

Biology 111: Human Genetics Spring 2013

Instructor: Dr. Susan Walsh

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Phone: 407-646-2534

Class Time: Tuesday 6:45-9:15p Science Village Classroom 2

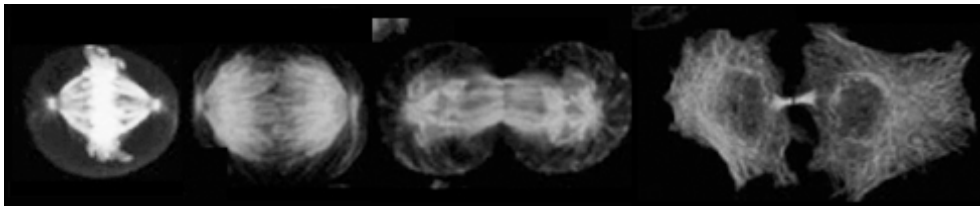
Required Readings:

Human Genetics: The Basics by Ricki Lewis (ISBN 978-0415579865) List Price \$20

The Language of Life by Francis S. Collins (ISBN 978-0061733185) List Price \$16

Additional readings will be posted on Blackboard.

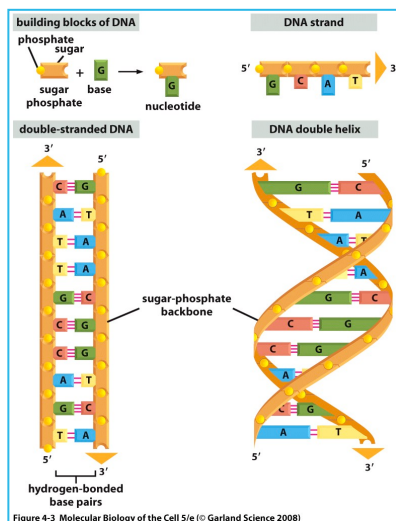
Office Hours: Tuesday and Wednesday 2:30-5pm Sci Village Admin 105 and **by appointment**



Course Objectives:

After successful completion this course, you should be able to do the following:

1. to interpret historical experiments leading to our current understanding of genetics
2. to describe the molecular processes of DNA replication, transcription, and translation
3. to model and distinguish between the cellular division processes of mitosis and meiosis
4. to describe and identify Mendelian and non-Mendelian patterns of inheritance from experimental data
5. to analyze scientific, ethical, and societal concerns of genetic testing, gene therapy, stem cells, and cloning
6. to track human evolution, applying population genetics mathematics to visible modern traits
7. to re-assess the commonly used term "race" in light of the genetic principles of skin color
8. to gain exposure to our current understanding of how genetics affects our brain and behavior
9. to distinguish among the genetic mechanisms that generate cancerous cells



Assessment Breakdown:

10 Quizzes (1% each)	10%
3 Exams (15% each)	45%
Calibrated Peer Review (CPR)	7%
Term Paper on a Genetic Trait	
Draft One	5%
Peer Review	1%
Final Draft	4%
Science Fiction? Reflection Paper	3%
Reading Reflection Journal	8%
Class Discussion and Participation	7%
In-Class Activities	10%
	100%

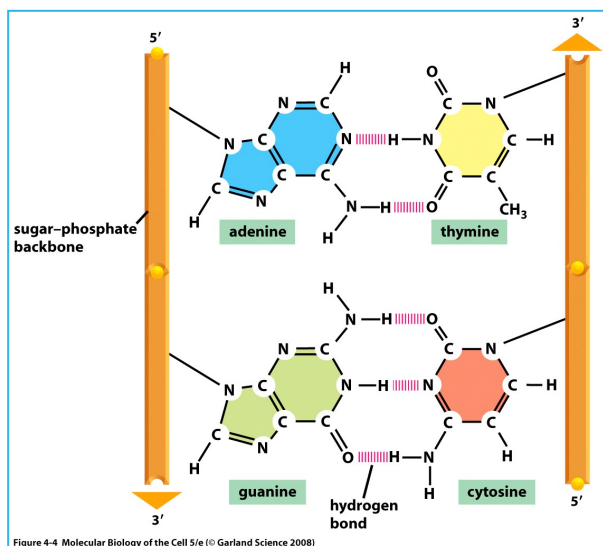
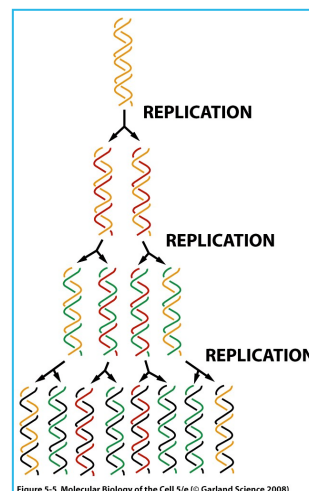
Class Expectations:

