BIO13: GENE EXPRESSION AND INHERITANCE

Lecture #/Date	Topic	Readings	Laboratory
[1] Jan 6 Mon	Course overview DNA as Genetic Material	 pp9-14	
[2] Jan 8 Wed	DNA Structure	pp15-31	**Lab #1: Genomic DNA prep/PCR**
[3] Jan 10 Fri	DNA Replication	Chapter 3; pp221-223	
[4] Jan 13 Mon	Transcription I	pp81-86	
[5] Jan 15 Wed	Transcription II	pp87-97	
[6] Jan 16 Thu	Transcription III	pp534-541	**Lab #2: DNA cleanup** **Gel electrophoresis/DNA sequencing**
Jan 17 Fri	Exam #1		
[7] Jan 20 Mon	No class - MLK day		Exam 1 optional retake due
[8] Jan 22 Wed	The Genetic Code	pp102-110	
Jan 23 Thu	Translation	pp110-123	**Lab #3: Analyze sequence data**
[9] Jan 24 Fri	Mutations	pp130-149	
[10] Jan 27 Mon	Genes and Gene Products	Chapter 4	
[11] Jan 29 Wed	Phenylketonuria Project		
[12] Jan 30 Thu	Meiosis and Mitosis Patterns of Inheritance I	pp326-339 Chapter 11	**Lab #4: Fly Crosses**
[13] Jan 31 Fri	Patterns of Inheritance II	pp339-353	
[14] Feb 3 Mon	Patterns of Inheritance III	Chapter 13	
[15] Feb 5 Wed	Patterns of Inheritance IV		
Feb 6 Thu	Transgenics	pp225-227	**Lab #5: yeast matings**
[16] Feb 7 Fri	Gene Editing Project I		
[17] Feb 10 Mon	Exam #2		
[18] Feb 12 Wed	Gene Editing Project II		Exam 2 optional retake due
[19] Feb 13 Thu	Linkage and Mapping I	Chapter 14	**Lab #6: Score fly crosses** **Lab Summary I due in class**
[20] Feb 14 Fri	Linkage and Mapping II		
[21] Feb 17 Mon	Inheritance of Molecular Markers I	pp248-262	
[22] Feb 19 Wed	Inheritance of Molecular Markers II	pp170-199	
[23] Feb 20 Thu	Bacterial Gene Regulation I	Chapter 17	**Lab #7: Transcriptional assays in fly larvae**
[24] Feb 21 Fri	Bacterial Gene Regulation II		
[25] Feb 24 Mon	Exam #3		
[26] Feb 26 Wed	Eukaryotic Gene Regulation I	pp518-530	Exam 3 optional retake due
Feb 27 Thu	Eukaryotic Gene Regulation II	pp534-541	
[27] Feb 28 Fri	Imprinting	pp531-534	
[28] Mar 2 Mon	Sex Determination	pp346-351; 557-564	
[29] Mar 4 Wed	Developmental Genetics	Pp547-553; 564-571	
[30] Mar 5 Thu	Gene Drives	Gantz et al	**Lab Summary II due in class.**
[31] Mar 6 Fri	Gene Drives		
March 12	FINAL EXAM 8:00a-11:00a		

Bio13 Winter 2020. Course Information

Faculty and Staff

Prof. Erik Griffin

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Office Hours: Mondays 2:00 - 3:00pm

Teaching Science Fellow

Miranda Greig ‘19

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Learning Fellows

Learning Fellows (LFs) are undergraduate students who will work alongside Prof. Griffin to help you learn. LFs facilitate group activities and discussions during class, while bringing their own experiences and understandings to the learning environment. They are peers who can listen to your questions, help you think creatively, and guide you towards answers during class. Your learning fellows will be:

June Dong '22.

Avery Schuldt '21.

Elwyn Zhang '21.

Laboratory Instructors

Nick Sylvain PhD (Lab Director)

Jessica Warren PhD

Graduate Teaching Assistants

Leena Abdulla

Nikhil Khatwan

Haleema Sadia Mali

Daniel Murant

Alia A. Sajan

Sweta Shrestha

Course Goals – Bio 13

At the end of the course, students will:

1) understand the "central dogma" of molecular biology, i.e. the key gene products and molecular mechanisms responsible for the transfer of genetic information from DNA to RNA to protein and ultimately to the expression of a phenotype

2) understand how genetic information is recombined and transmitted from one generation to the next

3) Analyze different types of data (from genetic crosses or genomic analysis) to determine genetic linkage and to create a genetic map.

