

## Syllabus for BIOL 313L- Cell Biology Lab. FALL 2016.

**COURSE TIME:** Monday (BIOL-313L-01) and Tuesday 1:30 - 4:30 pm (Biol-313L-03) in Room 403 in the College of Pharmacy, MUSC Pharmacy Quad Building F (4<sup>th</sup> floor) [go down the corridor from the entrance, take stairs [next to the elevator] or the elevator (that is very slow) to 4<sup>th</sup> level, turn right and on the right the QF403].

**INSTRUCTOR:** Dr. Richard Southgate. Biology PhD., U. Geneva, Switzerland, 1984.

**OFFICE:** HWWE 308, Harbor Walk, 360 Concord Street, Charleston SC 29401.

Tel.: 843-953-0340 is not very reliable as I am often not in this room on M – Th due my 12 hours of teaching per week, 9 in labs, so it would be far better if you e-mail me at [southgater@cofc.edu](mailto:southgater@cofc.edu) for the quickest replies.

**OFFICE HOURS:** 9:30 – 12:30 pm Fridays in HWWE 308 or appointment (via by e-mail) or after lab. sessions or end of class.

In this lab you will gain firsthand experience with the techniques commonly used in current cell biological research that includes quantitative microscopy, histochemistry, spectrophotometry, cell fractionation and centrifugation, organelle isolation, enzyme assays, and protein electrophoresis etc.

**CELL BIOLOGY LAB OVERVIEW:** The lab and lecture components of this course should not be considered as separate entities, all thrown together to confuse the poor biology major. No, the laboratory activities are designed to help the students to understand more directly about the critical concepts that are discussed in the Cell Biology classrooms. This will allow students to explore, propose and actually test hypotheses, that will result in novel data. The methods that are used in the Cell Biology Labs. are common techniques that are also used in molecular, biochemistry and plant research labs. etc.

### **Upon completion of this course, students will be expected to:**

- Understand the principles and concepts behind basic techniques used by cell biologists, and apply your knowledge of these techniques to novel experiments probing cell structure and function.
- Be able to read primary journal articles within the field of cell biology, interpret the author's findings, and communicate your insights orally and verbally.
- Be able to maintain a detailed and accurate laboratory notebook, and communicate your lab results in the format of a scientific paper to anyone else.

**CO-REQUISITE OR PRE-REQUISITE:** Biology 313 (Cell Biology).

### **REQUIRED TEXT AND LAB. INFORMATION ON OAKS.**

No textbook is required for the CB Lab. All Cell Biology activity procedures will be posted on OAKS and you will be responsible to download and read the lab protocol BEFORE you come to the lab. as there will be a quiz or a talk to the lab. members at the beginning of the particular activity.

Details will be given in the first lab., but the idea is to have 3 quizzes (10 points each) and 6 mini, 7 - 8 minute lab. "talks" over the next 3 months. As the lab. has 12 students, one

2 students team per bench will give a brief, 7-8 minute power point presentation in the semester so as to describe the upcoming lab. activity.

Everyone in the lab. should have understand the OAKS instructions before coming to the lab. so I will ask some questions to mainly the presenter team BUT also a few non-presenting students, if the presenter team's description is not so clear etc.

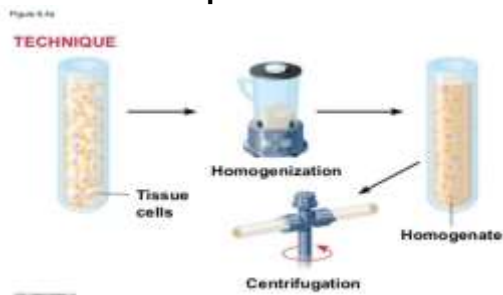
From the wall on bench 1 (closest to the door) is group #1, next week group 2, next week, bench 2 group 3 etc. This means each 2 student groups will have one "talk" @ 20 points each in the seminar (as the MUSC guest wifi is public and no security, it may be best to put your presentation on a USB etc.

To find the lab protocols go to: 1) OAKS, 2) Select this lab. section, 3) Click on CONTENT (I have cross-linked my 2 labs in to one for convenience as the two sections should be identical...) so even though you have specific lab. days, on OAKS you have only one CBL #.

**HOW TO DO WELL IN THIS LAB:** This is an upper division lab. It is expected you come to lab prepared, follow the protocols, and **ACTIVELY PARTICIPATE IN THE EXPERIMENTS**. This requires preparation, attention, and some fun, yes within the lab. rules ....

Attendance in these labs is **REQUIRED**. Since it is impossible to re-prepare a lab. activity, especially now with the greater distance from Harbor Walk to MUSC, there will no lab. make-ups but if you were ill, or had medical school interviews or sport activities etc. with "documented proof".....!, a make-up questionnaire, oral test etc. or a modified lab. report will be used to gauge your understanding of the missed lab's topic for a grade in my office at Harbor Walk (HWWE 308). This means you have to answer these questions as if you were about to do the lab. activity.