Readings, Preparation, and Reading Reflection Journal: Each day reading is assigned as indicated on the schedule, and readings should be completed *before* class. Typically, reading the material ahead of time means that the class time is better spent clarifying your questions than introducing you to new material. Readings will come from the two required books by Lewis or Collins or will be posted as pdfs on Blackboard.

You will be assigned to either Group A, B, or C (if you forget, assignments will be listed on Blackboard). Each day there will be an assignment everyone must read (listed in the table on the schedule), and there will often be an additional reading for Group A, Group B, and Group C (see Blackboard), particularly as we get to later topics. If additional reading is assigned, we will meet in small cohorts each containing a couple of readers from A, B, and C. During this time, you will present to one another the highlights of your individual readings. Quizzes for each day will only cover material common to everyone, but I may lecture on material found in any of the readings and lecture material of any type will appear on exams. You may of course read everything if you have time; I am choosing this system to avoid overwhelming you with reading. It will also be helpful to have a copy of the readings with you during class (bring your book, printouts, or a laptop).

On days when the reading is divided up into A, B, and C groups, you should submit at least one paragraph (150 words or more) to Blackboard written in grammatically correct English highlighting and summarizing key points of the reading and explicit items that intrigued you and that you would like to discuss with your classmates. As this may be the basis for what you will discuss with your group, I encourage you to bring a copy of this assignment with you to class.

Class Participation and Attendance: Attendance and class participation are expected. There is not a strict penalty for missing class; however, you will miss critical material, activities, quizzes, and participation points. When writing exams, I draw heavily from material we emphasized in the classroom. Moreover, participation means more than merely coming to class. You are expected to come prepared, having completed the assigned reading, ask questions and contribute relevant and constructive comments to the discussion. You are encouraged to get the notes from a classmate should you miss a class for college business or religious observances.



I use two teaching tools in the classroom: clickers and notecards. As you enter the classroom, you should pick up both a notecard and a clicker. Clicker questions may appear throughout the lecture, and it is in your best interest to attempt to answer these questions. All clicker questions are anonymous and do not count toward your grade. For notecards, please put your name at the top of the card. During class, I may ask you to write your answers on the notecards. I am more interested in your best guess at the correct answer than that you have the perfect answer. These cards are not graded, but I will use them to take attendance. The goal is to clear up any misconceptions in an informal way before you are tested on the material. At the end of the class period, please return both the clicker and the notecard to me.

In-Class Activities: Throughout the semester, we will do a number of individual and group activities and problem sets during class to reinforce the concepts we discuss more formally. Some activities may require you to submit a worksheet of answers at the end of the class period. As these activities should reflect and complement your studying, submissions will be graded and returned to you.

Quizzes: At the beginning of **each class** (that is not the first day or is an exam day), we will have a short quiz covering both the readings for that class period and the previous class. Your best 10 quiz scores (out of 11) will count toward your grade. Extra time will not be given if you arrive late.

Exams: The exam will consist of multiple-choice, short-answer, and essay questions. On exam days, we will spend the first 30 to 45 minutes of the period in a study session during which you may look over and discuss your notes and ask questions as a group. We will then take the exam individually in class. Each exam will only cover material since the previous exam; in other words, the final is not comprehensive.

Calibrated Peer Review: This is a multistep writing tool designed to refine student writing through constructive criticism from peers. The steps and grading scheme are briefly described below.

