

will be performed over a three week period. During the first week, the relevant concepts will be presented and the class will develop a protocol to be used in the experiment by adapting standard methods posted on the course WebCT site. Students are expected to keep an accurate laboratory notebook and have the necessary procedures written out in full when they arrive in class the following week. During week two, you will work in groups to carry out the experiment, analyze the data, and organize your results. During week three, students will review their findings in preparation for writing their final reports. Discussion of the next experiment will also take place at this time.

Written reports

After the completion of an experiment, each student should prepare a journal style article for the lab report. This should include:

- Abstract: concise summary of what happened during the experiment (2-3 sentences for each exp't)
- Introduction: to provide adequate background pertaining to the cell line and experiments to give any reader knowledge of why you did the experiment. This should include your hypothesis.
- Materials and Methods: concise summary of what you did including how the cells were prepared and maintained.
- Results: This section will include both figures and written results. Here you state simply what you saw.
- Discussion: This section you will analyze your results and state why you observed what you did during the experiment. (Conclusions section)
- References: you will need to be looking for references to support your introduction and discussion. Don't forget to cite the paper that the lab is based on!

Lab reports will be reduced by 10 points for each day they are late.

Quizzes

Quizzes will be held throughout the semester on non-experiment days. These quizzes will cover the necessary background for you to perform and understand the experiment that will follow the next week. Also, these quizzes may cover material that you have already done so stay prepared. The information that the quiz covers can be found on WebCT under each individual experiment folder. These will NOT be open note. Do note that these quizzes are not considered pop quizzes. MAKE- UP EXAMS WILL BE ADMINISTERED AT THE END OF THE SEMESTER ONLY FOR "UNIVERSITY APROVED EXCUSE ABSENCES"

Academic integrity

All students should be familiar with their rights and responsibilities under the Georgia Tech Academic Honor Code and are expected to abide by its provisions. Academic dishonesty isn't a "victimless" crime; it interferes with instruction, damages the reputation of the Institute, and ultimately harms the perpetrator who fails to learn course material or the value of individual effort. Violations of the Honor Code (<http://www.honor.gatech.edu>) are taken seriously and can result in severe disciplinary action, up to and including expulsion. Prohibited conduct includes, but is not limited to: copying from another student or allowing someone to copy your work (sharing group data when completing laboratory reports is permitted, but submission of identical written work is not), using notes in any form on a quiz without the express permission of the instructor, requesting a re-grade of an assignment after altering it, submitting someone else's work as your own, or allowing your work to be submitted under another person's name.

Attendance and Participation

All students are expected to be present each week in lab. (This includes being on time.) If you do not provide the instructor with a valid Georgia Tech excused absence (see the bylaws) within 24 hours of missing a lab, it will count against you. Participation will be based mainly on contribution to class discussions. During the discussion sessions, participation will be scored based on the quality (not correctness) of answering questions and if you ask questions that allow for forward movement of the discussion.

Grading

Quizzes and assignments	20%
Lab reports, Experiments 1-3	30% (10% each)
Attendance and Participation	10%
Final Presentation	10%
Final cumulative report	30%

Final scores will be rounded to the nearest whole number, and grades will be assigned according to the following scale: 90-100% A; 80-89% B; 70-79% C; 60-69% D; <60% F

SCHEDULE (subject to change)

- Jan 8, 10: Introduction to the cell biology laboratory
Objectives and format
Introduction of the paper by B. Xie *et al.* (1998) *J. Biol. Chem.* **273** (19), 11576-11582
Distribution and discussion of take home quiz
Lab Safety discussion
Photograph each student for class directory
- Jan 15, 17: **MLK day – no lab**
- Jan 22, 24: In depth discussion of Xie *et al.* paper
Statistics exercise and tutorial
Take home quiz due
- Jan 29, 31: Experiment 1 quiz
Preparation for Experiment 1
Procedures used in cell culture
- Feb 5, 7: **EXPERIMENT 1: HL-60 cell differentiation and phagocytic function**
In this experiment, you will use light and fluorescence microscopy to examine the effects of PMA on HL-60 cell morphology, culture density and phagocytosis relative to a negative control.
- Feb 12, 14: Discussion of Experiment 1
Experiment 2 quiz

Preparation for Experiment 2

- Feb 19, 21: EXPERIMENT 2: Viability of undifferentiated and PMA-treated HL-60 cells
You will examine the effects of PMA dose on cell viability using two different assays: trypan blue exclusion and marker enzyme activity (WST-1).
Report for Experiment 1 due
- Feb 26, 28: Discussion of Experiment 2
Experiment 3 quiz
Preparation for Experiment 3
- Mar 5, 7: EXPERIMENT 3: Expression of MMP-9 mRNA during PMA-induced differentiation
Xie et al. reported that an increase in MMP-9 mRNA levels was associated with differentiation of HL-60 cells. You will use a quantitative reverse-transcription PCR (RT-PCR) assay to measure relative amounts of MMP-9 mRNA in differentiated and undifferentiated cells.
Report for Experiment 2 due
- Mar 12, 14: Discussion of Experiment 3
Experiment 4 quiz
Preparation for Experiment 4
Experiment 5 proposals due
- Mar 19, 21: **Spring Break – no lab**
- Mar 26, 28: EXPERIMENT 4: Changes in MMP-9 enzymatic activity (Type IV collagenase/gelatinase) during cellular differentiation
You will determine the relative activity of MMP-9 protein in differentiated and undifferentiated HL-60 cells using an in situ gel electrophoresis (zymography) assay..
Report for Experiment 3 due
- Apr 2, 4: Discussion of Experiment 4
Preparation for Experiment 5
- Apr 9, 11: EXPERIMENT 5: Original Experiments
In this final experiment, the class will use the findings from Experiments 1-4 to derive hypotheses that will be tested by experiment(s) designed by the students.
- Apr 16, 18: Discussion of Experiment 5 and course wrap-up
Group Presentations
- Apr 23, 25: **Final (cumulative) lab report due (by noon)**