

## **BMB 495: Senior Seminar**

### **Spring 2008, 101 Biochemistry Building, Tues. 10:20 am - 12:20 pm**

#### ***Course Coordinator:***

Prof. Leslie Kuhn  
502C Biochemistry Building  
353-8745; KuhnL@msu.edu

#### ***Objectives:***

This 2-credit seminar course is designed to acquaint senior Biochemistry majors with a range of topics in modern biochemistry research, and with the thought processes characteristic of research in our discipline. A major objective is to familiarize students with the scientific method: the process of posing a scientific hypothesis, developing methods or experiments to test the hypothesis, interpreting the results of the experiments, and placing those results in context of current knowledge in the field. The second major objective is to give the student experience in clear and compelling scientific writing and speech. Aspects to consider as we discuss each topic:

- ❖ *What is overall importance of this topic in biochemistry and technology?*
- ❖ *What are the pioneering discoveries, and the most recent discoveries, in this area?*
- ❖ *What ethical or political issues are raised by research in this area?*

#### ***Prerequisites:***

BMB462, or BMB462 concurrently with BMB495. Open only to Biochemistry majors.

#### ***Required text:***

Materials for course will be posted on the Angel system at: <http://angel.msu.edu>

Log in using your MSU net ID and select BMB 495 to access the materials.

#### ***Course Format:***

The course is designed as a seminar, with each biochemistry topic split across two Tuesdays. About 2/3 of the students will submit a report on each topic. Students are free to choose which 9 of the 14 topics for the semester to choose for writing their required reports, except that they should *exclude the topic on which they present a talk*. These reports will summarize the "report" paper for each topic, listed under the corresponding professor's name on the Angel website. 3-4 students will have selected the same topic for their oral presentation in the course (using the presentation papers provided for the session professor on Angel as the basis for their talks) and will work with the topic's professor to prepare and practice the talks.

The first week will feature a 10 minute overview by the session professor to put the research topic into context, followed by half an hour of questions and answers on the report paper (or presentation papers, in the case of students who will be presenting on the topic). Everyone doing a report on this topic should read the report paper in advance of the question and answer session and make a list of two science-oriented questions on this topic, which they will turn in at the beginning of the question and answer session for credit (20% of the report grade). The professor will then select from these

questions (keeping anonymous the name of the student asking them) and provide answers, while also soliciting any new questions from the audience. The second week, the student presenters will give their 15 minute talks on the topic, followed by informal questions and discussions on each.

The student presenters for each week should coordinate so that each student presents a different paper. If there are four presenters for the week, the fourth presenter can either present the “report” paper for that week or arrange with the professor an additional paper to cover. The professor for the session will be available in the week(s) before the presentation to answer questions on the paper and provide feedback during a practice session of the talk, which is highly recommended! Keep in mind that professors have busy schedules. Therefore, please schedule your question and talk practice sessions with your professor well in advance of your presentation date.

### ***Evaluation of Performance:***

Reports on research papers (20% of report grade for submitted questions and 80% on written report):	60% of course grade
Oral presentation:	25%
Participation (evaluation of other students’ talks and participating in class discussions):	15%
Total:	100%

### ***Reports/Talks/Evaluations Each Week:***

Each student should write a report summarizing the report paper for that week’s topic (information is provided in the Angel website folder for that professor’s topic to distinguish which paper should be used for the week’s report). Students making oral presentations should not submit a report for their topic. Other students should submit reports at the beginning of the student presentation session on that topic for 9 of the 14 topics, and should keep track on their own how many reports they have completed. All students will also evaluate one of the speakers for that week, using an evaluation form provided in class. This provides useful feedback to the speakers and counts as the “participation” part of the course grade.

### ***Details on Report Writing:***

Each student should write a 2-3 page, double-spaced, typed report summarizing the major points of the report paper for the week’s topic. For original research papers, discuss each of the following as a separate, labelled section of your report:

- ❖ *Title and journal reference for the paper, including authors’ names*
- ❖ *Hypothesis (being tested by the research in the paper) or specific question being addressed by the research*
- ❖ *Background and significance of the problem*
- ❖ *Methods (used to test the hypothesis or address the question)*
- ❖ *Experimental results (and how they addressed the hypothesis)*
- ❖ *Conclusions (based on interpretation of the results)*
- ❖ *Particular weaknesses or strengths of the paper*
- ❖ *Any questions you have after reading the paper*

Some of the papers may be review papers summarizing the state of the field, rather than presenting the results of original research. For reviews, cover the following points in your report:

