

**G715 – Biochemical Basis of Biological Processes (36 lectures)**

**Course Directors: Lawrence Quilliam & Nick Brustovetsky; MWF 11am-Noon 2017**

**Spitzberg Auditorium (Room 103, Glick Eye Institute)**

**Membrane Biochemistry/Protein Structure [2 weeks]**

8/21	– Lipids and membranes, membrane structure and function	(Elmendorf)
8/23	– Biophysical properties of membranes, Ion channels & pores	(Elmendorf)
8/25	– From amino acids to protein structure	(Georgiadis)
8/28	– Structure/function in proteins I	(Georgiadis)
8/30	– Structure/function in proteins II	(Georgiadis)
9/1	– Protein bioinformatics <b>(Homework assessment)</b>	(Georgiadis)

**9/4 - Labor Day**

9/6	– Excitable membranes	(Obukhov)
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**Cell Signaling Block [2 weeks]**

9/8	– Concepts & overview	(Jerde)
9/11	– Cell-Cell signaling	(Jerde)
9/13	– Receptors: GPCR>G proteins>2nd messengers	(Jerde)

**9/15 – Review Session**

**Instructors**

**9/18 EXAM 1 10:30-12:30 PM**

9/20	– Receptors: RPTKs>Ras>MAPK cascade <b>(literature assignment)</b>	(Quilliam)
9/22	– Modular design of signaling macromolecules	(Quilliam)
9/25	– Apoptosis/cell death signaling	(Brustovetsky)

**Macromolecules Block [2 weeks]**

9/27	– Post-translational modifications	(Lu)
9/29	– Factors controlling protein degradation	(Lu)
10/2	– Proteomics 1	(Wells)
10/4	– Proteomics 2	(Wells)
10/6	– Proteomics 3 <b>(literature assignment)</b>	(Wells)

**Protein-Ligand Interactions Block [2 weeks]**

10/09	– Simple binding models and Michaelis-Menton Analysis	(Hurley)
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**10/11 - Review Session**

**Instructors**

**10/13 EXAM 2 10:30-12:30 PM**

**10/16 - FALL BREAK**

10/18	– Enzyme inhibition <b>(Homework assignment)</b>	(Hurley)
10/20	– Principles of enzymatic catalysis	(Hurley)
10/23	– Principles of macromolecular interactions	(Meroueh)
10/25	– Basic concepts of drug targeting and design	(Meroueh)

**Metabolic Processes Block [4 weeks]**

10/27	– Digestion	(Herring)
10/30	– Overview of metabolism and fate of fuels	(Roach)
11/1	– Metabolism of carbohydrates 1	(Roach)
11/3	– Metabolism of carbohydrates 2	(Roach)
11/5	– Glucose Homeostasis and Diabetes	(Roach)
11/8	– Regulation of mitochondrial energy production	(Brustovetsky)

**11/10 – Review Session**

**Instructors**

**11/13 EXAM 3 10:30-12:30 PM**

11/15	– Fatty Acid Metabolism	(Hurley)
11/17	– Respiratory Physiology	(Tune)
11/20	– Cholesterol Metabolism	(Hurley)

**11/22 & 11/24 - Thanksgiving Break**

11/27	– Amino acid metabolism 1	(Wek)
11/29	– Amino acid metabolism 2	(Wek)
12/1	– Metabolome changes in Disease <b>(literature assignment)</b>	(Ivan)
12/4	– Renal Physiology	(Williams)
12/6	– Integration of metabolism	(Roach)

**12/8 - Review Session**

**Instructors**

**12/11 EXAM 4 10:30-12:30 PM**

## **IU Security**

Two-Step Login (Duo) will be required for all students beginning November 2. Be sure to bring your primary device (like a cellphone or tablet) to class, so you can log in to secure IU systems such as Canvas. Also make sure you have a backup device like a hardware token or Google Voice. If you get stuck without a working device, the UITS Support Center can give you a bypass code, but it takes up to 20 minutes to verify your identity (not great for time-sensitive class activities).

## **IUPUI Policy on Disability Accommodations**

Students needing accommodations because of disability will need to register with [Adaptive Educational Services \(Links to an external site.\)](#) and complete the appropriate forms issued by AES before accommodations will be given. The AES office is located in Taylor Hall, UC 100. You can also reach the office by calling 274-3241.

## **IUPUI Policy on Religious Holidays**

IUPUI respects the right of all students to observe their religious holidays and will make reasonable accommodation, upon request, for such observances. Students seeking accommodation for religious observances must submit a request in writing to the course instructor by the end of the second week of the semester and should use the [Request for Course Accommodation Due to Religious Observance Form \(Links to an external site.\)](#). More information on the IUPUI Policy on Religious Holidays is available here: <http://registrar.iupui.edu/religious.html> ([Links to an external site.](#)).

## **IUPUI Policy on Academic Integrity:**

The IU Code of Student Rights, Responsibilities, and Conduct states that students must uphold and maintain academic and professional honesty and integrity; the code defines academic misconduct as any activity that tends to undermine the academic integrity of the institution. Students engaging in academic misconduct may therefore receive penalties from their course instructor and disciplinary action from the university. Policies against academic misconduct apply to *all* course-, department-, school-, and university-related activities. Academic misconduct may involve human, hard-copy, or electronic resources and includes but is not limited to the following: cheating, fabrication, plagiarism, interference, violation of course rules, and facilitating academic dishonesty. For definitions of these activities, visit <http://studentcode.iu.edu/responsibilities/academic-misconduct.html> ([Links to an external site.](#)). For information on how faculty and students are expected to handle cases involving academic misconduct, visit <http://registrar.iupui.edu/misconduct.html> ([Links to an external site.](#)). Additional information about the rights and responsibilities of IU students is available at <http://studentcode.iu.edu/> ([Links to an external site.](#)).

## **IUPUI Policy on Sexual Misconduct**

As your instructor, one of my responsibilities is to help create a safe learning environment on our campus. Title IX and our own Sexual Misconduct policy prohibit sexual misconduct. If you have experienced sexual misconduct, or know someone who has, the University can help.

If you are seeking help and would like to speak to someone confidentially, please visit <http://stopsexualviolence.iu.edu/help/index.html> ([Links to an external site.](#)) (Links to an external site.) for contact information.

It is also important that you know that federal regulations and University policy require me to promptly convey any information about potential sexual misconduct known to me to our campus'

Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, they will work with a small number of others on campus to ensure that appropriate measures are taken and resources are made available to the student who may have been harmed.

Protecting a student's privacy is of utmost concern, and all involved will only share information with those that need to know to ensure the University can respond and assist.

I encourage you to visit [stopsexualviolence.iu.edu](http://stopsexualviolence.iu.edu) ([Links to an external site.](#)) ([Links to an external site.](#)) to learn more about available resources on campus and in the community.

## **Education and Title VI**

Title VI of the Civil Rights Act of 1964 protects people from discrimination based on race, color or national origin in programs or activities that receive Federal financial assistance.