1. Submit an essay based on a writing prompt (15%).
2. Based on targeted questions, evaluate 3 instructor-written essays (30%).
3. Based on targeted questions, evaluate 3 peer-written essays and provide feedback (30%).
4. Based on targeted questions, evaluate your own essay (25%).

For more information about this tool, go the link under Assignments on Blackboard, and click on the "Students: Take the CPR tour!" link.

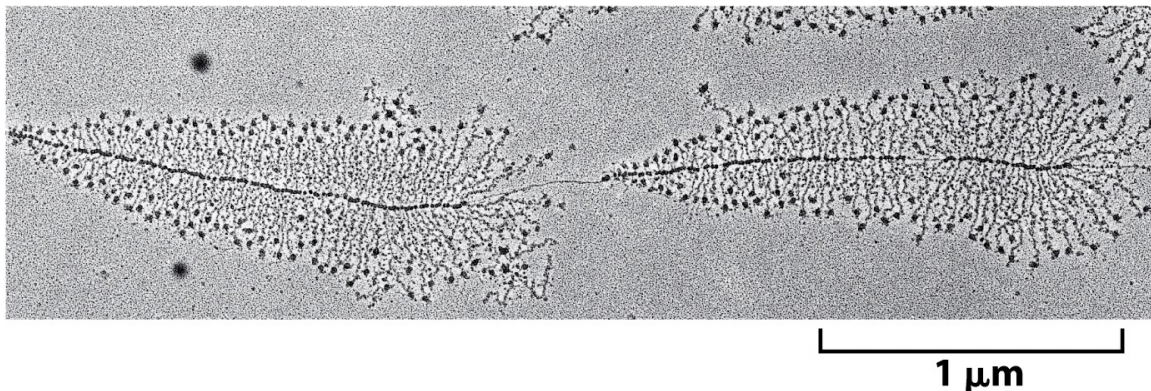


Figure 6-9 Molecular Biology of the Cell 5/e (© Garland Science 2008)

Genetic Trait Term Paper: This paper consists of a review paper exploring a specific genetic trait. You may NOT use sickle cell disease, cystic fibrosis, Down's Syndrome, or Tay-Sachs since these are canonical examples explored in detail in your textbooks. Regarding content, this paper should include the following: genetic inheritance patterns (autosomal, sex-linked, dominant, recessive, trisomy, etc) and cellular and/or systemic features (describe the trait in detail). You are encouraged to use any reliable resources available to you including the internet, your books, previous course materials, and your classmates. Wikipedia is not considered a valid, reliable resource (although some of the references in it might be). Although it is fairly technical, the Online Mendelian Inheritance in Man website (<http://omim.org/>) might be a good place to pinpoint a specific gene. In addition, the Human Genome Project website (http://www.ornl.gov/sci/techresources/Human_Genome/project/about.shtml) also contains a great deal of information. You may also wish to make an appointment with the science librarian, Cynthia Snyder, for guidance. I also encourage you to brainstorm topics and resources with me via email or at a mutually convenient time in person.

Writing is an iterative process, requiring much revision and editing. As such, you will first turn in a smooth draft of your paper to me via Blackboard. This paper should be relatively error-free, at least three pages in length, and appropriately referenced. I will provide feedback, and you should make modifications accordingly. Your next draft will be submitted for anonymous peer review; you do not need to include your name on it. You and your classmates will then review one paper, making comments as to the content and style. Finally, you will submit your final draft to me.

Each student should prepare a paper of at least 4 full pages articulating these details in complete sentences and grammatically correct English. This paper should be 12-point Times New Roman font, 1-inch margins, and double-spaced. The paper should also contain an appropriately formatted bibliography of reliable source materials (beyond the 4 pages; see below for formatting) and in-text citations as necessary.

For articles:

Caicedo, J.R., N.P. van der Steen, O. Arce and H.J. Gijzen. 2000. Effect of total ammonia nitrogen concentration and pH on growth rates of duckweed. *Water Research* 34: 3829-3835.

