BIO 548--NUCLEIC ACIDS AND PROTEIN SYNTHESIS--FALL 2009

Coursemaster
Peter Burgers
Department of Biochemistry & Molecular Biophysics,
1911 South Building
TEL: 362-3872
Email: burgers@biochem.wustl.edu

Website: http://mbb.wustl.edu/courses/bio548/index.html

Syllabus

This course is designed for graduate students and upper level undergraduate students who have a basic knowledge in molecular biology and nucleic acid biochemistry from appropriate undergraduate classes. Formal lectures in all areas of nucleic acids structure and function are complemented with discussions of current literature. The purpose of these discussion sessions is to gain a critical understanding of approaches and methodologies used to address basic problems in molecular biology.

It is assumed that students are already familiar with the material in a textbook such as Lewin's Genes IX (Prentice Hall), Lodish's Molecular Cell Biology(6th Ed., Freeman and Co.), Alberts' Molecular Biology of the Cell (5th Ed., Garland Publ.) or Berg's Biochemistry (6th Ed., Freeman and Co.), or a similar undergraduate textbook. There is no formal textbook for the course. The listed books are recommended as sources of background information for the lectures, or as specialized references that may clarify experimental procedures mentioned in assigned journal articles. One of these textbooks should suffice for any given subject.

The lecture section of the course is team-taught by a staff of 6 Washington University faculty. Each lecturer will assign 1-2 papers per lecture. The material in these papers may appear on the exams. Lecturers will also hand out a problem set pertaining to the lecture material, which is intended to be a study guide; it will be ungraded. Some of the questions on the problem sets are intended to be similar to exam questions.

In addition to the lectures, there will be nine discussion section meetings. Depending on class size, discussion groups will have 8-10 students. The purpose of these meetings is to discuss in detail specially assigned papers. Students will be assigned to a discussion leader for the duration of the course and will be required to write a short critical review of each of the assigned discussion papers. The reviews will be turned in for evaluation and grading.
How to write a good critique

Course grading is primarily based on exams. Each exam will have an in-class and take-home component. Exams are not cumulative. Each exam is worth 100 pts for a total of 300 pts. Each discussion critique is 10 pts for a total of 80 pts (the lowest scoring critique will not be counted); discussion participation and leadership will count for a total of 40pts.

Bio 548

Coursemaster: Peter Burgers; 362-3872; burgers@biochem.wustl.edu
Lectures: Cori or Holden Auditorium (TBA), MWF, 10:30-11:30 AM
Discussions: Location TBA, 2-3 Fridays per month, 10:30 AM -12 PM

Day	Date	Subject	Lecturer
Wed.	26-Aug	DNA B-, A-, and Z-Forms	Chivers
Fri.	28-Aug	Unusual DNA structures	
Mon.	31-Aug	Supercoiling	
Wed.	2-Sep	DNA Recognition	
Fri.	4-Sep	**DISCUSSION 1**-Chivers	
Mon.	7-Sep	**Labor Day**	
Wed.	9-Sep	Protein-Nucleic Acid Interactions	
Fri.	11-Sep	**DISCUSSION 2**-Chivers	
Mon.	14-Sep	DNA Replication: Overview and Fidelity	Burgers
Wed.	16-Sep	Replication Origins and Control	
Fri.	18-Sep	DNA replication mechanisms	
Mon.	21-Sep	DNA Damage and Damage Response	
Wed.	23-Sep	DNA Repair	
Fri.	25-Sep	**DISCUSSION 3**-Burgers	
Mon.	28-Sep	Homologous Recombination	Chalker
Wed.	30-Sep	Non-homologous end-joining; VDJ recombination	
Fri.	2-Oct	Transposon and retrovirus integration	
Mon.	5-Oct	**Exam 1 - In Class; Take-Home is Due**	
Wed.	7-Oct	Prokaryotic Transcription Machinery	Caparon
Fri.	9-Oct	**DISCUSSION 4-**Chalker	
Mon.	12-Oct	Prokaryotic Transcription Regulation I	
Wed.	14-Oct	Prokaryotic Transcription Regulation II	
Fri.	16-Oct	**DISCUSSION 5**-Caparon	
Mon.	19-Oct	RNA Pol II Transcription Complex Assembly	Majors
Wed.	21-Oct	Nucleosomes and Chromatin Structure	
Fri.	23-Oct	Pol II Promoters and Activators	
Mon.	26-Oct	Mechanisms of Activation and Repression I	
Wed.	28-Oct	Mechanisms of Activation and Repression II	
Fri.	30-Oct	**DISCUSSION 6**-Majors	
Mon.	2-Nov	Transcription in the Post-Genomic World	
Wed.	4-Nov	Pol I and Pol III Transcription	
Fri.	6-Nov	**DISCUSSION 7**-Majors	
Mon.	9-Nov	**Exam 2 - In Class; Take-Home is Due**	
Wed.	11-Nov	Regulatory RNAs I	Hall
Fri.	13-Nov	Regulatory RNAs II	
Mon.	16-Nov	Regulatory RNAs III	
Wed.	18-Nov	Small RNAs	
Fri.	20-Nov	**DISCUSSION 8** -Hall	
Mon.	23-Nov	Pre-mRNA Splicing I	

