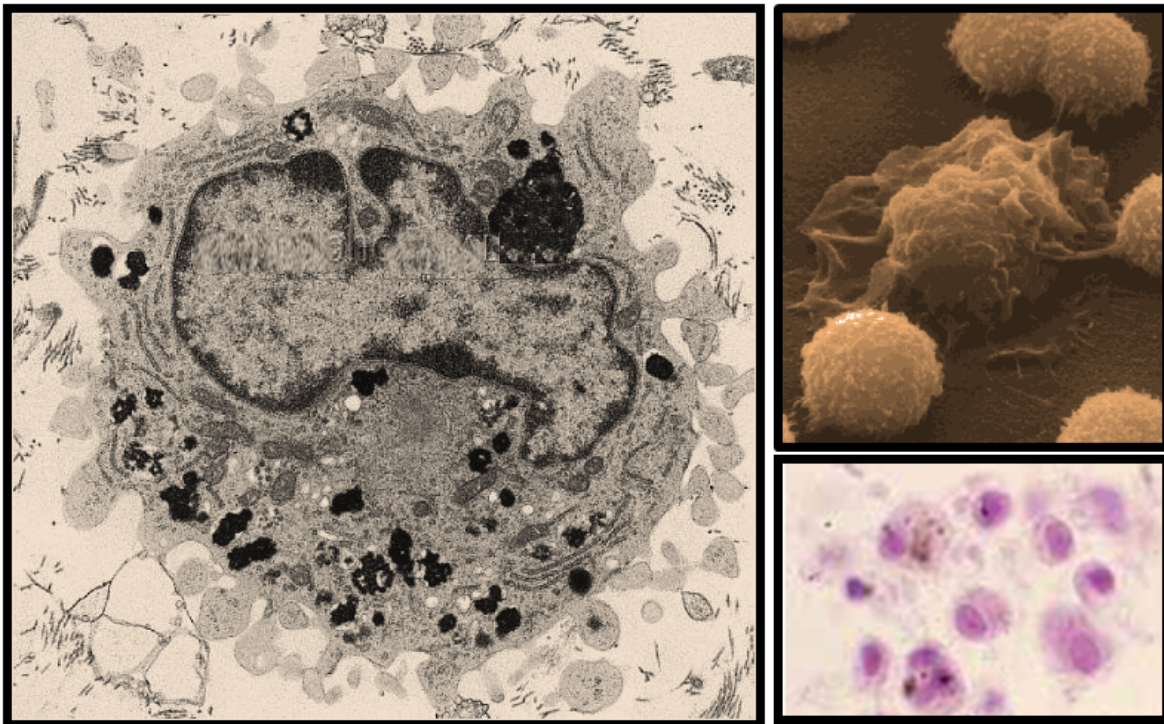


RUTGERS

Graduate School of
Biomedical Sciences

BASIC HISTOLOGY

Fall 2015



Course Director: Grace Pinhal-Enfield, Ph.D.

ABOUT THIS COURSE

This course is designed to provide graduate students with a solid foundation in basic histology. In addition, it will hopefully prepare students for learning in other disciplines that will follow in their graduate studies.

Basic Histology begins with a brief introduction to histological methods for light microscopy and describes the general principles of immunocytochemistry, transmission electron microscopy (TEM), and scanning electron microscopy (SEM). The course then goes on to discuss the characteristic morphologies of various cell types, cellular arrangements that form the four primary tissues (epithelium, connective tissue, muscle, nerve), and the microscopic structure of major organs within organ systems. The aim of this course is to provide students with the skills and knowledge needed to identify and describe the microscopic anatomy of various organs, with attention to the arrangement of the four primary tissues within each organ. There will be some basic discussion of structure-function relationships. Although both the details of mechanisms involved in these functions and in pathological processes are outside the scope of the course, brief reference will be made for interest in the broader perspective of medical science.

To succeed in Histology, students need to study pictures (illustrations, diagrams, photographs) and capture mental images. Acquisition of a good repertoire of mental images and their translation into three-dimensional concepts can be achieved through careful and repeated observation of textbook and virtual microscopy images.

