

G Protein-coupled Receptor Biology (9-10:20 TR)

BIOL 4395 -Topics in Biology CRN: 11975

BIOL 5301 Select Adv. Topics in Biological Science-CRN 13012

(4395 Undergraduate/5301graduate students)

G protein-coupled receptor biology is an opportunity to read and discuss scientific literature in the field of GPCR biology. As 40-50% of all drugs in the market today are targeted toward GPCRs, it is important for students to have a clear understanding of the function and relevance of these proteins to signaling, health and biology.

Graduate student Grades:

Under Graduate student Grades:

Midterm Assignments:	50% (please submit to the Blackboard Dropbox)	50 %	
Manuscript review Assignments	20%	Manuscript Participation	15 %
Take Home Final	20%		25%
Attendance and participation:	10%*		10%

All writing assignments are due on time. Late submissions will not be accepted.

DATE

ASSIGNMENT

August 26	Seven Trans-membrane Receptors
August 28	Structure of GPCRs
September 2	Structure of GPCRs
September 4	Signaling through GPCRs
September 9	Signaling through GPCRs-second messengers
September 11	Rhodopsin
September 16	No class (time for team work)
September 18	β 2 adrenergic Receptor
September 23	β 2 adrenergic Receptor
September 25	GPCR antagonists and how to write your exams
September 30	First Midterm assignment Due (no class today) October 2
	Neurotransmitters (mGluRs and dopamine receptor)
October 7	Neurotransmitters
October 9	Chemokine Receptors
October 14	Chemokine Receptors
October 16	GPCRs and obesity
October 21	Hormone regulation of GPCRs
October 23	Manuscript Review – Chelsea Mayer
October 28	Manuscript Review - Stephanie Moreno
October 30	Manuscript Review – Mayra Flores
November 4	Manuscript Review – Mabel Terminal
November 6	Manuscript Review – Sarah Chenausky
November 11	Manuscript Review – Lisette Contreras
November 13	Second Midterm assignment Due (no class today)
November 18	Manuscript Review – Miguel Beltran
November 20	Manuscript Review – Susan Portillo/Hector Gomez
November 25	Manuscript Review – Berenise De Haro
November 27	Thanksgiving – NO CLASS
December 2	Manuscript Review – Ken Negishi
December 4	Manuscript review –Jeremiah Ramos
December 6	FINAL DUE

Instructions for submitting assignments:

1) **Create your writing assignment.** Acceptable formats for submitting your assignment

are .doc or docx files.

2) Save the file with your last name and date 3) Attach the file to the Safe assignment 4) Submit to complete the process. I will be notified automatically that your assignment is ready for grading.

Course Description

G protein-coupled receptors (GPCRs) are cell surface receptors, that are encoded by more than 1,000 genes, and are used by many cells, to communicate within the host and to the world outside. For instance, sight, smell, taste and pain are controlled at the cellular and molecular levels by GPCRs. In each case a GPCR is used to discriminate millions of signals to provide intelligible information to the brain and allow the host to define what is occurring outside the host. In fact, you are using the GPCR rhodopsin to read this syllabus.

Therefore, it is not surprising that because GPCRs are readily accessible on the surface of many cells, over 40% of the drugs on the market today are targeted toward GPCRs. Montelukast (Singulair®) and Zafirluast (Accolate®) are examples of GPCR antagonists that are used to block GPCR-mediated bronchoconstriction during an asthma attack. Memantine HCl (Namenda®) is being used to try to slow the dementia associated with Alzheimer's disease, while beta-blockers (also called β -adrenergic receptor blocking agents) are being used to treat high blood pressure, glaucoma and migraines

In this course, we will discuss the structure and function of the "classical" GPCRs, rhodopsin and the β 2 adrenergic receptor. We will examine how small GTP-binding proteins are activated by ligand binding, by different types of GPCRs and examine the signaling effectors that promote downstream events, to begin to understand the specific cellular responses that are generated by ligand binding. In studying chemokine receptors, immune cell receptors that control the host immune response, we will begin to learn how individual GPCRs are important in regulating systemic responses. We will then discuss what happens when GPCRs dysfunction during neurological diseases. We will then examine current studies being carried that reveal novel insights into activation, signaling and desensitization of GPCRs.

This is an advanced discussion course. You will be graded on class participation and three written assignments. As you have been given the due dates in advance, unless you have extenuating circumstances, no late work will be accepted.