

# **BIO 58007 Retinal Cell Biology and its Evolutionary Perspectives**

**Spring 2021**

## **Instructor: Cavit Agca**

Introduction to course will cover all type of retinal cells in a typical mammalian retina and their unique architecture. Fundamentals of retinal cell biology; visual cycle, retinal circuitry as well as signal transmission to receptive fields in brain will be included. A more depth organizational perspective will be given by cross comparing several organisms including human, mouse, octopus, jellyfish, drosophila, sea urchin and further. An evolutionary comparison of retinal cell types and their origin will be covered. Finally, retinal development and its gene regulatory networks will be studied. Specific attention will be given to the transcription factors including Math5, Pou4f1, Pou4f2, NeuroD1 and especially Pax6 which can form ectopic eyes solely by its overexpression in flies.

## **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: Human retina and retinal cell types / Article discussions
- Week 3: PAX6 Drosophila and human / Article discussions
- Week 4: Evolutionary perspectives and article discussions / Student presentations
- Week 5: Ganglion cells, gene regulatory networks and evolutionary perspectives / Student presentations
- Week 6: Retinal development in mammals / Article discussions/ Student presentations
- Week 7: Deadline for proposals / 5 min presentations of proposal plan
- Week 8: RETINAL DISEASES / Article discussions /

Week 9: RETINAL DISEASE MODELS / Article discussion / Student presentations /  
Week 10: LAB SESSION MICRON IV / HANDS ON EXPERIENCE AT GEBZE  
Week 11: LAB SESSION OCT / HANDS ON EXPERIENCE AT GEBZE  
Week 12: AMD / Article discussion / Student presentations / Proposal discussions  
Week 13: Gene therapies (Retina) and article discussions / Student presentations  
Week 14: Retinal organoids / Student presentations

### **Grading:**

**40% An essay / proposal will be written in one of the retina related topics e.g. retinal cell biology, retinal diseases, retinal gene therapies, retinal organoids or evolutionary perspectives of retina. Students will decide their topic 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.**

**20% Participation to classroom and retina lab .**

### **Contact:**

#### **Instructor:**

**Cavit Agca:** L025. Office hour: TBA

#### **TA:**

**Mehri Ahmadian,** [mehriahmadian@sabanciuniv.edu](mailto:mehriahmadian@sabanciuniv.edu)

Office hrs: TBA

**Lectures:** Wednesday 14:40-17:30 Hybrid, FASS,G022

Zoom Meeting

<https://sabanciuniv.zoom.us/j/7556177895?pwd=cTViMFhwWk9tZGN1MFJ4WDIzUi94Zz09>

Meeting ID: 755 617 7895

Passcode: Bio332