

BI 182, 2008: DEVELOPMENTAL GENE REGULATION AND EVOLUTION OF ANIMALS

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Lectures 2-4PM Wednesdays, 151 Braun

BI182 will be taught from a recent book by your Prof., “The Regulatory Genome: Gene Networks in Development and Evolution” (Elsevier, 2006). In the second part of the Course various aspects of animal evolution will be covered beyond those dealt with in “Regulatory Genome”. This is an advanced course and some background in respect to molecular biology is expected. If you have had no previous exposure to developmental biology or embryology, remedial guidance will be available from your TA. There are no letter grades and no exams in this course, and it is given Pass/Fail only. One fairly certain way not to pass is to cut any lectures, barring illness or other bad luck. At the end of the course a set of three relevant thought problems will be handed out. The best solutions to each will be presented by their authors and discussed in the last session of the course.

Jan 9. I. The Regulatory Genome in development and evolution.

Jan 16. II. Modular *cis*-regulatory design for spatial gene expression, and *cis*-regulatory logic processing functions.

Jan 23. III. Basic mechanistic aspects of transcription and gene regulation; dynamics of transcript synthesis and turnover

Jan 30. IV. Regulatory state specification in diverse modes of embryonic and post-embryonic development.

Feb 6. V. Developmental gene regulatory networks (GRNs): definitions, general principles, subcircuits; Examples from the sea urchin endomesoderm GRN

Feb 13. VI. Comparative GRN analysis and principles of GRN subcircuit design

Feb 20. VII. Evolutionary history before and since the Cambrian and modes of regulatory DNA sequence change

Feb 27. VIII. Cooption, Conservation and Network Kernels in Evolution

March 5. IX. Evolution of the Bilateria

March 12. X. Presentation and discussion of problem solutions