Biochemistry and Metabolism - AY2019

Jump to Today

The overall goal of HST 146 is to give students a basic understanding of the biochemical and metabolic processes that underlie human disease, with a focus on carbohydrate, lipid, nucleotide, and protein metabolism. The course has two core components. The first component consists of faculty lectures, which will highlight overarching principles, current areas of research and clinical correlations, patient presentations and class exercises. The second component is a self-directed project in which the students will explore one area of diabetes in detail. In addition to these core components, the course includes a video series designed to provide a detailed outline of the major biochemical pathways, as a foundation for boards preparation. Though the videos have been coordinated with faculty lectures when possible, they should be considered a parallel entity.

Teaching Staff:

Course Director: Sudha Biddinger, sudha.biddinger@childrens.harvard.edu (mailto:sudha.biddinger@childrens.harvard.edu)

Teaching Assistant: Tim Caradonna, timothy_caradonna@hms.harvard.edu (mailto:timothy_caradonna@hms.harvard.edu)

Senior Curriculum Manager: Kate Hodgins, catherine_hodgins@hms.harvard.edu (mailto:catherine_hodgins@hms.harvard.edu)

Course Aims and Objectives:

- To become familiar with the major metabolic pathways, including those involved in glucose, lipid, amino acid, and nucleotide metabolism
- To identify key problems in metabolism relevant to basic research and clinical care
- To connect underlying metabolic defects to clinical phenotypes and treatments, and develop an understanding of how these can impact the lives of patients

Course Policies and Expectations:

Class Participation is assessed by engagement and discussion through the semester, attendance and punctuality. It is a key component of the course. Please plan to arrive at least 5 minutes prior to the start of class and turn off your cell phones during class.

Please be prepared for **changes to the schedule**. Occasionally, guest lecturers will need to be rescheduled or will post additional reading assignments before their lectures. In addition, please note that our goal is to

make this course the best it can be; if we find ways to improve the course through the semester, we may make changes.

Attendance and punctuality are expected, and students will be responsible for making up for any missed class time. Absences must be communicated to the teaching assistant as far in advance as possible, and unexcused absences and tardiness will be reflected in the final grade. Note that meetings with potential PIs should not be scheduled during class time.

A special note about clinical correlations. To show respect for the patients who have volunteered their time to join us during the course, ***please dress professionally (including white coat)***. Once clinical correlation sessions have started, the doors will be locked; late entry will not be permitted.

Resources:

Canvas contains a number of resources available to assist you throughout the course:

1. Faculty Lectures (posted when available)

2. Video lectures and packets (including additional review videos that are not required viewing)

3. Discussion Board. Discussion board can be used by students to publically post questions and comments. The TAs will answer questions, and also share their observations and insights.

4. Stryer's Biochemistry 5th Edition, which can be used for supplemental reading.

Videos and Quizzes:

The videos can be accessed from their respective URLs found on Canvas under 'Files.' The videos range from 25-60 minutes and cover the details of the metabolic pathways necessary for the boards.

Each video has a corresponding packet that includes notes on the videos as well as other supplemental materials. The end of each packet highlights the relevant sections in Stryer.

Each video also has a corresponding quiz with 15 questions. All of the questions in the quizzes are answered in the video lectures and packets; these are meant to serve as a comprehension benchmark. Quizzes are entirely open-note. Please be aware that only the first score of each quiz will be counted. Scores of 12/15 or better will be counted as a pass. Scores of 11/15 or lower will require meeting with the TAs to go over the material.

The **due dates** are:

9/10: The 5 carbohydrate quizzes 10/1: The 2 lipids quizzes

10/15: The vitamins quiz 10/22: The 3 amino acids quizzes

10/29: The nucleotides quiz

Assignments and Grading Procedures:

Summary of evaluation method:

Class Participation	25%
Final Presentation	45%
Quizzes	15%
Final	15%

Academic Integrity:

Students are expected to be familiar with and to follow the University's policies on academic integrity (see http://www.registrar.fas.harvard.edu/general-information/handbooks). Specifically, class presentations and Case Response papers must be the student's own work and include appropriate citations of peer-reviewed primary articles and reviews, as appropriate.