4) understand the fundamental concepts that underly the regulation of the expression of genetic information

5) be familiar with specific foundational experiments and well-studied examples in molecular genetics

6) be able to think critically and solve problems in genetics

Textbook

iGenetics: A Molecular Approach by Peter Russell, 3rd Edition (ISBN 0-321-56976-8)

(Optional) iGenetics: Study Guide and Solutions Manual. 3rd Edition.

Prerequisites

There are no enforced prerequisites for Biology 13. However, Biology 11 or a strong prior preparation in biology is recommended. The details of Biology Department's recommendations for entry into Biology 13, for those that have not taken Biology 11, can be found at https://canvas.dartmouth.edu/courses/5105/pages/how-to-interpret-the-score-on-the-placement-slash-advisory-test.

Grading

		Individual Component	Group Component	Retake Option
First Exam:	15%	100%		Yes
Second Exam:	20%	85%	15%	Yes
Third Exam:	20%	100%		Yes
Final Exam:	20%	100%		No
Participation:	5%			
Laboratory:	20%			
Total	100%			

Exams

Individual exams: All exams in the course, including the final, will be open note. Students are allowed notes on a single sheet of 8.5x11 inch paper, front and back, in the exam room. This sheet must be handwritten (no typing, no miniaturizing book or powerpoint figures). However, the exams will focus on the broad concepts and the application of learned material rather than the details. The first exam will be during the class period. The 2nd and 3rd exams will be in the evening to allow time to work on more complex problems.

Retake option: When students hand in their exam, they will have the option to retake some questions. Students must indicate on the exam they are handing in the questions they would like to retake with a brief explanation. The retake exam is due two days after the initial exam at the beginning of class (for example, on the Wednesday after a Monday exam). Both the original and the revised answer will be graded. In most cases, the revised answer will get a higher score than the original answer, but in rare cases the revised answer may receive fewer points. Your score will be adjusted up/down by 25% of the points gained/lost, with a maximum of an additional 5% of the exam grade. For example, if you get a 6 points on a question on the first exam, and 10 points on the retake exam, you will have 1 additional point added to your exam grade. For the retake exam, you may consult with other students and the course material, but not with the Teaching Science Fellow, the Learning Fellows or the Graduate TAs. There is no retake option for the group component of Exam 2 or for the final exam.

Group component: There will be a group component to exam 2. The group component of the exam will be handed out the Thursday before the Monday exam and will be turned in at the beginning of the exam on Monday. Each group will hand in a singe answer and all group members will receive the same grade. All group members are expected to meet and work together on the group exam-- if your name is on the answer, you are indicating that you participated in answering the questions. It will be a considered a violation of the Honor Principle if you put your name on a group exam without having participated in answering the question. Students are not allowed to consult with students outside of their group or with the Teaching Science Fellow, the Learning Fellows or the Graduate TAs. There is no retake option for the group component.

Participation Grade. Your participation grade will be based worth 5% of your final grade. There are two components to class participation. First, you need to answer the pre-class questions associated with the pre-class lectures. The key here is effort; you will not be graded on the accuracy of your answers. In order to receive full credit for pre-class participation, you will need to complete a minimum of 90% of the pre-class questions. Second, in order to receive full credit for in-class participation, you need to attend 90% of the class periods and actively participate in the in-class exercises (in other words, you will not be penalized unless you miss > 3 classes). Below the 90% threshold for missed assignments/absences, the penalty will increase with additional missed assignments/absences.

Grade Distribution. The median grade in the course will be a "B". If you receive a final score of 90% or above you will automatically receive some form of an "A" grade, and a score between 80% and 90% will guarantee some form of a B grade. Traditionally the median score in the course is below an 80% and the final grades are curved to account for this. You must master 50% of the material in the course in order to pass.

