BIO 48006 / 58006 Gene Regulation and Disease Syllabus
FALL 2021

Instructor: Cavit Agca

Nowadays, medicine is in a transformation stage where classical drug treatments are slowly getting replaced by approaches like personalized medicine and gene therapy. Therefore, therapies are requiring more and more in depth knowledge of molecular biology and to be able make connections with more advanced techniques and the etiology of the disease that is studied. This course will provide advanced level of training and understanding of the molecular mechanisms of diseases by focusing on gene regulatory mechanisms like chromatin remodeling and mRNA transcription, RNA splicing, as well as post-transcriptional and post-translational mechanisms. The course will also focus on gene regulatory and gene correction tools for therapeutic approaches like dCas9, TALE, Zinc finger, CasRX, Cas13a and base editing The course will complement the understanding of basic research findings and their outcomes in animal models and thus their consequences on the whole organism.

Readings:

Primary articles given in advance for lectures. Copies will available on SUcourse.

Supporting Material:

-Molecular Biology of the Cell (6th Ed)
Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K. and Walter, P.
Garland Publishing Inc. (2015) ISBN 978-0-8153-4464-3
www.homerbooks.com

PLEASE NOTE THAT THE SYLLABUS IS ONLY ANTICIPATED AND MAY HAVE UPDATES DEPENDING ON UPCOMING COVID19 MEASURES AND TIME CONSTRAINTS !!!

Week 1:	First Meeting and introduction to the course / Discussion of future plans.
Week 2:	Gene regulatory tools I / Article discussions
Week 3:	Gene regulatory tool applications / Article discussions
Week 4:	Gene therapies (Retina) and article discussions / Student presentations
Week 5:	Gene therapies (SMA1) and article discussions / Student presentations
Week 6:	Therapeutic applications and vectors/ Article discussions/ Student presentations
Week 7:	Deadline for disease conditions selection / 5 min presentations of proposal plan
Week 8:	Gene regulation-related diseases I / Article discussions / 5 min presentation of proposal plan continue

Week 9: Gene regulation-related diseases II/ Article discussion / Student presentations / Proposal discussions /
Week 10: Gene regulatory tools II / Article discussion / Student presentations / Proposal discussions
Week 11: Gene regulatory tools applications / Article discussion / Student presentations / Proposal discussions
Week 12: AMD / Article discussion / Student presentations / Proposal discussions
Week 13: HIV / Article discussion / Student presentations / Proposal discussions
Week 14: TBA / Student presentations

Grading:

40% An essay / proposal will be written covering the etiology, diagnostics and ongoing or possible therapautic appraoches of a given disease. Students will decide disease condition at 7th week of the course. Details of the format will be announced.

40% Article presentation is expected from each student. Details are given as a separate sheet. Graduate students will be assigned first.

20% Participation to classroom discussions.

IMPORTANT NOTES ABOUT CLASSROOM:

- **Active (Face-to-face) classes will start immediately. Due to constraints related to Covid19, you have two options to select. You can participate to online version or the active version. Either option will occur simultaneously**

- **Please note that depending on the attendance profile, we may have to do arrangements for the active participants.**

Contact:

Instructor:
Cavit Agca: L025. Office hour: TBA
TA:
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Office hrs: TBA

Lectures: Monday 9:40-12:30 Hybrid, FENS, L035
Zoom Meeting
https://sabanciuniv.zoom.us/j/7556177895?pwd=cTViMFhwWk9tZGN1MFJ4WDlzUi94Zz09
Meeting ID: 755 617 7895
Passcode: Bio332