

BIOM555 - REGULATION OF THE GENOME: SPRING 2020

Lectures: Austrian Auditorium, CRB: Tuesdays and Thursdays: 9:00 am – 10:30 am; Thursday, January 16 through Thursday, May 7

Small Group Discussions: January 30 through April 30. Students choose one discussion session and attend that session each week. Attendance and participation are required.

- A: Session 1: Thursday 11am ~ 12pm ~ Room 104 Stellar Chance (McKensie)
- B: Session 2: Thursday 11am ~ 12pm ~ Room 204 Stellar Chance (Isabel)
- C: Session 3: Thursday 3:30pm ~ 4:30pm ~ Room 104 Stellar Chance (Sylvia)
- D: Session 4: Thursday 3:30pm ~ 4:30pm ~ Room 204 Stellar Chance (Yaoyu)
- E: Session 5: Fridays 11am - 12pm ~ Room 104 Stellar Chance (Ioana)
- F: Session 6: Friday 11am – 12pm ~ Room 204 Stellar Chance (Rebecca)
- G: Session 7: Friday 11am – 12pm ~ 301 Stellar Chance (Adam)

Exams: 3 Exams, equal weight (25% each exam) Start at 8:30 am, end at 10:20 am. No regrading by teaching assistants. For issues with exam grades, please make an appointment with the course director.

Course Director:

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Section 1 – Genome Maintenance

Thursday, January 16: Course Introduction – Definition of Common Terms and Techniques (Klaus Kaestner)

Tuesday, January 21: Design and interpretation of ChIP-Seq and ATAC-seq (Klaus Kaestner)

Thursday, January 23: Design and Interpretation of RNAseq, GROseq, and scRNAseq (Golnaz Vahedi)

Tuesday, January 28: Regulation of DNA Replication (Paul Lieberman)

Thursday, January 30: DNA Repair and Cell Cycle Checkpoints (Roger Greenberg)

(Discussion of problem set 1: Design and Interpretation of RNAseq, GROseq, scRNAseq, ChIP-Seq and ATAC-Seq)

Section 2 – Transcription and Epigenomic Methods

Tuesday, February 4: Eukaryotic Gene Transcription 1 (Ken Zaret)

Thursday, February 6: Eukaryotic Gene Transcription 2 (Ken Zaret)

(Discussion 2: Regulation of DNA replication and DNA repair and cell cycle checkpoints)

Tuesday, February 11: Telomere Function (Brad Johnson)

Thursday, February 13: REVIEW SESSION FOR EXAM (TAs)
(Discussion 3: [Eukaryotic Transcription](#))

Tuesday, February 18: **EXAM 1, IN CLASS** (Material up to February 4)

Section 3 – Chromatin Modifications

Thursday, February 20: Covalent DNA Modifications (Zhaolan (Joe) Zhou)
(Discussion 4: [Telomere Function](#))

Tuesday, February 25: Nucleosome Structure (Ben Black)

Thursday, February 27: Genome Editing (Jorge Henao-Mejia)
(Discussion 5: [Covalent DNA Modifications](#))

Tuesday, March 3: Histone and Chromatin I (Shelley Berger)

Thursday, March 5: Histone and Chromatin II (Shelley Berger)
(Discussion 6: [Nucleosome Structure and Genome Editing](#))

Tuesday, March 10: **Spring Break ~ No Class**

Thursday, March 12: **Spring Break ~ No Class**

Section 4 – Chromatin Regulation

Tuesday, March 17: Chromatin Regulation in the Polycomb Pathway (Roberto Bonasio)

Thursday, March 19: Trithorax and Chromatin Remodeling (Roberto Bonasio)
(Discussion 7: [Histone and Chromatin](#))

Tuesday, March 24: Chromatin-Chromatin Interactions (Gerd Blobel)

Thursday, March 26: Analysis of Higher Chromatin Astructure:3C, 4C, HiC (Robert Faryabi)
(Discussion 8: [Chromatin: Nuclear Architecture and Polycomb Pathway](#))

Tuesday, March 31: Chromatin Regulation in the Context of Imprinting (Marisa Bartolomei)

Thursday, April 2: REVIEW SESSION FOR EXAM (TAs)
(Discussion 9: [Analysis of Higher Order Chromatin Structure](#))

Section 5 – Post-transcriptional Regulation

Tuesday, April 7: **EXAM 2, IN CLASS** (Material up to March 26)

Thursday, April 9: miRNAs/siRNAs (Zissimos Mourelatos)
(Discussion 10: [Chromatin in the Context of Imprinting](#))

Tuesday, April 14: Long Non-Coding RNAs (Montserrat Anguera)

Thursday, April 16: RNA Editing (Tom Jongens)
(Discussion 11: [miRNA/siRNA](#))

Tuesday, April 21: RNA Processing I (Kristen Lynch)

Thursday, April 23: RNA Processing II (Kristen Lynch)
(Discussion 12: [Long Non-Coding RNAs, RNA Editing and Translational Control](#))

Tuesday, April 28: Translational Control and RNA Localization I (Peter Klein)

Thursday, April 30: Translational Control and RNA Localization II (Peter Klein)
(Discussion 13: [RNA Processing and Translational Control](#))

Tuesday, May 5: REVIEW SESSION FOR EXAM (TAs)

Thursday, May 7: **EXAM 3, IN CLASS**

General References for Review (Library/Web)

Molecular Biology of the Cell (Alberts et al.)

<http://www.ncbi.nlm.nih.gov/books/bv.fcgi?call=bv.View..ShowTOC&rid=mboc4.TOC&depth=10>

Molecular Cell Biology Lodish et al. (older editions are by Darnell et al.)

<http://www.ncbi.nlm.nih.gov:80/books/bv.fcgi?call=bv.View..ShowTOC&rid=mcb.TOC>

Genes VIII Benjamin Lewin

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