Course Summary:

Date	Details	
Fri Aug 31, 2018	Introduction to Course - Biddinger (https://canvas.hms.harvard.edu/calendar?event_id=39540&include_contexts=course_1130)	9am to 10am
Mon Sep 10, 2018	Carbohydrate Metabolism I: Background Nomenclature, Important Sugars, and Glucose Transporters (https://canvas.hms.harvard.edu/courses/1130/assignments/10569)	due by 9am
	Carbohydrate Metabolism II: Glycolysis (https://canvas.hms.harvard.edu/courses/1130/assignments/10570)	due by 9am
	Carbohydrate Metabolism III: Gluconeogenesis and Glycogen Storage (https://canvas.hms.harvard.edu/courses/1130/assignments/10572)	due by 9am
	Carbohydrate Metabolism IV: TCA Cycle, Electron Transport Chain, HMP Shunt (https://canvas.hms.harvard.edu/courses/1130/assignments/10573)	due by 9am

Date	Details	
	Introduction to Enzymes (https://canvas.hms.harvard.edu/courses/1130/assignments/10574)	due by 9am
	Carbohydrates I - Biddinger (https://canvas.hms.harvard.edu/calendar?event_id=39541&include_contexts=course_1130)	9:15am to 10:30am
	Carbohydrates II - Biddinger (https://canvas.hms.harvard.edu/calendar?event_id=39542&include_contexts=course_1130)	10:30am to 12pm
Mon Sep 17, 2018	Ketone Metabolism - Biddinger (https://canvas.hms.harvard.edu/calendar?event_id=39543&include_contexts=course_1130)	9:15am to 10:15am
	Patient Presentation: Type 1 Diabetes - Wolfsdorf (https://canvas.hms.harvard.edu/calendar?event_id=39544&include_contexts=course_1130)	10:15am to 11:30am
	How To Pick A Question - Biddinger (https://canvas.hms.harvard.edu/calendar?event_id=41269&include_contexts=course_1130)	11:30am to 12pm
Mon Sep 24, 2018	Problem Set 1 Discussion - TA (https://canvas.hms.harvard.edu/calendar?event_id=41270&include_contexts=course_1130)	9:15am to 10:15am
	Patient Presentation: Type 2 Diabetes - McDonnell (https://canvas.hms.harvard.edu/calendar?event_id=39546&include_contexts=course_1130)	10:15am to 11:15am
	Diabetes Discussion (https://canvas.hms.harvard.edu/calendar?event_id=41271&include_contexts=course_1130)	11:15am to 12pm
Mon Oct 1, 2018	Lipid Metabolism I: Introduction, Fatty Acid Breakdown, Fasting and Ketone Synthesis (https://canvas.hms.harvard.edu/courses/1130/assignments/10575)	due by 9am
	Lipid Metabolism II: Fatty Acid Synthesis, Regulation, Lysosomal Storage Disorders (https://canvas.hms.harvard.edu/courses/1130/assignments/10576)	due by 9am
	Research Question Submission (https://canvas.hms.harvard.edu/courses/1130/assignments/11197)	due by 9am
	Fatty Acid Metabolism - Cohen (https://canvas.hms.harvard.edu/calendar?event_id=39548&include_contexts=course_1130)	9:15am to 10:30am
	Lipoprotein Metabolism (https://canvas.hms.harvard.edu/calendar?event_id=39549&include_contexts=course_1130)	10:30am to 12pm