For books:

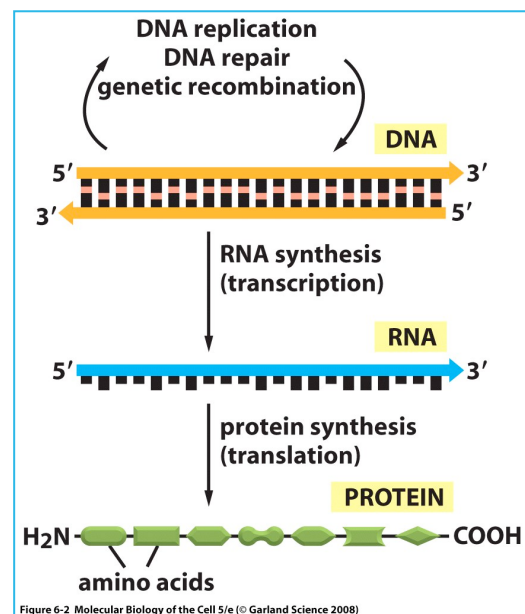
Nybakken, J.W. and M.D. Bertness. 2005. *Marine Biology*, 6th ed, Pearson Education, Inc., CA, pp. 25-30.

For websites:

Wray, G.A. Echinodermata. [Internet]. 1999 Dec 14 [cited 2006 Jan 12]. The Tree of Life Web Project. Available from <http://tolweb.org/tree?group=Echinodermata&congroup=Metazoa/>

Special Note about Academic Honesty: To further preserve academic honesty, be sure that the phrases, sentences and paragraphs are **yours**. Plagiarism will not be tolerated. In your own words, paraphrase the work of other researchers and cite them appropriately. Do not use direct quotes (this is an acceptable practice in other disciplines, but is *rarely* used in the natural sciences). We will use the software Turnitin.com that allows you to check for plagiarism before submitting your paper. Do not hand in any drafts that have scores of >15% on turnitin as these usually indicate some degree of plagiarism. Revise and correct papers as necessary.

Science Fiction? Reflection Paper: For this last assignment, you should find a movie, book, graphic novel, or play that addresses themes that are relevant to the topic of genetics. After watching or reading this fictional piece, you should first address explicitly how the story relates to genetics and then using what you have learned in this course, reflect on how scientifically (not necessarily ethically) feasible you think the scenarios are at this current day. This should be presented as a quality paper of at least one full page, double-spaced, Times New Roman 12-point font. Some examples of relevant stories (of varying quality) include *GATTACA*, *Jurassic Park*, *A Number*, *Contagion*, *The Twilight of the Gods*, *Brave New World*, *Rise of the Planet of the Apes*, *In Time*, *Repo: The Genetic Opera*, *Lorenzo's Oil*, *The Fly*, *Altered States*, *Species*, *X-Men*, *District 9*, *Prometheus*, *The Island*, *Outbreak*, *Never Let Me Go*, *Moon*, *The Fifth Element*, and *My Sister's Keeper*, but you are welcome to explore others of your own choosing.



Additional Policies:

Academic Honor Code: Membership in the student body of Rollins College carries with it an obligation, and requires a commitment, to act with honor in all things. Because academic integrity is fundamental to the pursuit of knowledge and truth and is the heart of the academic life of Rollins College, it is the responsibility of all members of the College community to practice it and report apparent violations.

The following pledge is a binding commitment by the students of Rollins College:

The development of the virtues of honor and integrity are integral to a Rollins College education and to membership in the Rollins College community. Therefore, I, a student of Rollins College, pledge to show my commitment to these virtues by abstaining from any lying, cheating, or plagiarism in my academic endeavors and by behaving responsibly, respectfully and honorably in my social life and in my relationships with others.

This pledge is reinforced every time a student submits work for academic credit as his/her own by adding the following handwritten abbreviated pledge and signature. Material submitted electronically should contain the pledge; submission implies signing the pledge.

On my honor, I have not given, nor received, nor witnessed any unauthorized assistance on this work.

If you do witness a violation of the Honor Code you are required to report it to the Academic Honor Council. The student that has witnessed a violation can, but is not required to, encourage the student suspected of the violation to self-report. If the student refuses to self-report, then the student that witnessed the violation must report it to the Academic Honor Council.