Class format will include lecture presentations accompanied by demonstration of various tissue sections by the instructor. After discussion of lecture material, students will be able to view tissue sections of the region of interest using virtual microscopy (VM). In VM, glass slides previously scanned at high resolution are viewed on a computer monitor and selected regions of interest can be viewed at higher magnification. Each student is encouraged to bring his/her own laptop computer to class for each session. Team-based learning (TBL) will also be employed. Both VM and TBL have been shown to be effective in increasing comprehension and knowledge retention due to employment of collaborative learning.

This course is designed for graduate students in biomedical sciences and for students (such as biology teachers, laboratory technicians, or graduate students in research) whose work requires examination of tissue sections. Although it is primarily designed for Masters students, doctoral students (other than those in the department of Cell Biology & Molecular Medicine) may take this course for credit with added requirements in the form of extra assignments. The course will meet for 15 evening sessions, once per week for 3 hours each session.

Grace Pinhal-Enfield, Ph.D.
Course Director

BASIC HISTOLOGY – Fall 2015

Course # & Credits

CBMM N5001 for 3 credits (College Biology is a prerequisite.)

Course Instructor

Grace Pinhal-Enfield, Ph.D.

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Session Time and Location

Thursdays 5:30-8:30 pm in MSB C600 for lecture and MSB B518 for lab.

Materials

- Ovalle WK and Nahirney PC. (2013) Netter's Essential Histology, 2nd ed. Saunders, Elsevier. ISBN 978-4557-0631-0
- Students with laptops should bring them to class. The use of VM employs a team-oriented study approach as classmates view computer images together.
- Websites
 - http://njms.rutgers.edu/gsbs/olc/bhis/index.htm
 - http://vm.njms.rutgers.edu [core username and password]
 - https://moodle2.rutgers.edu/login [core username and password]

Grading Policy

- Exam I (lecture & lab practical components) 40%
- Exam II (lecture & lab practical components) 40%
- 3 Team-Based Learning Assessments (5% each) 15%
- Attendance and participation (includes TBL learning issues) 5%

Each exam will consist of approximately 50 questions. Exams will be comprised of practical questions (based mainly on VM labs) and lecture questions (multiple choice, matching, fill-in-the-blank, short essay questions based mainly on lecture and TBL material). Students may not bring any books, notes, or electronic devices including computers, calculators, cell phones, players, etc. into the examination room. There will be no make-up examinations. Students, who need to be absent for class, must notify the instructor in advance. If the University cancels classes because of weather, students are still responsible for the missing day's assignments.

Please see statement on academic integrity at http://njms.rutgers.edu/gsbs/current_students/docs/2014/MastersHandbook.pdf

Survival Guide

- Be prepared. Keep up. Focus on subject at hand without "multi-tasking".
 - Read the text (1-2 chapters per week) and focus on points emphasized.
 - Integrate lecture material with lab material.
 - Study productively in groups.
- Ask questions.

MOODLE

The course website is an integral component of Basic Histology. In addition to course material, the website will contain information concerning the administration and operation of the course (e.g., syllabus) and will provide links to the virtual microscopy image database and other useful internet sites. Course announcements, including snow and emergency procedures, will be displayed on the homepage. You can access the course website by using your core username and password at <http://moodle.rutgers.edu> for MOODLE.

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VIRTUAL MICROSCOPY

VM slides can be accessed at <http://vm.njms.rutgers.edu> using your core username and password. Please refer to your lab guide and lecture materials for more detailed information about how to view and study the images in your virtual slidebox.

You can use the wireless connection during VM labs, but the physical connection (using your own ethernet cable plugged into the jacks in the VM labs) will be much faster (100 MB versus 10 MB). To register for wireless, please go to <http://istreg.rbhs.rutgers.edu>. For Technical Assistance, please refer to http://ist.rbhs.rutgers.edu/about_IST/contact_us01.shtml to contact IST.