- ❖ *Title and journal reference for the paper, including authors' names*
- ❖ *Topic being reviewed*
- ❖ *Background and significance of the problem*
- ❖ *Different groups' methods and results discussed in the paper, and their relative merits*
- ❖ *Conclusions: what these approaches and results tell us about the state of the art, and the remaining challenges to be solved*
- ❖ *Particular weaknesses or strengths of the paper*
- ❖ *Any questions you have after reading the paper*

*Simply copying sentences from the paper or using another's writing as part of your report is considered plagiarism and will result in a grade of zero for that assignment.* The quality of your writing does matter, as much in the "real world" as in class, so please pay careful attention to grammar and spelling, and get help with them as needed. Using the spelling and grammar checkers on your word processor are highly recommended, and the grammar checker will tell you what is wrong with your sentence construction, too. Each report on a topic should be turned in at the beginning of the student presentation class session to receive credit. It will be graded by that week's professor, on the following scale (out of 8 points):

- 8 perfect
- 7 excellent
- 6 very good
- 5 good
- 4 reasonable
- 3 some effort
- 1-2 poor
- 0 nothing submitted

The professors are not required to grade late reports; if they are accepted, 30% of the points will be deducted. This is because students turning in reports after hearing the presentations would otherwise have an unfair advantage over students who turned in their reports on time.

***Details on Oral Presentation:***

Each student's talk should be 15 minutes long followed by 5 minutes for questions. There will be a timer that lets you know when you have two minutes left in your talk. Talks should address the same points as described under *Reports* above, beginning with a clear introduction to the area of research. The most successful talks include data and figures from the paper, accompanied by clear explanations of how they address the research questions. Presenting the ramifications of those results for science or technology will make your talk more interesting. Visual aids to accompany your talk are essential. Using PowerPoint slides with a computer is highly preferred (in fact, this is the standard for giving talks in science). It is recommended to bring the talk on your own laptop to use with the classroom video projector, so you won't have to worry about your presentation appearing different due to a different version of PowerPoint being installed on the classroom's computer. Alternatively, bring a CD, pen drive, or floppy disk to load your talk onto the classroom computer. It is a good idea to check your talk with the A/V system in our classroom before the day of your talk, to make sure your presentation opens correctly on that system. Similarly, I strongly encourage you to do several practice runs of your talk (including once with the session professor, to give you feedback) and time

your talk to make sure it is the right length. Presentations will be graded by Dr. Kuhn on a scale of 10, and you will receive a written evaluation of your presentation by e-mail.

***Student Evaluations and Participation:***

Much of what makes the class successful and fun is active participation by the audience, through questions and discussion. You are encouraged to ask the speaker question(s) in class and vigorously participate in the discussions. Much more interesting than being passive, this encourages your neurons to keep up the good battle! It also provides the speaker with thoughtful feedback on his talk.

***Final Examination:***

There will be no final exam in the course. The course session scheduled at the final exam time will cover the final topic in the course, with the same format as preceding weeks.

## Biochemistry 495 Senior Seminar, Spring 2008

### Session Schedule

1/8: Organizational meeting – Prof. Leslie Kuhn; [kuhnl@msu.edu](mailto:kuhnl@msu.edu)

1/15 at 10:20am: Overview on Preparing Good Talks and Reports – Prof. Leslie Kuhn

1/15 at ~11:20am: Introduction to “Blood Coagulation” - Dr. Kaillathe Padmanabhan ([padmanab@msu.edu](mailto:padmanab@msu.edu)) and question & answer (Q&A) session on this topic

1/22 at 10:20am: Student presentations on “Blood Coagulation” under the direction of Dr. Padmanabhan

1/22 at ~11:20am: Introduction to “Protein Allostery” – Prof. Maria Zavodszky ([zavodszk@msu.edu](mailto:zavodszk@msu.edu)) and Q&A session on this topic

1/29 at 10:20am: Student presentations on “Protein Allostery” under the direction of Prof. Zavodszky

1/29 at ~11:20am: Introduction to “Hypoxia, Metabolic Imbalance and Cancer” – Prof. John LaPres ([lapres@msu.edu](mailto:lapres@msu.edu)) and Q&A session on this topic

2/5 at 10:20am: Student presentations on “Hypoxia, Metabolic Imbalance and Cancer” under the direction of Prof. LaPres

2/5 at ~11:20am: Introduction to “Biochemistry of Anthrax Toxin” - Prof. Nick Duesbery, Van Andel Research Institute ([nick.duesbery@vai.org](mailto:nick.duesbery@vai.org)) and Q&A session on this topic