Wed.	25-Nov	**Thanksgiving**	
Fri.	27-Nov	**Thanksgiving**	
Mon.	30-Nov	Pre-mRNA Splicing II	
Wed.	2-Dec	Pre-mRNA Splicing III	
Fri.	4-Dec	**DISCUSSION 9** -Hall	
Mon.	7-Dec	Translation I	
Wed.	9-Dec	Translation II	
Fri.	11-Dec	Ribozymes	
Mon.	14 Dec	**Exam 3 – In Class; Take-Home is Due**	

Bio548 Lecturers 2009

Peter Chivers
Department of Biochemistry and Molecular Biophysics, Box 8231
2902 South Building
Tel: Office 362-1496; Lab 362-1521 Fax: 362-7183
Email: chivers@biochem.wustl.edu

Peter Burgers
Department of Biochemistry and Molecular Biophysics, Box 8231
1911 South Building
Tel: Office 362-3872; Lab 362-3182 Fax: 362-7183
Email burgers@biochem.wustl.edu

Doug Chalker
Department of Biology, Box 1137
304 Monsanto (Danforth Campus)
Tel: Office 935-8838; Lab 935-7143 Fax: 935-4432
Email dchalker@biology2.wustl.edu

Mike Caparon
Department of Molecular Microbiology, Box 8230
10250 McDonnell Pediatric Research Bldg.
Tel: Office 362-1485; Lab 362-7650 Fax: 362-1232
Email caparon@borcim.wustl.edu

John Majors
Department of Biochemistry and Molecular Biophysics, Box 8231
2804 North Building
Tel: Office 362-1135 Fax: 362-7183
Email majors@biochem.wustl.edu

Kathleen Hall
Department of Biochemistry and Molecular Biophysics, Box 8231
2816 North Building
Tel: Office 362-4196; Lab 362-4197 Fax: 362-7183
Email hall@biochem.wustl.edu, kathleenhal@gmail.com

How to write a good critique

Critiques should be short, one page at the most, single space, font 12. Please, list the title of the paper and your name.

Summarize in one paragraph what you think is the critical point (or the critical points) that the paper makes, or tries to make. How does it advance our understanding of the field, or does it? Do not copy/paste the authors' Abstract. We want your impression.
Do not describe what is presented in the figures of the paper, although you can point out a figure that you think is of critical importance.

Critique the paper. This could take several forms. You may argue that some data are not correctly collected (problems in experimentation), that some data are incorrectly presented, e.g. critical absence of statistical analysis (problems in data analysis/presentation), that authors' conclusion or model is not supported by the data (problems in interpretation). And/Or, you may point out how the advance in the paper will allow further studies to be carried out (the next experiment). Use a few sentences to support your thesis (why you think that there is a problem; how you would do the next experiment).

Sub-optimal layout of figures or poor use of colors are not valid criticisms. If you think, the authors should have used different or additional nucleic acid substrates, cell lines, etc. for their studies, give a reason why this would be important.

Oh, spell-check!