

BIOC 470 - Introduction to Lipids and Lipoproteins (3 credits) (Winter) (Prerequisite: BIOC 311 or equivalent). (Open to U3). Structure, function and metabolism of lipids and lipoproteins as they relate to lipid storage diseases, obesity, insulin resistance, diabetes, heart disease, Alzheimers disease and other neurological diseases. Transcriptional and post-translational mechanisms governing the synthesis and degradation of important enzymes, lipids, and lipid transport molecules; role of lipid mediators in signaling pathways and protein modification; assembly and dynamics of lipoproteins and biological membranes; genetic disruptions of lipid regulatory proteins such as cell surface receptors leading to human disease.

Discussants:

Dr. Robert Scott Kiss (Co-coordinator), Block E, Glen site, EM1.2220

Tel: 514-934-1934 ext. 76410 (robert.kiss@mcgill.ca)

Dr. Tommy Nilsson (Co-coordinator), Block E, Glen site, E02.6210

Tel: 514-649-3293 (tommy.nilsson@mcgill.ca)

Prerequisite: BIOC311 or equivalent

Lectures: Tuesdays and Thursdays from 10:35am – 11:55am

First Class: January 5, 2023

Location: MCMED 903

Grading:

Midterm examination: 40%

Final examination: 50%

Participation and Presentation: 10%

Textbook:

Biochemistry of Lipids, Lipoproteins and Membranes (Fifth Edition; Eds. Vance and Vance). The textbook is a resource and is not required reading. The textbook will be provided to the students.

Syllabus – Winter 2023

Date			Lecture Title	Lecture
Jan.				
05R	10:35	10:55	Introduction-Welcome	
	10:55	11:55	Fatty acid biosynthesis-Kiss	1
10 T	10:35	11:55	Phospholipid biosynthesis-Kiss	2
12 R	10:35	11:30	Phospholipid transport and conversion-Kiss	3
	11:30	11:55	Summary of Paper Kiss	
17 T	10:35	11:30	Cholesterol synthesis and regulation-Kiss	4
	11:30	11:55	Summary of Paper Nilsson	

19 R	10:35	10:50	Presentation of Paper 01 by student	
	10:50	11:05	Presentation of Paper 02 by student	
	11:05	11:55	Cholesterol transport-1-Kiss	5
24 T	10:35	10:50	Presentation of Paper 03 by student	
	10:50	11:05	Presentation of Paper 04 by student	
	11:05	11:55	Cholesterol transport-2-Kiss	6
26 R	10:35	10:50	Presentation of Paper 05 by student	
	10:50	11:05	Presentation of Paper 06 by student	
	11:05	11:55	Cholesterol transport-3-Kiss	7
31 T	10:35	10:50	Presentation of Paper 07 by student	
	10:50	11:05	Presentation of Paper 08 by student	
	11:05	11:55	Cholesterol transport-4-Kiss	8
FEB				
02 R	10:35	10:50	Presentation of Paper 09 by student	
	10:50	11:05	Presentation of Paper 10 by student	
	11:05	11:55	Bile acid metabolism and regulation-1-Kiss	9
07 T	10:35	10:50	Presentation of Paper 11 by student	
	10:50	11:05	Presentation of Paper 12 by student	
	11:05	11:55	Discussion-Questions Before Mid-term	
09 R	10:35	11:55	<i>Midterm Exam</i>	
14 T	10:35	10:50	Presentation of Paper 13 by student	
	10:50	11:05	Presentation of Paper 14 by student	
	11:05	11:55	Bile acid metabolism and regulation-2-Kiss	10
16 R	10:35	10:50	Presentation of Paper 15 by student	
	10:50	11:05	Presentation of Paper 16 by student	
	11:05	11:55	Inositol Phosphates-Kiss	11
21T	10:35	10:50	Presentation of Paper 17 by student	
	10:50	11:05	Presentation of Paper 18 by student	
	11:05	11:55	Protein Transport - Nilsson	12
23 R	10:35	10:50	Presentation of Paper 19 by student	
	10:50	11:05	Presentation of Paper 20 by student	
	11:05	11:55	Lipid Droplet Formation - Nilsson	13
February 27th - to March 3rd – Reading Week				

March 07 T	10:35	10:50	Presentation of Paper 21 by student	
	10:50	11:05	Presentation of Paper 22 by student	
	11:05	11:55	The Metabolic Syndrome - Nilsson	14
09 R	10:35	10:50	Presentation of Paper 23 by student	
	10:50	11:05	Presentation of Paper 24 by student	
	11:05	11:55	Non-Alcoholic Fatty Liver Disease - Nilsson	15
14 T	10:35	10:50	Presentation of Paper 25 by student	
	10:50	11:05	Presentation of Paper 26 by student	
	11:05	11:55	Proteomics in Cell Biology and NAFLD- Nilsson	16
16 R	10:35	10:50	Presentation of Paper 27 by student	
	10:50	11:05	Presentation of Paper 28 by student	
	11:05	11:55	Role of Lipids in Fatty Liver Disease- Nilsson	17
21 T	10:35	10:50	Presentation of Paper 29 by student	
	10:50	11:05	Presentation of Paper 30 by student	
	11:05	11:55	Role of Lipids in Cancer- Nilsson	18
23 R	10:35	10:50	Presentation of Paper 31 by student	
	10:50	11:05	Presentation of Paper 32 by student	
	11:05	11:55	ER stress and Relevance to Disease- Nilsson	19
28 T	10:35	11:55		20
30 R				
Apr				
4 T	10:35	11:55	Lipophagy and Autophagy- Nilsson	21
6 R	10:35	11:55	Role of MTORC1 - Nilsson	22
11 T	10:35	11:55	Role of Rab18 - Kiss	23
13 R	10:35	11:55	Exam preparation-Question time	24

Marking Scheme:

Midterm exam (**Thursday, February 09, 2023, in class**) **40% of total mark**
(covers material up to and including Thursday, February 7, 2023)

Final exam (during regular exam period) **50% of total mark**
(covers material for the whole semester).

Final exam (due to the exceptional circumstances of the viral outbreak) will now be a take home written essay, consisting of two critical reviews. The students will have a choice of two topics from 5 options

and each topic will have 3 papers assigned. The student must write a complete summary of the topic (from all three papers and the relevant literature), discuss in depth the theme of the papers assigned, the most relevant experiments discussed in the papers, and then critically evaluate the work drawing upon the literature to support or refute the conclusions. Use of the internet and online sources is encouraged and should be included in the text as long as the sources are cited. Plagiarism is still forbidden. The topics will be given out on April 19, 2020, and the student must submit the two critical reviews by April 30, 2020 11:59PM EDT. Should there be any unusual circumstances that prevent the prompt and timely submission of these reviews, we should be informed of them in advance (conflicting exams or papers) or with a doctor's note.

If you miss writing the midterm exam, you MUST BRING a doctors' note to the main office, room 905, McIntyre Building within 1 WEEK of the exam date. In this case, a make-up midterm will be scheduled within the 2 weeks. If a legitimate doctor's note is not provided, you will receive a zero on the midterm and the final exam will be worth 50%.

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In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

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