It's a good idea to put all your lab stuff in one notebook and I will periodically check the "quality" of your notes. A good way to understand the various lab activities is to also make a flow chart in your notebook, detailing the lab's chemical components, procedures, and its general goals. This is especially important as some of the later labs will be multitasking i.e. more than one protocol at the same time, so you need to be well organized..... example:



If you are to be a doctor, dentist etc. your job requires good documentation of your patient's medical status .... A notebook can reinforce this idea of "quality" note making, which will be reflected in your lab. grade and your final grade if they are not up to code.

**YOU ARE RESPONSIBLE FOR DOWNLOADING and PRINTING THE LAB. PROTOCOL** in question as I have seen many students struggling to see the protocol details on a cell phones ... If you wish to only use a cell phone etc., **AT LEAST MAKE A PAPER COPY OF**

**THE LAB. PROTOCOL TABLES** (you need to write results down and often you will not have enough time to look on your Ipad etc.

I-pads, laptops and cell phones on a lab. bench are considered very “endangered” toys/tools” due to a very high chance of water spills and worst on the lab. benches.....

The quizzes will be relatively easy, as it tests 90% what you have read in the protocol.

I will also add certain VOICE THREAD (<http://voicethread.com/about/features>) to help with the protocols. The first time you use it, you have to sign in with your student ID and password. More info: <http://blogs.cofc.edu/tltutorials/2012/02/24/voicethread/>,

**STUDENTS WITH DISABILITIES** who have the proper documentation through SNAP services for extended exam times will be required to take the exams through SNAP services (assuming you want to use the additional time, if not, you are welcome to take the exam with your classmates). Those students who wish to take exams in the SNAP office must schedule their exams and inform me when they will be taken before the event. See Center for Disability Services (SNAP) for more info. <http://disabilityservices.cofc.edu>. Please contact me at [southgater@cofc.edu](mailto:southgater@cofc.edu) or in person ASAP to make sure you receive all the help by law.

**REQUIREMENTS:** You must wear a lab coat in the lab., there are no exceptions as both COFC and MUSC dictates the safety rules in this lab. space

- You cannot eat FOOD or DRINK in the lab. and there should be no SANDALS, PERFORATED SHOES, FLIP-FLOPS or HIGH HEELS in the lab as well.
- Wear gloves and goggles when instructed to do so.
- WASH YOUR HANDS FREQUENTLY DURING AND WHEN YOU LEAVE THE LAB.

We follow the College lab safety policy posted on OAKS and MUSC safety polices as well (see below).

**SYLLABUS:** A TENTATIVE CBL SYLLABUS for FALL 2016 (BIOL-313L-01 and -03).

DATE	TOPIC	LAB REPORTS DUE DATES
AUG M 29 + T 30, 2016	Lab 1 – Microscopy, Microscope Use, Safety Instructions and looking at different cells (live or slides) including <i>Tetrahymena</i> feeding and <i>Onion</i> cytoplasmic streaming	
SEPT M 5 + T 6, 2016	Lab 2 - Histochemistry Lab. talk #1 on Histochemistry	Lab 1 report
SEPT M 12 + T 13, 2016	Lab 3 –Enzyme Kinetics Lab. talk #2 on Enzyme Kinetics	Lab 2 report
SEPT M 19 + T 20, 2016	Lab 4 – Photosynthesis Lab. talk #3 on Photosynthesis HOME ASSIGNMENT #1 instructions	Lab 3 report
SEPT M 26 + 27, 2016	Lab 5 – DNA concentrations in different species Lab. talk #4 on DNA amounts	Lab 4 report
OCT M 3 + T 4, 2016	Lab 6 – Cell fractionation lab. Lab. talk #5 on Cell fractionation HOME ASSIGNMENT #1 report due date	Lab 5 report
OCT M 10 + T 11, 2016	Lab 7 - Polyacrylamide gel electrophoresis	Lab 6 report