Exam Grading. Graded exams will be returned to the students approximately one week after they are taken. Exams are graded very carefully not only for content but also for clarity and conciseness. The exam key will be posted on Canvas. There are instances in which graders make errors in assessing exams. If you feel there was an error in the scoring of your exam, carefully read the key posted on Canvas. If you still feel there is an error, you may submit a regrade request. Include a typewritten explanation stapled to your exam detailing the mistake made in the grading. Do not write or alter the exam prior to handing it in for regrading as this is considered a violation of the Honor Principle. The regrade request can be handed in before or after lecture. All requests must be submitted within one week of distribution of the graded exam.

Academic Honor Principle in Bio13

Academic honesty is essential. The following is quoted directly from the Dartmouth College Student Handbook: "Students who submit work that is not their own or who commit other acts of academic dishonesty forfeit the opportunity to continue at Dartmouth." The complete text of the Academic Honor Principle is available at http://www.dartmouth.edu/~uja/honor/. Please read it carefully; *you* are responsible for it. The application of the Honor Principle is to the in-class exams in Bio 13 is quite simple; all your quiz and exam work must be 100% your own, and you may not use any unauthorized notes, textbook, electronic resources (smart phones, iPads, laptops, internet) or other resources during the quizzes and exam. Any violations of the Honor Principle within the context of Biology 13 will be referred to the Undergraduate Judicial Affairs Office and can result in a hearing before the Committee on Standards and can result in your suspension for multiple terms or, in the most extreme cases, separation from the College.

There are a number of situations in which a student in Biology 13 might be tempted to violate the Academic Honor Principle. These situations include (but are not limited to) the following:

a) Examinations must be completed without reference to written materials other than those provided with the exam paper and written materials approved by the professors prior to the exam. The exam must be completed without communication with anyone else (the only permissible exception is that

students may request clarification of any exam question from the course faculty and staff who are present expressly for that purpose). The answers that you provide must be entirely your own work.

b) Our policy permits the re-submission of exams for potential re-grading by the professors. Any alteration of the answers between the time when the graded papers were returned to the student and the time when the paper was submitted for re-grading constitutes a breach of the Academic Honor Principle. To deter this practice, we routinely photocopy exams after grading them.

c) Some laboratory exercises are performed in small groups, and we encourage collaborative analysis of the data. However, any work submitted for grading must represent the **original** words of the student submitting that report. Do not share computer files of work (including text, graphs, tables, etc.) to be submitted for grading! The student misrepresenting the work of another as his or her own is in violation of the Academic Honor Principle and it is quite possible that the Committee on Standards might find the student providing the original file also to be in violation.

d) There is a group component to some of the exams in this course. Students are expected to participate in answering the group component of the exam questions, and indicate their participation by placing their names on the answer. If a student puts their name on group work that they did not contribute to, the student is considered to have misrepresented the work of another as his or her own and is in violation of the Academic Honor Principle.

Honesty is the foundation of the academic pursuit of knowledge. In recognition of this, the faculty of Biology 13 will not overlook any violations of the Academic Honor Principle. Indeed, the Faculty Handbook of Dartmouth College states explicitly that College Faculty members are obligated to report potential violations of the Academic Honor Principle to the Dartmouth College Committee on Standards. Should the Committee on Standards find the student to be in violation of the Academic Honor Principle, punishments usually involve suspension for multiple terms or separation of the student from the College.

Wellness Support for Dartmouth Students

I recognize that the academic environment at Dartmouth is challenging, that our terms are intensive, and that classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including: your undergraduate dean (http://www.dartmouth.edu/~upperde/), Counseling and Human Development (http://www.dartmouth.edu/~chd/), and the Student Wellness Center (http://www.dartmouth.edu/~healthed/). I encourage you to use these resources and come speak with me to take care of yourself throughout the term.

Other Matters

Note to Students with Physical or Learning Disabilities Students with disabilities who may need disability-related academic adjustments and services for this course are encouraged to see me privately as early in the term as possible. Students requiring disability-related academic adjustments and services must consult the Student Accessibility Services office (Carson Hall, Suite 125, 646-9900). Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to

me. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

Religious Holidays Some students may wish to take part in religious observances that occur during the academic term. If you have a religious observance that conflicts with your participation in the course, please speak with Prof. Griffin as soon as possible to discuss appropriate accommodations.

Special appointments If you have particular concerns, difficulties or interests that you would like to discuss individually, email Prof. Griffin to set up an appointment.