Date	Details	
Mon Oct 15, 2018	Vitamin Metabolism (READ THE INSTRUCTIONS) (https://canvas.hms.harvard.edu/courses/1130/assignments/10830)	due by 9am
	Case Presentation: Glycogen Storage Disorders - Mitchell (https://canvas.hms.harvard.edu/calendar?event_id=39550&include_contexts=course_1130)	9:15am to 10:15am
	Vitamin Metabolism - Mitchell (https://canvas.hms.harvard.edu/calendar?event_id=39551&include_contexts=course_1130)	10:15am to 11:15am
	Problem Set 2 Discussion - TA (https://canvas.hms.harvard.edu/calendar?event_id=39552&include_contexts=course_1130)	11:15am to 12pm
Mon Oct 22, 2018	Amino Acid Metabolism I: Introduction + Amino Acid Anabolism (https://canvas.hms.harvard.edu/courses/1130/assignments/10826)	due by 9am
	Amino Acid Metabolism II: Amino Acid Derivatives (https://canvas.hms.harvard.edu/courses/1130/assignments/10827)	due by 9am
	Amino Acid Metabolism III: Amino Acid Catabolism (https://canvas.hms.harvard.edu/courses/1130/assignments/10828)	due by 9am
	Electron Transport - Mootha (https://canvas.hms.harvard.edu/calendar?event_id=39553&include_contexts=course_1130)	9:15am to 10:15am
	Amino Acid Metabolism - Goldberg (https://canvas.hms.harvard.edu/calendar?event_id=39554&include_contexts=course_1130)	10:15am to 11:15am
	Biochemistry Mystery Case - TA (https://canvas.hms.harvard.edu/calendar?event_id=39555&include_contexts=course_1130)	11:15am to 12pm
Mon Oct 29, 2018	Annotated Bibliography Submission (https://canvas.hms.harvard.edu/courses/1130/assignments/11198)	due by 9am
	Nucleotide Metabolism - Moody (https://canvas.hms.harvard.edu/calendar?event_id=39556&include_contexts=course_1130)	9:15am to 10:15am
	Nucleotide Metabolism (https://canvas.hms.harvard.edu/courses/1130/assignments/10829)	due by 9:59am
	Patient Presentation: Hypercholesterolemia - DeFerranti (https://canvas.hms.harvard.edu/calendar?event_id=39557&include_contexts=course_1130)	10:15am to 11:15am

Date	Details	
	Case Presentation: Gout - Mitchell (https://canvas.hms.harvard.edu/calendar?event_id=39558&include_contexts=course_1130)	11:15am to 12pm
Mon Nov 5, 2018	Cancer Metabolism - Henske (https://canvas.hms.harvard.edu/calendar?event_id=39559&include_contexts=course_1130)	9:15am to 10:15am
	Harnessing Metabolism to Save Lives: IDHIFA - Dang (https://canvas.hms.harvard.edu/calendar?event_id=39561&include_contexts=course_1130)	10:15am to 11am
	Patient Presentation: Urea Cycle Disorder - Berry (https://canvas.hms.harvard.edu/calendar?event_id=39562&include_contexts=course_1130)	11am to 12pm
Mon Nov 19, 2018	Enzyme Kinetics - King (https://canvas.hms.harvard.edu/calendar?event_id=39563&include_contexts=course_1130)	9:15am to 10:45am
	Cholesterol Metabolism - Levy (https://canvas.hms.harvard.edu/calendar?event_id=39564&include_contexts=course_1130)	10:45am to 11:45am
	Problem Set 3 Discussion - TA (https://canvas.hms.harvard.edu/calendar?event_id=39565&include_contexts=course_1130)	11:45am to 12pm
Mon Nov 26, 2018	Student Presentations 1 (https://canvas.hms.harvard.edu/calendar?event_id=39566&include_contexts=course_1130)	9:15am to 11:30am
	Bioenterprise Seminar + Lunch - Gjorstrup, Levinson (https://canvas.hms.harvard.edu/calendar?event_id=39567&include_contexts=course_1130)	11:30am to 1:15pm
Mon Dec 3, 2018	Student Presentations 2 (https://canvas.hms.harvard.edu/calendar?event_id=39568&include_contexts=course_1130)	9:15am to 12pm
Mon Dec 10, 2018	Student Presentations 3 (https://canvas.hms.harvard.edu/calendar?event_id=39569&include_contexts=course_1130)	9:15am to 12pm
Mon Dec 17, 2018	Final Exam (https://canvas.hms.harvard.edu/calendar?event_id=39570&include_contexts=course_1130)	9:15am to 11:15am
	Course Reflection + Wrap Up - Biddinger (https://canvas.hms.harvard.edu/calendar?event_id=39571&include_contexts=course_1130)	11:15am to 12pm