SCHEDULE

WEEK	DATE	TOPIC	NETTER'S HISTOLOGY CHAPTERS
1	Aug 27, 2015	Introduction, Cells, Epithelium	1,2
		Lab 1 is scheduled for week 2.	
2	Sep 03, 2015	Connective Tissue	3
		Blood and Bone Marrow	7
3	Sep 10, 2015	Muscle	4
		Nerve (TBL)	5
4	Sep 17, 2015	Skin (Integumentary System)	11
		Cartilage and Bone	6
5	Sep 24, 2015	Digestive System	12-14
6	Oct 01, 2015	Cardiovascular System	8
		Exam Review	practice practical & review sheet
7	Oct 08, 2015	Mid-Term Exam	
8	Oct 15, 2015	Eye and Ear	19-20
9	Oct 22, 2015	Respiratory System	15
10	Oct 29, 2015	Lymphatic System	9
11	Nov 05, 2015	Urinary System (TBL)	16
12	Nov 12, 2015	Endocrine System	1-
13	Nov 19, 2015	Female Reproductive System (TBL)	18
14	Dec 03, 2015	Male Reproductive System	17
		Exam Review	practice practical & review sheet
15	Dec 10, 2015	Final Exam	

TEAM-BASED LEARNING (TBL) - Background

Introduction

Many educational institutions have implemented Team-Based Learning (TBL) into curricula as a tool for active, self-directed, cooperative student learning. TBL merges small-team interactive learning with instructor-driven content focus. Generally, TBL sessions include objective-oriented assignments (learning issues answered prior to TBL session), individual readiness assurance tests (IRATs), group readiness assurance tests (GRATs), and group application problems.¹

Implementation of TBL enhances academic performance and increases student satisfaction. Institutions that have employed TBL as a learning method report that GRAT scores are higher than IRAT scores, indicative of cooperative learning. These institutions have also witnessed a positive trend in which lecture-taught students in the bottom 25th percentile showed better performance with the TBL format. In addition to improved performance, most students perceived TBL activities to be more engaging, effective, satisfying than traditional didactics and go as far as identifying TBL as the preferred learning method. In a study where students (n=60) were asked to answer a TBL satisfaction questionnaire, TBL was ranked first in ease of understanding, content retention, applicability, class time appropriateness, learning motivation and reduced stress when compared to traditional Lecture-Based (LBL) and Problem-Based Learning (PBL).²

Learning Issues

The learning issues (and lab guides) define the knowledge base of histology to be mastered and cover the scope of information that might be tested on exams for that topic. TBL sessions are based on a series of learning issues, which are derived from the required textbook. You are only responsible for reading the figures and associated text that are specified in the learning issues for that TBL. Each member of the team must come to class prepared for TBL sessions with written responses to the learning issues prior to each session.

Session Formats

Each TBL session will take place at the beginning of class in B518 with a short individual quiz ("IRAT" containing 5-10 MCQ) that addresses the session's learning issues. After the individual quiz, team discussion of the learning issues will occur for at least 30 minutes with the goal that team members will reach a uniform understanding of the information to be mastered for each topic. Misunderstandings not resolved by the team should be clarified by the instructor. After team discussion, the same quiz will be retaken as a group quiz ("GRAT") and immediate feedback will be provided to insure proper recognition and understanding of the correct answers.

TBL Grades

Students will determine quiz (individual and group) grade weights at the beginning of the semester. For each TBL session, the instructor will check with each student to see that learning issues are completed. Completion of all learning issues for each TBL will be reflected in your class participation grade.

¹Michaelson, LK. (2008) Team-Based Learning Defined. International Association of Medical Science Educators Meeting.

²Eusetasak R, Thongsri T, Yongyos J, Klanarong S. (2007) Team-Based Learning Satisfaction Compared to Lecture-Based and Problem-Based Learning. Association for Medical Education in Europe Meeting.