2/12 at 10:20am: Student presentations on “Biochemistry of Anthrax Toxin” under the direction of Prof. Nick Duesbery

2/12 at ~11:20am: Introduction to “Chronic Myelogenous Leukemia – A Cancer that can be Controlled by New Therapeutics” – Prof. Justin McCormick ([mccormi1@msu.edu](mailto:mccormi1@msu.edu)) and Q&A session on this topic

2/19 at 10:20am: Student presentations on “Chronic Myelogenous Leukemia – A Cancer that can be Controlled by New Therapeutics” under the direction of Prof. Justin McCormick

2/19 at ~11:20am: Introduction to “Genetic Engineering of Succinate Production in Escherichia coli” by Prof. Claire Vieille ([vieille@msu.edu](mailto:vieille@msu.edu)) and Q&A session on this topic

2/26 at 10:20am: Student presentations on “Genetic Engineering of Succinate Production in Escherichia coli” under the direction of Prof. Claire Vieille

2/26 at ~11:20am: Introduction to “The Structure and Function of Replication Initiator Proteins” by Prof. Michael Weinreich, Van Andel Research Institute ([michael.weinreich@vai.org](mailto:michael.weinreich@vai.org)) and Q&A session on this topic

3/4: No class – spring break!

3/11 at 10:20am: Student presentations on “The Structure and Function of Replication Initiator Proteins” under the direction of Prof. Michael Weinreich

3/11 at ~11:20am: Introduction to “RNA Elongation Catalyzed by RNA Polymerase II” by Prof. Zach Burton ([burton@msu.edu](mailto:burton@msu.edu)) and Q&A session on this topic

3/18 at 10:20am: Student presentations on “RNA Elongation Catalyzed by RNA Polymerase II” under the direction of Prof. Zach Burton

3/18 at ~11:20am: Introduction to “Hot Spots of Protein-protein Binding” by Prof. Jennifer Ekstrom ([ekstrom@msu.edu](mailto:ekstrom@msu.edu)) and Q&A session on this topic

3/25 at 10:20am: Student presentations on “Hot Spots of Protein-protein Binding” under the direction of Prof. Jennifer Ekstrom

3/25 at ~11:20am: Introduction to “Relative Contributions of Translesion Synthesis and Homologous Gene Conversion to the Ability of Human Cells to Replicate DNA Containing Fork-Blocking DNA

*Lesions: Relationship to Carcinogenesis” by Prof. Veronica Maher ([maher@msu.edu](mailto:maher@msu.edu)) and Q&A session on this topic*

*4/1 at 10:20am: Student presentations on “Relative Contributions of Translesion Synthesis and Homologous Gene Conversion to the Ability of Human Cells to Replicate DNA Containing Fork-Blocking DNA Lesions: Relationship to Carcinogenesis” under the direction of Prof. Veronica Maher*

*4/1 at ~11:20am: Introduction to “Multiple Sequence Alignment” by Prof. Bill Wedemeyer ([proteins@msu.edu](mailto:proteins@msu.edu)) and Q&A session on this topic*

*4/8 at 10:20am: Student presentations on “Multiple Sequence Alignment” under the direction of Prof. Bill Wedemeyer*

*4/8 at ~11:20am: Introduction to “Protein Glycosylation in Cancer” by Prof. Brian Haab, Van Andel Research Institute ([brian.haab@vai.org](mailto:brian.haab@vai.org)) and Q&A session on this topic*

*4/15 at 10:20am: Student presentations on “Protein Glycosylation in Cancer” under the direction of Prof. Brian Haab*

*4/15 at ~11:20am: Introduction to “Homocysteine and heart disease - don't even think about it! Science and intellectual property in collision” by Prof. Tom Deits, Chair of Science, Lansing Community College ([deitst@lcc.edu](mailto:deitst@lcc.edu)) and Q&A session on this topic*

*4/22 at 10:20am: Student presentations on “Homocysteine and heart disease - don't even think about it! Science and intellectual property in collision” under the direction of Prof. Tom Deits*

*4/22 at ~11:20am: Introduction to “The Process of Drug Discovery” by Prof. Leslie Kuhn ([kuhnl@msu.edu](mailto:kuhnl@msu.edu)) and Q&A session on this topic*

*4/29 – note: at 10:00am, not 10:20, in assigned final exam room. Student presentations on “The Process of Drug Discovery” under the direction of Prof. Leslie Kuhn*