# BIOL 380-01, Topics in Biomedical Science, Spring 2011

## Biology 380: Topics in Biomedical Science – Spring Semester, 2011

Time: Monday and Wednesday, 7:30-8:45 a.m.
Location: FJ-B

**Course Instructors:**
Oliver Sturm, Ph.D., Oliver.Sturm@stjude.org
Melissa Parsons, Ph.D., Melissa.Parsons@stjude.org
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**Course Director:** Terry W. Hill, hill@rhodes.edu, FJ-110, ext. 3559

**Course Goal:** The principal objective of this course is to introduce students to the ways in which modern biomedical research is conceived, conducted, and reported. Each topic will begin with an overview of the scientific background that informed the research of that section's instructor. Students will then learn about relevant, state-of-the-art techniques utilized in the research in that area, and they will read and discuss a related primary research report. Finally, students will explore the clinical relevance of the research. As a result, students will come to a greater understanding of how basic scientific research translates into clinical application.

**Course Schedule:**

**Topic 1: Immune Response to Influenza – Dr. Oliver Sturm**

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| Jan 12 | Short Introduction of Immunology | |
| Jan 19 | The Immune Response to Influenza Virus | |
| Jan 24 | Discussion of Review Article: *Immunity to respiratory viruses* | Kohlmeier JE, Woodland DL. 2009. Annu. Rev. Immunol. 27: 61-82. |
| Jan 26 | **Quiz**<br>Overview of Experimental Approaches: Methods, Graphs and Statistics. | |
| Jan 31 | Discussion of Primary Literature: *Augmented IL-7 signaling during viral infection drives greater expansion of effector T cells but does not enhance memory.* | Sun JC, Lehar SM, Bevan MJ. 2006. J. Immunol. 177: 4458-63. |
| Feb 2 | Dangerous Flu Strains: The Spanish influenza pandemic; H5N1 - a new pandemic on the horizon? | |
| Feb 7 | **EXAM I** | |

**Topic 2: Apoptosis and Cancer – Dr. Melissa Parsons**

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| Feb 9 | Cell Death (apoptosis): It sounds sad, but it's really, really important | |
| Feb 14 | From the inside and from the outside: Two roads to apoptosis | |
| Feb 16 | Discussion of Review Article: Cancer – in essence, it's a genetic disease | Review article (TBD) |
| Feb 21 | **QUIZ**<br>Apoptosis and Cancer: Cancer avoids apoptosis at every step!!! | |
| Feb 23 | Discussion of Primary Literature – Turning the tables on cancer: tricking cancer into undergoing apoptosis | Primary research article (TBD) |
| Feb 28 | How we know what we know: Studying apoptosis and cancer in the lab | |
| Mar 2 | **EXAM II** | |

**Topic 3: The Immunological Aspects of Solid Tumors:**
**The soldiers are there... but why aren't they fighting? – Dr. Joe Qualls**

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| Mar 7 | Tumor Immunology Overview: Search and destroy mission... can our immune system recognize and eliminate cancer cells? | |
| Mar 9 | Tumor Allies: Tumor associated macrophages (TAMs) and myeloid derived suppressor cells (MDSCs). | |
| Mar 14 | *No Class (Spring Break)* | |
| Mar 16 | *No Class (Spring Break)* | |
| Mar 21 | Discussion of Review Article: *Macrophage diversity enhances tumor progression and metastasis.* | Qian BZ, Pollard JW. 2010. Cell 141: 39-51 |
| Mar 23 | **QUIZ**<br>History of Cancer Immunotherapy: Revisiting the battlefield... What has been attempted and why hasn't it worked? | |
| Mar 28 | Discussion of Primary Literature: *Inhibition of Mac-1 (CD11b/CD18) enhances tumor response to radiation by reducing myeloid cell recruitment.* | Ahn GO, et al. 2010 Proc. Natl. Acad. Sci. 107: 8363-8 |
| Mar 30 | Cancer Immunotherapy: Current and future applications... Let's increase (and enhance) the artillery! | |
| Apr 4 | **EXAM III** | |

**Topic 4: Modern Drug Discovery Methodologies – Dr. David Smithson**

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| Apr 6 | Introduction to the Modern Drug Discovery Process (it's more than eating leaves now) | |
| Apr 11 | High Throughput Experimental Design Considerations (aka, why didn't my experiment work?) | |
| Apr 13 | Discussion of Review Article: *Hit and Lead Generation: Beyond High-Throughput Screening* | Bleicher et al. 2003. Nature Reviews Drug Discovery 2: 369-378 |
| Apr 18 | **QUIZ**<br>Pharmacokinetics and Toxicology – Following up your leads | |
| Apr 20 | Discussion of Primary Literature: *N-myristoyl-transferase inhibitors as new leads to treat sleeping sickness* | |
| Apr 25 | High Throughput Everything – What else can we do with this technology? | Frearson et al. 2010. Nature 464: 728-734 |
| Apr 27 | **EXAM IV** | |

**Readings and PowerPoints:** Electronic course materials will be provided on the College Acad_Dept_Pgm file server or via the Moodle course management system. The link \\fileserver1\Acad_Dept_Pgm\Biology\Hill_Terry\Public\Courses\Topics in Biomedical Sciences - 380 will connect you to the correct sub-folder of the server if you are connected to the campus network – to access from off campus, contact the ITS HelpDesk (help@rhodes.edu) for instructions.

**Attendance and Class Preparation:** Attendance is required at all sessions. You will be expected to have read assigned material prior to class and to participate fully in discussions of the readings. Poor attendance, poor preparation, or insufficient participation in discussions will result in a decrease of up to ten percent of the final grade.

**Examinations:** Exams and quizzes must be taken at the scheduled times except in cases of medical or personal emergency. In such cases, the Course Director must be consulted for approval prior to the exam time or as soon as possible afterwards. The Course Director may allow a rescheduled exam or may average grades without the exam at his or her discretion. Exams and quizzes missed for reasons deemed inexcusable will receive a grade of zero.

Technical difficulty in accessing electronic material will not be accepted as an excuse for missing or delaying a quiz or exam. You should always anticipate the possibility of such difficulties and obtain electronic or hard copies of materials well in advance of each exam or quiz.

**Grading:** You will be evaluated on the basis of your performance on examinations, quizzes, and participation during class discussion. The relative weights of these components are as follows:

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| Attendance and Participation | = | 10% |
| 4 quizzes at 5% each | = | 20% |
| 4 exams at 17.5% each | = | 70% |

Midterm and final grades will be determined strictly according to the following scale:

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| A | 93.0 – 100 | C | 73.0 – 76.9 |
| A- | 90.0 – 92.9 | C- | 70.0 – 72.9 |
| B+ | 87.0 – 89.9 | D+ | 67.0 – 69.9 |
| B | 83.0 – 86.9 | D | 63.0 – 66.9 |
| B- | 80.0 – 82.9 | D- | 60.0 – 62.9 |
| C+ | 77.0 – 79.9 | F | 0 – 59.9 |

**Communication:** Email addresses have been provided for all of your instructors. The instructors read their messages regularly and will use email to contact individual students and send group messages to the class. Thus, you should check your account on a daily basis. **Timely email communications from your instructors carry the same weight as do announcements made in class.**

**Honor Code:** Your conduct in this course must adhere to the Rhodes College Honor Code.