**BMB/MMG/PSL 825**

**Spring 2020**

**Cell Structure and Function**

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| **Instructors** |
| Dr. Susanne Hoffmann-BenningBMB223 Biochemistry517-355-9644hoffma16@msu.edu |  Dr. Yonghui Zheng Dr. Hari Subramanian Dr. Rupali Das  MMG PSL PSL  4195 BPS 2196 BPS 2195 BPS 517-884-5314 517-884-5052 517-884-5049  zhengyo@msu.edu subram46@msu.edu dasrupal@psl.msu.edu  |

**Time:**

Classes will be held from 1:00-2:20 p.m. Tuesday and Thursday throughout Spring Semester in Room 1420 BPS.

**Office Hours:**

Appointments will be scheduled as needed. Short questions can be answered by e-mail.

**Readings:**

Readings from the text and/or the current literature will be assigned by individual instructors. The recommended text is “Molecular Biology of the Cell”, by Alberts et al., 6th Edition. You may want to purchase this book but it is not absolutely required.

**Class participation:**

Attendance/ participation is mandatory; missing more than three class periods results in a failing grade.

**Evaluation:**

 3 Exams (70%); Exam 1 (45 points), Exam 2 (45 points), Exam 3 (50 points); 140 points total

 Term paper (20%) 35 points

 Presentations (10%) 25 points

**Examination Times:**

The examinations will be held at the following times. *Please mark these times on your calendar, as makeup exams will not be given except in MSU-approved emergencies.*

Exam 1 Tuesday, February 6th from 12:45 until 2:45 in Room 1420 BPS Bldg. Note that we have scheduled extra time to allow students to have up to 2 hours.

Exam 2 Tuesday, March 17th from 12:45 until 2:45 in Room 1420 BPS Bldg.

Exam 3 Wednesday April 29nd from10 am until noon in Room 1420 BPS Bldg.

**Presentations:** You will be expected to give a ten-minute presentation summarizing a publication assigned by the professor. This presentation is worth 15 points. There will be three presentation days of five presentations each. On the days that you are not presenting, you will be expected to read the publications, provide one question/comment per publication at the beginning of class and participate in the discussion.This participation is worth 5 pts per discussion day.

**Term Paper:** Topics for a potential term paper will be provided by each professor. **The paper must be delivered to the office of the appropriate professor by 4:00 p.m. on Thursday, April 16th** and must closely follow the guidelines provided in the syllabus**.** Points will be deducted if the paper is late. Instructions are attached.

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| **Day** | **Date** | **Lecturer** | **Topic** |
| T | Jan 7 | SHB | The Diversity of Cells; Methods in cell biology |
| Th | Jan 9 | SHB | The plasma membrane: How structure affects function |
| T | Jan 14 | SHB | Mitochondria  |
| Th | Jan 16 | SHB | Plant metabolic pathways |
| T | Jan 21 | SHB | The Endoplasmic Reticulum |
| Th | Jan 23 | SHB | The Secretory Pathway |
| T | Jan 28 | SHB | Methods in Cell Biology: Presentations and discussion |
| Th | Jan 30 | SHB | Lipid metabolism and Signaling |
| T | Feb 4 | SHB | Signaling |
| Th | Feb 6 | SHB | **Exam 1: 12:45-2:45, 1420 BPS** |
| T | Feb 11 | YZ | ER Stress |
| Th | Feb 13 | YZ | Ubiquitin/proteasome  |
| T | Feb 18 | YZ | Autophagy/lysosome |
| Th | Feb 20 | YZ | Protein transport into/out of nucleus |
| T | Feb 25 | YZ | RNA export |
| Th | Feb 27 | YZ | Cell Cycle  |
|  | **Mar 2-6** | **Spring Break** |
| T | Mar 10 | YZ | Apoptosis |
| Th | Mar 12 | YZ | Presentations |
| T | Mar 17 | YZ | **Exam 2: 12:45-2:45, 1420 BPS** |
| Th | Mar 19 | RD | Cytoskeleton: Actin and Actin binding proteins |
| T | Mar 24 | RD | Cytoskeleton: Myosin and microtubules |
| Th | Mar 26 | RD | Cytoskeleton: Cell polarization and migration |
| T | Mar 31 | HS | Cell Adhesion: Cell-cell junctions |
| Th | Apr 2 | HS | Cell Adhesion: ECM |
| T | Apr 7 | HS | Cell Adhesion: Cell and ECM junctions |
| Th | Apr 9 | RD | Presentations and discussion |
| T | Apr 14 | RD | Cancer: Critical pathways |
| Th | Apr 16 | RD | Cancer: Prevention and treatment |
| T | Apr 21 | HS | Developmental mechanisms and developmental timing |
| Th | Apr 23 | HS | Development: morphogenesis and growth |
| W | Apr 29 | HS/RD | **Exam 3:** 10 am – 12 noon, 1420 BPS |

**Instructions for the Preparation of a Term Paper**

1. **Topic Selection:** Topics for the term papers will be provided by each instructor and you will be given a chance to select a topic of interest. Discuss your area of focus with the assigned instructor BEFORE beginning work. Provide the papers you have selected and an outline of your paper before beginning the writing process. You should contact the instructor **a month in advance** of the due date.
2. **Format:** The paper should be no more than 7-10 typewritten, double-spaced pages (excluding the references). The first page or two should be an introduction to the topic that assumes the reader has some knowledge of the material presented in class but not beyond. The middle 4-6 pages should focus on 3-4 experimental reports bearing directly on your specific topic. Figures (3-5) should be used to guide the reader. Unless there is an important exception, the papers cited should be from reputable journals from the 2006-2020 literature. For the most part, they should be original articles supported as needed by review articles. One aspect of this assignment may be to narrow the topic from that provided to focus on a specific subtopic. The last page or two of the paper is VERY important. It should be a summary or synthesis that reflects your assessment of the area presented in a mature, thoughtful manner. Discuss any controversies and be sure to provide your own ideas for future directions and experiments. **The summary and proposed future experiments MUST reflect the maturity of your thinking on this topic and will play a key role in the grade.**
3. Your reference list at the very end of the paper should include all the authors for each article, the title of the article, the volume and date of journal and all page numbers.
4. Plagiarism: Copying paragraphs or sentences from your cited or non-cited references constitutes plagiarism! Rephrasing sentences and paragraphs does not represent a scholarly effort. All writing must be your synthesis of the material presented in your own words. ***Any significant form of plagiarism will result in an automatic failing grade since it constitutes scientific misconduct.***
5. **The term paper is due in the appropriate professor’s office by 4:00 p.m. Thursday, April 16th.** Points will be deducted for papers turned in late. Papers can be turned in prior to this date.