

CAMB 608 -- FALL 2011
REGULATION OF EUKARYOTIC GENE TRANSCRIPTION
Tuesday (3-5pm) CRB Room 400

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This is a course intended to bring students up to date concerning our understanding of transcriptional regulation in eukaryotes. It will be based on assigned readings, formal presentations by individual class members, and the critical evaluation of primary data. Each student will be responsible for one topic. Each of these will focus on two to three papers and, together, will cover a variety of experimental systems and concepts.

Individual presentations should be organized as seminars, and include approximately *10-20 minutes of introduction* that will supply background information about the experimental system and its significance. The introductory material should be derived from *extensive* additional reading, not just the assigned papers and reviews. After the introduction, the presentation will be devoted to a *critical evaluation of the experiments and conclusions* of the assigned papers. Students should not give simply a blow-by-blow account of each experiment and the authors' conclusions. The papers should be presented more as if they were the students' own work — it is possible that some figures will not be discussed. The topics build on one another, so as the course proceeds students should be able to relate and compare the data and conclusions of the papers being discussed to those of previous discussions, pointing out apparent consistencies and differences.

Preparation deadlines are as follows. On the Thursday or Friday before their talks (which occur on Tuesdays), presenters will discuss their presentations with their faculty preceptor (an outline and/or preliminary PowerPoint presentation is recommended). Call or email to make an appointment. This will allow sufficient time for feedback on the presentation and for the presenters to practice their deliveries.

The papers will also be critically evaluated by each class member. Lively discussion and criticism involving all members of the class is expected. The papers should be treated as if they were being reviewed for publication in a journal—despite the fact that they're already published!—and students should be prepared to discuss both a paper's strengths and weaknesses. A high level of discussion will not occur unless each participant thoroughly reads the papers and formulates questions. Accordingly, *each student will be required to prepare one question from each of the assigned papers prior to class*. The questions should be well formulated, possibly citing specific data (e.g. lanes in gels) or quotations from the text. Although it would not be unreasonable for the length of a well-designed question to approach 1/2 type written page, they should be expressed succinctly. Each week's questions must be written out and handed in at the beginning of class.

Grades will be based on students' presentations as well as weekly participation in the discussions and submitted questions. The faculty will provide an evaluation of each student's performance within a week of the presentation. Evaluations of each presentation will also be provided by the class using standard forms. These will be given directly to the presenter at the end of class for his/her own use; they will not be read by the faculty. This peer review will allow the presenters to obtain more input concerning their presentations. This should help in the preparation of future scientific talks such as thesis committee meetings, thesis defenses, and eventually job seminars.

Topics

- 1. Sept. 13: Assigning function to DNA elements**
- 2. Sept. 20: Promoters**
- 3. Sept. 27: Role of Pol II pausing in transcriptional control**
- 4. Oct. 4: Impact of 3' processing on gene transcription: 'Retro-regulation'**
- 5. Monoallelic gene expression (Date and time TBD)**
- 6. Oct. 18: Impact of histone modifications on alternative splicing**
- 7. Oct. 25: Chromatin organization**
- 8. Nov. 1: Gene expression and chromatin architecture**
- 9. Nov. 8: Long non-coding RNAs**
- 10. Nov. 15: Cis-regulatory changes and human evolution**
- 11. Nov. 22: DNA methylation**
- 12. Nov. 29: DNA de-methylation**
- 13. Dec. 6: Transcription-linked deposition of EJCs control of NMD in the cytoplasm**
- 14. Dec. 13: Co-Transcriptional deposition of Pol II subunits impacts mRNA translation**