**