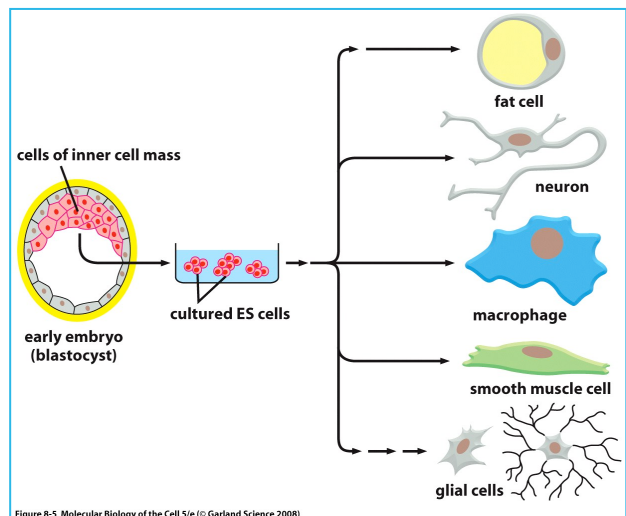
ADA Statement/Students with Disabilities: Rollins College is committed to equal access and does not discriminate unlawfully against persons with disabilities in its policies, procedures, programs or employment processes. The College recognizes its obligations under the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 to provide an environment that does not discriminate against persons with disabilities.

If you are a person with a disability on this campus and anticipate needing any type of academic accommodations in order to participate in your classes, please make timely arrangements by disclosing this disability in writing to the Disability Services Office at (box 2613) - Thomas P. Johnson Student Resource Center, 1000 Holt Ave., Winter Park, FL, 32789. Appointments can be scheduled by calling 407-646-2354 or email: gridgeyway@rollins.edu.

Last Date to Withdraw Without Academic Penalty is

March 22. Holt students should contact the Holt School Office if there are questions regarding withdrawal deadlines, policies, or procedures.

Late Work and Make-up Policy: All assignments listed on the syllabus must be completed by the 6:30pm on Tuesday. Unless *prior* arrangements are made, assignments that are submitted late will receive 15% off for every 24 hours late; ie at 6:31pm, an A paper may be reduced to a B-. It is the student's responsibility to maintain awareness of all assignments that are made by being attentive in class and consulting the syllabus and the course's BlackBoard site. If there is a family or medical emergency, please notify the Dean of Student Affairs, Karen Hater.



Computers: To prevent disasters from occurring, insure that you back up your work on a reliable device. You may use your laptop during class, but the expectation is that you will only be working on course-related sites, not Facebook.

Email and BlackBoard: The Dean has announced that all Rollins students are responsible for any information, instructions, and requirements transmitted to them at their Rollins e-mail address. I will communicate with you through this address and will post materials for your use at the course's Bb site. This means that you must check your Rollins e-mail and Bb regularly. If you have trouble, contact Information Technology immediately.

Cell Phones: Cell phones must never ring during class; please silence (not vibrate) your phone when you enter the classroom. Do not text in our classroom!

