

**Introduction to Biomedical Sciences
Genome-Based Studies of Human Health and Disease**

**3 credits
BMS 601A Section Number 4805
Fall 2008**

Course Director: **Thomas Begley, tbegley@albany.edu**
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office hours, contact the course director for an appointment.

Class meets: Mon. & Wed. 8:15-9:35 PM in the Masery Conference Room in the Cancer Research Center, East Campus, University at Albany

Course Description: This course will discuss the use of biomedical sciences and genome-scale technologies to better understand human health. Importantly, students will gain an understanding of how molecular biology, genomics, proteomics, and cell biology lead to improvements in public health. Particular focus will be on the influence of one's genetic composition and environment on disease onset and progression. In addition, students will learn how to integrate genome based approaches into their research and will become familiar with scientific writing and review.

Learning Objective: Students will learn about role of genetics and the environment in human disease, and the utility of genomic-scale technologies for studying disease. In addition, students will learn about the genetic, molecular and biochemical mechanisms associated with human health, environmental exposure, and disease. Students will also learn about statistical and computational methods for managing and analyzing genome based datasets. Students will apply fundamental concepts in the core areas of biochemistry, molecular biology, neurobiology, and cell biology. They will demonstrate additional depth of knowledge in systems biology and genomics, and apply laboratory skills such as planning of experiments to a selected research problem. Also, students will learn about the fundamentals of grant writing, grant review, and seeking funding opportunities. Students will also develop both verbal and written communication skills through presentations and homework assignments and apply fundamental concepts in the biomedical sciences to public health issues, in particular, in the detection, treatment, and prevention of disease. Student will also critically evaluate the work of their peers in biomedical sciences and will be required to demonstrate broad knowledge of the genetic basis of cellular function and demonstrate basic knowledge of human genetic diseases and disorders. In particular, they will demonstrate broad knowledge of the cellular and molecular basis of cancer, neuronal function, and age-related disease, and will demonstrate a thorough knowledge of how disturbances in cellular pathways and regulatory mechanisms lead to diseases. Students will ultimately be required to demonstrate a foundation of knowledge in the core areas of biomedical sciences and identify the strengths and limitations of various laboratory methodologies. They will also explain the biological and molecular basis of public health and articulate how biological, chemical, and physical agents affect human health. Finally, students will be required to explain how genetics and genomics affect disease processes and public health policy and practice.

Textbook: None, papers or literature will be given to students for use in class and for presentations as indicated. See the attached reading list and class syllabus. Note recently published articles relevant to individual lectures may also be introduced and will be supplied by the instructor.

EReserves: Papers are accessible via UAlbany's ERes web based system, on line via the library or as handouts as the Instructors feel appropriate.

Prerequisites: A basic understanding of molecular biology, genetics, and biochemistry.

Grading: Course is graded A-E. Grading will be based on homework assignments (20%), three exams (40%), class participation (10%) and the preparation and presentation of a National Research Service Award (NRSA) Grant or suitable alternative*(30%). Homework will consist of written critiques of scientific papers and the proper completion of administrative forms associated with the writing project. Homework will be evaluated based on the student's ability to understand the papers, and to identify strengths and weaknesses of the stated work. In addition, proper completion of the administrative forms, as described in the associated directions, will determine grades for the administrative section of the writing project. Attendance is mandatory and along with active participation in class discussions, will be used to determine the participation grade. Exams will consist of essay-based questions and will test understanding of class materials and assigned readings. The grant assignment or suitable alternative will be a semester long project that results in a 10-page research proposal and final oral presentation (20 minute power point) of the project. Grades for this project are based on organization, clarity, scientific understanding and writing style and the ability to orally present and discuss your project.

* A suitable alternative to the NRSA grant-writing project is available for those students who would be better served by another granting agency or who would rather write a review article. Those wishing to undertake other grant forms (i.e. public health grants available from the CDC or foundation grants) or who wish to prepare an extensive review of a public health issue can do so in consultation with Dr. Begley.

SCHEDULE OF LECTURES

	Date	Person	Lecture	Due Dates
Monday	25-Aug	Thomas Begley	Introduction, Overview of Writing Project	
Wednesday	27-Aug	Sridar Chittur	Genomic Array Platforms	
Monday	1-Sep		Labor Day off	
Wednesday	3-Sep	Sridar Chittur	FACS Analysis	
Monday	8-Sep	Scott Tenenbaum	Systems Biology in Public Health	
Wednesday	10-Sep	Thomas Begley	Genome Based Analysis of Drug Targets	Reading assignment #1
Monday	15-Sep	David Carpenter	Environmental Risks and Cancer	Reading assignment #2
Wednesday	17-Sep	Thomas Begley	Test 1	Administrative Forms Due (Homework 1)
Monday	22-Sep	Doug Conklin	Functional Genomics	Reading assignment #3
Wednesday	24-Sep	Doug Conklin	Genome-Scale Study of Cancer I	Reading assignment #4
Monday	29-Sep	Rosh Hashhanah	off	
Wednesday	1-Oct	Doug Conklin	Genome Scale Study of Cancer II	
Monday	6-Oct	Thomas Begley	Oral Outline of Student NRSA Proposal and Critique I	Reading assignment #5
Wednesday	8-Oct	Thomas Begley	Oral Outline of Student NRSA Proposal and Critique I	
Monday	13-Oct	Thomas Begley	Exam 2	Specific Aims Page / Introduction Due
Wednesday	15-Oct	David Carpenter	Diseases of Age and the Environment	
Monday	20-Oct	William Wolfgang	Parkinson's and Huntington's Disease	
Wednesday	22-Oct	Qishan Lin	Proteomics I	Reading assignment #6
Monday	27-Oct	Qishan Lin	Proteomics II	
Wednesday	29-Oct	Thomas Begley	Protein Biomarkers of Disease	
Monday	3-Nov	Brian Parr	Mouse Genomic Resources and Disease Models	
Wednesday	5-Nov	Thomas Begley	Exam 3	First Draft of Grant Due
Monday	10-Nov	Scott Tenenbaum	Genome Scale Study of Heart Disease	Reading assignment #7
Wednesday	12-Nov	Thomas Begley	Current Events: Genes and genomics I	Current Events Write up due (Homework 2)
Monday	17-Nov	Thomas Begley	Current Events: Genes and genomics II	
Wednesday	19-Nov	Thomas Begley	Student Presentations and Critiques	
Monday	24-Nov	Thomas Begley	Student Presentations and Critiques	
Wednesday	26-Nov	Thomas Begley	Student Presentations and Critiques	
Monday	1-Dec	Thomas Begley	Student Presentations and Critiques	
Wednesday	3-Dec	Thomas Begley	Student Presentations and Critiques	
Monday	8-Dec	Thomas Begley	Student Presentations and Critiques	Final Draft of Grant Due

GRANT DUE DATES

- September 17: Administrative forms from grant are due (must be typed)
- October 6: Oral outline (10 minutes) and class discussion of grant
- October 13: Rough draft of 1-page specific aims and 4-pages of background information due plus 3 copies (must be typed, 11 pt Arial font, single spaced)
- November 5: First draft of completed grant due (Plus two copies)
- Nov 19 – Dec. 8: Powerpoint presentation of grant (10- 15 slides, 20 minute talk)
- December 8: Final grants are due (plus two copies, remember to include administrative forms)

