

Bio2500: Fundamentals of Cell Biology for Neuroscience

W2020

TTH 10 - 11:15 am
DeRoy 0046

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Description and Objective: The brain is made up of cells, the fundamental unit of life. As neuroscientists, to understand the brain you need to have an in depth understanding of cells. Indeed, this class is a foundational class for any Neuroscience major or minor. By looking closely at the structure and function of each intracellular organelle, as well as specific classes of proteins, this class will help you develop a model of neurons and glial cells as the living machines underlying brain function. While neurons and glia will be emphasized, other cell types may also be discussed as they best illustrate important principles of cell function and behavior.

Learning objectives: This class covers A LOT of material; students claim in too much detail. This generally reflects a student's focus on memorizing information/vocabulary; think about how often you ask: "what do I need to know" (... for the exam, to pass, to get an A or whatever). But the goal in this class is for you to begin to *understand* cells as living machines. This then requires you to go beyond the words, and to also evaluate the "*why, when, where and how*" of cell *structure and function*.

Your viewpoint is another way to think about this. Generally, you are used to learning from the outside as a spectator just reading the words describing the cell. In this way, you tend to reduce everything to the words you memorize. SO try the following: pretend you are the cell and constantly ask **how and why** do you (the cell) do what you do? When you look at AND study the figures, ask why they are drawn as they are, how do the pieces connect, where exactly are we, etc. In this way you will begin to uncover the underlying principles and logic of a cell's life.

Deeper understanding is delineated by the formal learning objectives of this class:

- (1) describe the basic structure of a eukaryotic cell and its different compartments (organelles)
- (2) integrate the relationship between an organelle's structure and function within different cells
- (3) model how molecules necessary for an organelle's function are routed to the correct organelle
- (4) depict the flow of information within a cell and between cells (especially neural transmission)
- (5) predict outcomes when information flow within a cell or between cells is not correctly regulated
- (6) reconstruct how a cell grows, duplicates, and dies
- (7) create a dynamic model of a cell and its behaviors under different conditions.

Prerequisites: The Department of Biological Sciences is *strictly enforcing* the prerequisites for Bio2550. The prerequisites for this class are Bio1510 with a C- or better, or transfer of equivalent courses. If you do not meet these criteria, you **must** drop BIO2550. If you wish to discuss this policy contact a Biology departmental advisor, as I cannot alter the outcome. I do know that exceptions are rarely granted.

Text: The text is REQUIRED reading, and a critical part of your learning. But it is not about memorizing the whole textbook per se, but rather using it as the learning tool it was designed to be. Enjoy reading the material, and thinking about it as you study the diagrams and figures. It is cell **processes**, not just things. And, YES, you will need to carve out more study time to do it correctly.

Unless otherwise stated, students are responsible for **ALL** material found in the assigned chapters even if NOT specifically covered in class. The chosen text is a national standard: **Essential Cell Biology**, Fifth Edition, by B. Alberts, et al., [ISBN-13: 978-0393680362]. The Fourth edition will suffice, so if necessary, find a cheap edition of this text and use it. The text can be purchased with access to on-line material that some students find useful, but is not strictly required.

You are **strongly encouraged** to do the questions/problems interspersed throughout each chapter. They are great for self-evaluation - discover what you understand, and even better what you do not understand, before an exam; besides, variations of these questions also appear on exams.

Office hours: I will be available in my office (room 5178 BSB) from 2 to 3 pm on Tuesdays and Thursdays before class. Come early, not 5 min before it ends. In addition, I typically arrive ~15 min early to class and once electronics are set up I enjoy answering questions. E-mail is preferred for establishing a mutually convenient appointment. I do not answer long questions by e-mail, as learning means to help you get to an answer.

Class Web Site: Go to Academia and then to our Canvas web site (or bookmark Canvas site directly). The Canvas site is our major communication portal and includes most things you need for the class. CHECK this site OFTEN. You will also be able to download PDF files of class PowerPoint Presentations. These mostly contain the figures from the textbook so they are great for printing out before class and writing your own notes on them.

Grading Policy: A final grade will be calculated based on your performance in three (3) classroom exams, a cumulative Final exam, work in the discussion section, and class clicker questions.

EXAM dates are indicated in the box at right. These dates will NOT change, although content may change to reflect pace of lecture material. Exams will consist of multiple-choice questions requiring answer sheets provided by instructor. You will drop your lowest exam score, but each of the other two will be worth 100 points (i.e. 200 points towards your final score). Because you can drop an exam, NO Makeup Exam will be provided regardless of your reason for missing it. It is STRONGLY recommended that you take all three exams and then drop your lowest.

