ADVANCED TOPICS IN CELL BIOLOGY
MCB6772 Section 2E39, 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)

(The Zoom meeting discussions will be recorded and posted in Canvas. You are not required to attend the Zoom meetings synchronically. However, you are welcome to attend if you are interested)

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 papers and upload questions and/or comments under Assignments in Canvas (do not send to the instructor) for each class. At least 3 questions or comments on each paper are required. You are encouraged to watch the videos of virtual class discussion, which will discuss the review and research articles. The links to the videos will be posted in Canvas. You can also attend the virtual class through Zoom (meeting ID, passcode)

There will be one quiz on each article (8 in total) and quiz questions will be extracted from the assigned research articles.

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. You will also be expected to prepare about 20 Powerpoint slides for a 30-min presentation on the 1st animal paper or the 1st plant paper you will learn in the course.

Student Evaluation:

Quizzes will be worth 40% of grade; final paper will be worth 30% of grade; participation (submission of questions and/or comments) will be worth 10% of grade; Powerpoint presentation will be worth 20% of the 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: (In case you are interested, the review papers are provided)

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

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

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Topic: *Cytoskeleton in animal immunity and pathogenesis II*
Article:

- **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.**
- (Review) 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.

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Topic: *Cytoskeleton in animal immunity and pathogenesis III*
Article:

- **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.**
- (Review) Rastogi et al 2019. Translocation of effector proteins into host cells by *Toxoplasma gondii*. Curr Opin Microbiol 52, 130-138.

2/17
Topic: *Cytoskeleton in animal immunity and pathogenesis IV*
Article:

- **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.**
- (Review) Liss and Hensel 2015. Take the tube: remodeling of the endosomal system by intracellular *Salmonella enterica*. Cell Microbiol 17, 639-647.

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

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

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Topic: *Cytoskeleton in plant immunity and pathogenesis II*
Article:

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

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Topic: *Cytoskeleton in plant immunity and pathogenesis III*
Article:

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

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Topic: *Cytoskeleton in plant immunity and pathogenesis IV*
Article:

- **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.**
- (Review) Bhandari & Brandizzi 2020. Plant endomembranes and cytoskeleton: moving targets in immunity. Plant Biol 58, 8-16.