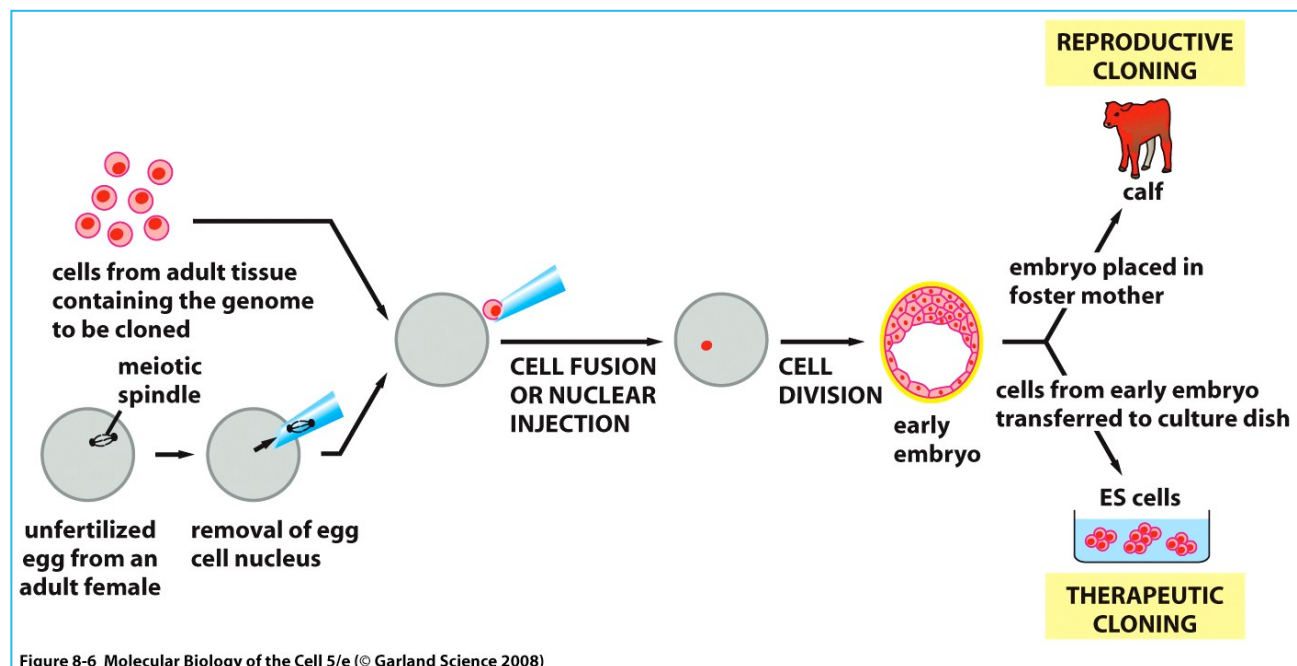
Classroom Policy for All Biology Courses: The faculty of the Biology Department place great value on maintaining a classroom environment that is conducive to learning. Therefore, **any of the following distractions will result in deducting 0.5% of your final grade for each incident.**

1. Two late arrivals.
2. Text messaging.
3. Laptop use unrelated to class.
4. Repeated ringing of cell phone.
5. Walking in and out of the classroom (if you are feeling ill, please let your instructor know).

Grading Policy:

Final grades are based on the following scale.

60.0-62.3% D-	69.2-72.5% C-	79.4-82.7% B-	89.6-92.9% A-
62.4-65.7% D	72.6-75.9% C	82.8-86.1% B	93.0-100% A
65.8-69.1% D+	76.0-79.3% C+	86.2-89.5% B+	



Tentative Lecture Schedule: I reserve the right to change this schedule as necessary.

Date	Topic	Assigned Reading	Assignments Due*
Jan 15	Introduction, Pretest, Basics of Cells and DNA		
Jan 22	History, Structure, and Replication of DNA	p1-3 and p44-53 (Lewis) p1-13 (Collins)	CPR submission
Jan 29	Making DNA into Protein	p53-73 and p78-79 (Lewis) p291-295 (Collins)	
Feb 5	Cell Division: Mitosis and Meiosis	posted on Bb	CPR completed Topic for term paper
Feb 12	EXAM		
Feb 19	Patterns of Inheritance	p27-44 and p73-77 (Lewis) p23-41 (Collins)	bring laptop with you to class to use Genetics software
Feb 26	Patterns of Inheritance Continued		bring laptop with you to class to use Genetics software Term Paper Draft One
Mar 5	Spring Break		
Mar 12	Genetic Testing	p119-147 (Lewis) p42-96 (Collins)	
Mar 19	Gene Therapy, Cloning, Stem Cells	p149-157 (Lewis) p253-267 (Collins)	Term Paper submitted for Peer Review
Mar 26	EXAM		
Apr 2	Human Evolution and Population Genetics	p4-21 and p79-88 (Lewis) posted on Bb	Term Paper returned to peer
Apr 9	Genetics of Skin Color	p142-163 (Collins) posted on Bb	
Apr 16	Genetics of Behavior	p183-208 (Collins) posted on Bb	Final Term Paper due
Apr 23	Cancer Genetics	p100-107 (Lewis) p98-141 (Collins)	
Apr 30	EXAM		Science Fiction? Reflection Due

*All assignments are to be submitted to Blackboard by 6:30pm the day of class.