The **FINAL Exam** is a CUMULATIVE exam worth 150 points towards your final grade. It is scheduled by WSU as indicated in the box at right - NOTE THE START TIME. A make-up exam will be set for any student that misses this exam as long as they can provide a **documented** reason (e.g. illness, or family emergency) for absence that is signed by a *non-family* professional person (e.g. doctor, police, funeral director etc.). *Travel is NOT an acceptable reason for a make up.* Without a note you will not write the exam and it will be counted as zero points.

EXAM DATES:

Thursday Jan. 30, 2020

Tuesday March 3, 2020

Tuesday April 14, 2020

FINAL:

Tuesday April 28, 2020

STARTS at 8 am- 10 am

Clickers: The iClickers are a classroom response system that provides an interactive component via anonymous polling. Class often begin with a few asking questions recapping a previous lecture as well as question based on having read ahead. Questions also occur randomly throughout class. The primary purpose is to keep you engaged in the class and to actively think about the material. *They are NOT gift points for being in class.* If you come to class prepared you can truly benefit from these questions, as they help you figure out what you know, and what you still need to work on. But this only works well if you come to class prepared, including having read the textbook and begun to process what you have been reading. Just showing up and listening is not likely to get you many of these points. Try answering them on your own or by chatting with a nearest neighbor so you begin to identify things you do not yet know.

ONLY questions answered using a clicker and seen by my base will be counted. You will receive 0.5 pts if you answer the question and 1.5 points if you answer the question correctly. During the semester you have the potential to accumulate many clicker points (typically >200 points worth). ONLY at the end of the semester will they be used in a grade calculation, and only be worth a total of 25 points towards your final grade. As a 'make-up' for missed class, dead battery etc. as long as you answer 85% or more of the questions correctly, you will receive all 25 points. That is, if I ask 100 questions and you received 85 points or more, then you will get 25 points. If you only obtained 65 total points, you will get $65/85 \times 25 = 19$ pts. Again, clicker points are ONLY summed at the end of a semester; they are not used in evaluating withdrawal grades. Finally, while a clicker can be used in class without registration, you must ultimately register your clicker through our Canvas site so that I will know what clicker you are using and can assign points.

Discussion sections: We are excited that a Discussion section has been added to this new course. Each of you is enrolled in a discussion section, which occur immediately before or after the lecture session and are run by Graduate Teaching Assistants (see box). These are mandatory and work done in these sessions will account for a portion (~12%) of your final grade (see below).

But as these sessions are new, please be patient as we all learn to make these sessions as beneficial as possible. We are working on a variety of worksheets, problems and other structured activities to help you learn the material more deeply, as opposed to simply memorizing a bunch of facts. While TAs will give specifics, but it is anticipated that you will earn well over 50 points, so, just as described for clickers, these will be adjusted to a final total of 50 points.

TAs are:

Katherine Dwyer
 T 8:30 - 9:20 am
 Th 11:30 am - 12:20 pm
fa3735@wayne.edu
 Office hours: Monday through Friday
 by email/appointment.

Lisa Koshko
 T - 11:30 am-12:20 pm
 Th - 8:30 - 9:20 am
eq1512@wayne.edu
 Appointments: Immediately
 following discussion, or email

Summary of final grade calculation: At the end of the year, a letter grade is calculated based on total points accumulated as delineated below. Total points will be normalized to the second highest total points obtained in the class, and this number is then converted into a percentage. Finally, this percentage is rounded (the usual way) to the nearest whole number and converted to a letter grade using the table shown at left. There is always someone on the border but I do NOT just give you a point to improve a grade.

93-100%	A
90-92	A-
86-89	B+
83-85	B
80-82	B-
76-79	C+
73-75	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
59 or less	F

Exam I 100 points	} top two scores counted = 200 points (47.1%)
Exam II 100 points	
Exam III 100 points	
Final Exam	= 150 points (35.3%)
Discussion section	= 50 points (11.7%)
Class Clickers	= 25 points (5.9%)
TOTAL	= 425 points

Challenge option: Students have **one (1) week** after the return of a class Exam (but not Final exam) to challenge a grade; after this the grade stands “as is.” Winning a challenge is a rare event. A challenge consists of a typed description of why your answer should be considered a BETTER answer than the one indicated, based on published material that you cite properly. Semantics (word use) is an inherent part of examinations, especially with a multiple-choice exam:

so arguments based solely on semantics are not viewed favorably. You will submit your typed challenges to me in person (e.g. before or after a lecture) -- NO e-mail.

Attendance: Class attendance is mandatory for those days in which an exam is being held (see dates below): failure to write the exam results in a grade of zero (0) for that exam. I **strongly** recommend that you attend all classes. While I try to post announcements on Canvas, you are responsible for all announcements even if they were only announced in class. ECHO360 has been activated and you gain access to these recordings through Canvas. If you have issues with access call the help desk, not the professor as I won't be able to help you.

Timeliness: On exams dates do NOT arrive late!! You will not be allowed to take the exam if you arrive after the first student has finished the exam and left the room. Moreover, assuming you sit for the exam, no additional time will be provided --- **at 1:00 pm** all exams will be collected.