		<b>Q1</b>	
<b>OCT M 17 + T 18, 2016</b>	<b>Lab 8 – Immunoblot</b> <b>HOME ASSIGNMENT #2 instructions</b>	<b>Q2</b>	Lab 7 report
<b>Oct M 24 + T 25, 2016</b>	<b>Lab 9 – Analysis and mystery lab.</b> <b>to be announced in Lab 8.</b>	<b>Q3</b>	Lab 8 report
<b>Oct M 31 + NOV 1, 2016</b>	<b>Lab 10- Mitosis and DNA (cheek cells / PTC DNA gel)</b> <b>HOME ASSIGNMENTS #2 report due date</b> <b>Lab. talk #6 on Mitosis</b>		Lab 9 report
<b>FALL BREAK</b>	<b>Nov 5 – 8, Election on T Nov 8,</b> <b>Classes resume on W Nov. 9</b>		
<b>NOV 14 + T 15, 2016</b>	<b>PTC DNA gel</b> <b>Student Literature Presentations part 1 (at MUSC or Harbor Walk, decided by lab. vote).</b>		Lab 10 report
<b>NOV 21 + T 22, 2016</b>	<b>Student Literature Presentations part 2 (at MUSC or Harbor Walk, decided by lab. vote).</b>		
<b>THANKSGIVING HOLIDAY</b>	<b>WED NOV 23 – SUN NOV 27</b>		
<b>NOV M 28 + T 29, 2016</b>	<b>FINAL (Comprehensive) EXAM – the end (at MUSC or Harbor Walk), decided by lab. vote).</b>		

**GRADES:** Grades for this course is determined from lab quizzes, your lab. talk, your written reports, your two team or solo literature presentations.

**3 Lab quizzes:** 10 points per quiz X = 30 points.

**10 Lab reports:** (200 total points, 20 points per lab.). Reports are aimed to demonstrate your understanding of the lab material and its conceptual background.

Lab reports are due at the beginning of the following lab. Due to different writing styles in the labs. ALL reports have to be printed with size 12 and a pleasant font for reading (e.g. Arial ) AS WELL AS on OAKS DROPBOX. **There will also be a 4-point penalty, per day, for late reports!!!**

- LAB. 1 report will be a traditional, duo student (you and your partner).

- Due to the more restricted conditions in the Cell Biology Labs. at MUSC, I am proposing a new lab. report system. Normally 2 students (who worked together) would produce a duo report. My modification will be a group report of 4 students per bench to produce a single report.:

- 1) All 4 students can work together to write the INTRODUCTION section and a brief MATERIALS/METHOD section of the report. There is no point repeating word for word of the lab's protocol, so describe the materials/methods very briefly, highlighting the most important summary of this section.

- 2) All 4 students i.e. 2 x 2 student groups will describe their individual RESULTS section of the lab. activity in question, i.e. 2 RESULT PARTS for each bench per report.

3) For the discussion, all 4 students can work TOGETHER to describe the basis for this cell lab. activity, concepts etc. for the 4 student group to generate a single discussion. Any DIFFERENCES in the two groups results as well as, and even more important, offering the best SCIENTIFIC EXPLANATIONS as to why something did not worked out as planned. Research and fact finding on the internet are also but if you borrow information from the internet, you have to document it with web sites (PLAGIARISM IS NOT ALLOWED ANYWHERE)....

So, each report will have:

- the 4 students write the Introduction and Materials/Methods,
- all 4 students, each in a group of two, will generate 2 different results, and then
- all 4 students will work together to generate a joint discussion with explanations for any possible discrepancies.

• Each lab. report will be a COLLECTIVE GRADE of all the four students per bench with the hope that this will result in better reports, greater understanding and greater reasoning. You will have to trust the other 2 students will work well together to explain any differences between the two results and then to explain the scientific basis of these, hopefully small, inconsistencies in the discussion section. Probable reasons: human error, miscalculated volumes, leaving the protein (for example) on the bench to long at room temperature etc.

**Notes:** Your individual notes will be looked on random times in the next three months for a total of 20 points to ascertain the quality of your original note taking i.e. neither copies of your partner's notes nor the lab. protocol!! You have to create your notes by reason and observation i.e. not copying from someone else.... , and your organization (e.g. flow and readable English) will be tested as well. If your notes are not up to the College's "standards", you can lose up to 20 points, not catastrophic but ....

2 Home assignments (paper and OAKS, Dropbox copies) for 2 student teams, will be based on a recent (less that 5 years ago) peer-reviewed cell biology experimental technique etc. to be discussed in lab. 4 (Sept 19 / 20) and the report due on Oct 3 and 4 for Home assignment #1. The second Home Assignment will be discussed in lab. 8 (Oct. 17 / 18) and the report due date: Oct 31 and Nov. 1. Each report will be 25 points each.

**LITERATURE PRESENTATION (60 points).** Duo (or solo) student pairs will produce a minimal 15 minute power point presentation and 5+ minutes for questions from the other students in the particular lab. The article has to be recognized topic in CELL BIOLOGY and related to the BIOL-313-01 class and OAKS lectures. It also has to be based on primary research literature (PUBMED etc.) i.e. PEER-REVIEWED and published within the last 3 – 4 years maximum. Details on this project will be given at the end of lab 7 and you need to select your paper subject, **AND GET IT APPROVED BY YOUR INSTRUCTOR (i.e. me)** by lab 9. No article = a loss of 80 pts....