TEAM-BASED LEARNING (TBL) - Instructions

Detailed Instructions for TBL Session Procedures

Each TBL assignment is to be completed individually by each student prior to the TBL session. Although answers for the learning issues will not be collected or graded, the instructor will check (during TBL group discussions) to see that the assignment has been completed by each student. The purpose of the learning issues is to help focus on the more relevant material in the chapter and prepare for the quiz. Outside resources in addition to the textbook may be needed to complete the assignment. TBL sessions will proceed as follows:

- TBL sessions will be held in B518 and will start on time. So, don't be late!
- Each student will take a 5-10 question multiple choice quiz (not open-book format) within the first 15 minutes of class. This is the IRAT (Individual Readiness Assurance Test).
- Once IRATs are completed and replaced in folders, teams will thoroughly discuss learning issues for at least 30 minutes.
- Once each team has discussed each and every learning issue, students will take the same quiz as a team using the IF-AT form. This is the GRAT (Group Readiness Assurance Test).

The image displays four examples of Immediate Feedback Assessment Technique (IF-AT) forms, labeled A, B, C, and D. Each form is titled 'IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)' and includes fields for Name, Test #, Subject, and Total. Below the header is a grid of questions, each with four possible answers (A, B, C, D) and a 'Score' column. The grid is covered by brown rectangles, which are scratched off to reveal the correct answer. Example A shows a grid with all answers covered. Example B shows the correct answer 'D' for question 1, with a star underneath the 'D' rectangle. Example C shows the correct answer 'A' for question 2, with a blank rectangle underneath the 'A' rectangle. Example D shows the correct answer 'B' for question 2, with a star underneath the 'B' rectangle.

A. Each group receives the test with all answers covered by brown rectangles.

B. Students in the group decide on an answer and scratch off the corresponding brown rectangle. The correct answer to question 1 ("D") was scratched off. The star underneath rectangle "D" informs the students that they are correct and immediately reinforces learning.

C. Students in the group narrow the answer to question 2 to "A" or "B" and scratch off "A." The blank rectangle immediately indicates that "A" is incorrect.

D. Now the group chooses "B" and exits this question with knowledge even though it took more than one attempt to answer correctly.

- After GRATs are completed, the class will have the opportunity to discuss answers.
- Folders with IRAT/GRAT quizzes will be collected for grading. Class will immediately follow TBL in C600.

TEAM-BASED LEARNING (TBL) – Sample Quiz

1. A fellow student in the Graduate School of Biomedical Sciences Masters program, wants to take a course that focuses on the microscopic anatomy of various tissues and organs, with some attention to structure-function relationships, mechanisms, and clinically significant processes. You suggest a wonderful course ☺ that is offered in the fall on Thursday evenings. Based on the syllabus for the course, you inform her that
 - A. to succeed in this course, students need to “keep up” and build a repertoire of histology images through detailed and repeated observation of pictures.
 - B. the course will give students access to visualization of the microscopic anatomy of tissues and organs on glass slides through state of the art Olympus microscopes.
 - C. lecture and lab sessions are scheduled to meet in the same room and every student must have a laptop.
 - D. make-up exams are structured as oral exams that follow a question-answer interview format and are given on an individual basis within 2 weeks of the original exam date.

2. In order to demonstrate how TBL works and the format of TBL quiz questions, your instructor asks you to engage in a TBL session the first day of class. During this TBL, each student is asked to read the syllabus independently and answer 3 quiz questions about the syllabus and TBL. After class, a friend from a different class asks you about TBL. Which of the following statements about TBL is generally correct?
 - A. Although exam scores for TBL (team-based learning) and LBL (lecture-based learning) are similar, student satisfaction is increased.
 - B. IRAT scores are higher than GRAT scores, indicative of cooperative learning.
 - C. Learning issues are a group of questions that set out to focus information for study and are answered with written responses by each team member prior to TBL sessions.
 - D. Feedback for correct and incorrect answers on the TBL quizzes is provided by the instructor at the beginning of the following week.

3. The images below exhibit interactions between students during a TBL session. Place the following images in order from least effective to most effective team discussions.



1



2



3



4



5

- A. 5-4-1-3-2
- B. 4-1-3-5-2
- C. 1-2-4-3-5
- D. 3-2-5-1-4