Cheating: Is not allowed, and is against the Honor Code each of you has signed. This includes copying/sharing work or answers, using a clicker on behalf of another student, and using other illicit electronic devices or applications. If caught you will get zero points for whatever you cheated on - the particular exam, all discussion points, and/or all clicker points; a second cheat will result in an F in the class

without recourse to dropping the class. You are also cheating everyone else in the class, and not really just the prof. As such, as a student, if you are aware of a fellow student cheating you are required to report it to the prof or TA - otherwise you become an accessory to the cheating. Finally, I will also report all incidents to the Dean's office who will then track what you do in other classes.

Individuals with Disabilities: If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 Undergraduate Library in the Student Academic Success Services department. Once you have your accommodations in place, I will be glad to meet with you privately to discuss your special needs.

Religious Conflicts: If you have a conflict with any of the scheduled class or exam times due to religious reasons, you must notify me in writing by class time on **Sept 5, 2019**: look over ALL exam dates now. Every attempt will be made to find a mutually convenient solution, but at times, this may include using your ability to drop one exam. No make-up exams will be given unless you have notified me in writing by the above date. Contact your lab TA directly for conflicts with lab assignments.

ADD/DROP POLICY: I follow all university policies on adding or dropping class and I recommend that you contact Mrs. Hunter, Biology Advisor for help in this regard. Note Wayne State has changed the grading policy, and in particular there are no more "X" grades; you will receive an F if you fail to do the administration work required to drop the class. Per WSU regulations, if you drop the course, you will be assigned WP, WF or WN as appropriate. Any "I" given to a student will automatically revert to "F" if the work is not completed within one calendar year. There are no exceptions. For details see: <http://sdcl.wayne.edu/RegistrarWeb/Registrar/policies.htm>.

UNEXPECTED UNIVERSITY CLOSURES.

If the University is officially closed on an exam day, the exam will be held on the next regularly scheduled class day. Closure of the University is announced by the following mechanisms:

1. University News line (313) 577-5345 *
2. WSU Homepage (www.wayne.edu) *
3. WSU Pipeline (www.pipeline.wayne.edu) *
4. WSU broadcast text and e-mail. *
5. WDET-FM (Public Radio 101.9)
6. Other local radio and television stations

* Note: The information on closures and class cancellations is likely to be found at these locations before it is broadcast by local radio and television stations

Any specific issue not covered by this syllabus will be resolved using University policies.

Disputes that cannot be resolved following the guidelines present in this syllabus will be resolved by following the guidelines of the University "Student Due Process".

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VanBerkum

W20

Tentative Class Lecture Schedule

We may go faster or slower than this proposed schedule but the order of topic presentation will probably not change. Significant alterations in this schedule will be 1) announced in class, and 2) posted on Canvas. **EXAM DATES WILL NOT CHANGE** – but the content may change to reflect lecture progress.

Jan.	7	Administration and Introduction	
	9	Protein Structure/Function (Chp. 4)	
	14	Protein Structure/Function (Chp. 4)	
	16	Membrane Properties (Lipids) (Chp. 11)	
	21	Membrane transport (Chp. 12)	
	23	Membrane transport (Chp. 12)	
	28	Neuronal transmission & glia cells. (= Chp 12 “B”)	
	30	EXAM 1 (Chp 4, 11, 12 & 12”B”)	
Feb.	4	Cellular Energy (Chp. 13)	
	6	Mitochondria (Chp. 14)	Last day to request a withdrawal from class:
	11	Mitochondria (Chp. 14)	
	13	Intracellular Compartments (Chp. 15)	Sun. Mar. 22, 2020
	18	Intracellular Compartments (Chp. 15)	
	20	Intracellular Compartments (Chp. 15)	
	25	Cell Communication (Chp. 16)	
	27	Cell Communication (Chp. 16)	
Mar.	3	Exam II (chp 13-16 inclusive)	
	5	DNA/ Nucleus (Chp. 5)	
	10/12	MARCH BREAK	
	17	DNA Replication & Repair (Chp. 6)	
	19	RNA Transcription and Translation (Chp. 7)	
.	24	RNA Transcription and Translation (Chp. 7)	
	26	Control of Gene Expression (Chp. 8)	
	31	Cytoskeleton (Chp. 17)	
Apr	2	Cytoskeleton (Chp. 17)	
	7	Cell Cycle/Cell Death (Chp. 18)	
	9	Cell Cycle/Cell Death (Chp. 18)	
	14	EXAM III [Chp 5-8, & 17 & 18?]	
	16	Cell Communities: Tissues, Stem Cells, and Cancer (Chp 20)	

Tuesday April 28, 2020 - **CUMULATIVE FINAL EXAM**
8 am to 10 am NOTE time it begins and ends.