You will need to also supply an electronic copy of your chosen article and power point presentation (OAKS, Dropbox) plus a paper copy of your power point presentation (2 images per page) for grading purposes **BEFORE YOU START YOUR PRESENTATION**, and as many students in the past did not do this small task, there will be a penalty of 10 points if this copy is not given to me just before your talk.... .

<b>SUMMARY:</b> 3 QUIZZES 1 LAB. TALK	10 points (3 X 10 pts. = 30 points) 20 points per 2 student groups total: 50 points per student
Lab. Notes:	20 points
Lab. Reports	200 points (10 X 20 pts.)
2 Home assignments	25 points each = 50 pts.
PPT PRESENTATIONS	60 points
TOTAL:	380 points.

**Grades:** Your final grade is determined as a % of the 520 points as follows:

A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	0-59

**Student conduct and safety issues in this course is governed by the College of Charleston Honor Code, no plagiarism etc... and now MUSC Honor Code as well...**

- <http://studentaffairs.cofc.edu/honor-system/> and
- <http://academicdepartments.musc.edu/esl/studentprograms/honorcode/>
- <http://www.lib.usm.edu/legacy/plag/plagiarismtutorial.php>
- <http://studentaffairs.cofc.edu/honor-system/faqs.php>
- <http://jinr.people.cofc.edu/honorcode.pdf>
- <http://studentaffairs.cofc.edu/honor-system/index.php>

I will give you a copy of this policy (\*\*\*\*\*) in the first lab. and we will briefly discuss its meaning. At the beginning of the second lab. you will have to sign this policy, no signature means no future labs in this semester ....., so take the week to fully understand its contents and sign it and one of the lab 2 quiz questions will be on one of these safety issues.

**IMPORTANT: College of Charleston Honor Code and Academic Integrity**

Students can find the complete Honor Code and all related processes in the *Student Handbook* at <http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php>

**SUMMARY OF THE COLLEGE OF CHARLESTON HONOR CODE**  
**Reporting violations and the XF Sanction– Instructor Guide**  
 Instructors, with any necessary assistance from the Dean of Students (953-5522), will assess whether the behavior of the student falls into one of three classes and then follow the affiliated procedures:  
**Class 1** – act involves significant premeditation; conspiracy and/or intent to deceive, e.g., purchasing a research paper.  
**- Penalties for Class 1:** XF and either suspension or expulsion assigned if student found responsible for this class of offense by Honor Board.  
**Class 2** – act involves deliberate failure to comply with assignment directions, some conspiracy and/or intent to deceive, e.g., camouflaged use of the Internet when prohibited, fabricated endnotes or data, copying several answers from another student’s test.  
**- Penalties for Class 2:** XF and other sanctions assigned if student found responsible for this class of offense by Honor Board.

**Class 3** – act mostly due to ignorance, confusion and/or poor communication between instructor and class, e.g., unintentional violation of the class rules on collaboration.  
- **Penalties for Class 3:** Zero on the assignment/test, resubmission of assignment, etc.  
The complete XF policy can be found in Appendix A of the [Student Handbook 2012-2013](#).

**CLASSROOM DISRUPTION INFORMATION:**

Check out if you are thinking of being one of these students:

<http://deanofstudents.cofc.edu/policies-and-procedures/classroom-disruption.php>

The bottom line to do well in this lab.

- 1) You need to be ORGANIZED,
- 2) Understanding the protocol BEFORE coming to the lab. for the same day quiz,
- 3) During the lab. experiments, please remember the SAFETY RULES (below) and THINK FIRST before potentially messing up your (and your partner's) experiment, it happens but if you know the concepts and the major features of the protocol, you and your partner will do so much better. Team work is not so bad.
- 4) Preparing a good report in old-style good flowing English and grammar (bad grammar etc. means considerable lower points and can easily be minimized with a word-speller...), and too short or very unpolished and/or choppy sentences and fact/spelling errors will all result in lower points.

LOGIC: every career requires good communication skills and apart the proper biological learning and understanding in these labs, you also have the real opportunity to improve your writing skills by practice.

- 5) To answer the quiz questions and the final correctly by using Sherlock Holmes's logic.

TIP: read aloud out your team's report with your partner or others to hear how the "report" actually sounds, because if it is not easily flowing, you can immediately understand it feels ugly and how you can lose many points.

'You see, but you do not observe. The distinction is clear.'

Sherlock Holmes Quote, - *A Scandal in Bohemia*

"The world is full of obvious things which nobody by any chance ever observes."

Sherlock Holmes Quote, -*The Hound of the Baskervilles*

'How often have I said to you that when you have eliminated the impossible, whatever remains, *however improbable*, must be the truth?'

Sherlock Holmes Quote -*The Sign of Four*