

NUTRITIONAL ASPECTS OF LIPIDS

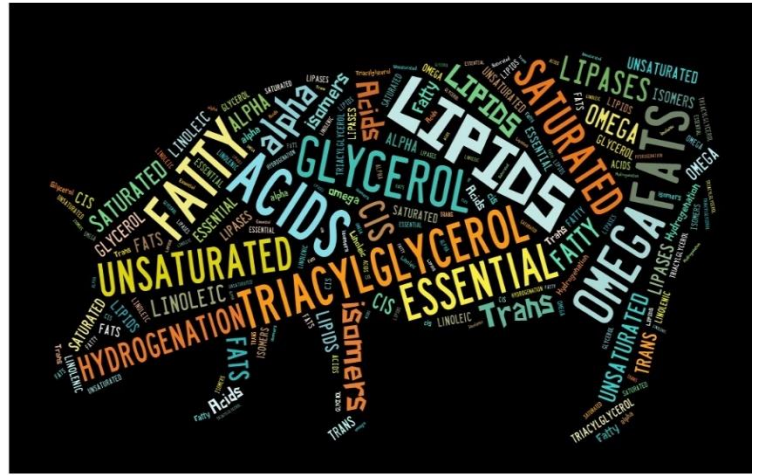
HUN 6301

3 CREDIT HOURS

SPRING 2019

ROOM MCCB 1108

TWO 75 MINUTE PERIODS BEGINNING AT
3:00 PM ON TUESDAY AND FRIDAY



middleearthbiochem.wordpress.com

INSTRUCTOR: Peggy R. Borum, Ph.D.
409 FSHN Building
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OFFICE HOURS: Tuesday and Friday from 2:00 PM to 3:00 PM or by appointment.

COURSE WEBSITE: <http://lss.at.ufl.edu>

COURSE COMMUNICATIONS: Communication is important to all of us. For email communication, use of the Canvas email is probably the better choice because the instructor's regular email box is often overflowing.

REQUIRED TEXT: We will use the following 10 journal articles published or accepted for publication in 2018 instead of a textbook:

Ludwig, D. S., et al. (2018). "Dietary fat: From foe to friend?" *Science* **362**(6416): 764-770.

Dyar, K. A., et al. (2018). "Atlas of Circadian Metabolism Reveals System-wide Coordination and Communication between Clocks." *Cell* **174**(6): 1571-1585 e1511.

Violante, S., et al. (2018). "Peroxisomes can oxidize medium- and long-chain fatty acids through a pathway involving ABCD3 and HSD17B4." *Faseb J*: fj201801498R.

Chen, L., et al. (2018). "Hepatocyte-specific Sirt6 deficiency impairs ketogenesis." *J Biol Chem*.

Leckey, J. J., et al. (2018). "High dietary fat intake increases fat oxidation and reduces skeletal muscle mitochondrial respiration in trained humans." Faseb J **32**(6): 2979-2991.

Wang, M., et al. (2018). "n-3 Polyunsaturated fatty acids for the management of alcoholic liver disease: A critical review." Crit Rev Food Sci Nutr: 1-14.

Merritt II, J. L., et al. (2018). "Fatty acid oxidation disorders." Annals of Translational Medicine.

Sodhi, C. P., et al. (2018). "Fat composition in infant formula contributes to the severity of necrotising enterocolitis." Br J Nutr **120**(6): 665-680.

Gutierrez-Casado, E., et al. (2018). "The impact of aging, calorie restriction and dietary fat on mitochondrial ultrastructure, dynamics and autophagy markers in mouse skeletal muscle." J Gerontol A Biol Sci Med Sci.

Zhu, T. B., et al. (2018). "Lipid metabolism in Alzheimer's disease." Brain Res Bull.

Feel like you many need a little background review and update on the current knowledge concerning the nutritional aspects of lipids? The instructor will present the following lectures using mainly material from the book entitled "**The Molecular Nutrition of Fats**" edited by Vinood B. Patel and published in 2018 by Elsevier:

Classes, Nomenclature, and Functions of Lipids and Lipid-Related Molecules and the Dietary Lipids

Lipid Metabolism: An Overview

Fatty Acids, Gut Bacteria, and Immune Cell Function

Omega-3 Fatty Acids and Epilepsy

Docosahexaenoic Acid (DHA): A Dietary Supplement With Promising Anticancer Potential

Strategies to Counter Saturated Fatty Acid (SFA)-Mediated Lipointoxication

You may be interested in reviewing the following two eBooks in the UF library:

Biochemistry of lipids, lipoproteins and membranes

edited by Neale Ridgway and Roger McLeod.

Published: Amsterdam : Elsevier, 2017.

<http://www.sciencedirect.com/science/book/9780444634382>

The fats of life: essential fatty acids in health and disease

Glen D. Lawrence.

Author: Lawrence, Glen D. 1948-

Published: New Brunswick, N.J. : Rutgers University Press, c2010.

<http://lib.mylibrary.com/Open.aspx?id=256241>

PURPOSE OF COURSE: The purpose of the course is to provide opportunities for students to increase their knowledge of the nutritional aspects of lipids, to critically read the current literature, to communicate the author's ideas, and to communicate their own ideas using traditional techniques and the latest techniques accepted by peer reviewed journals. A project addressing a real world nutrition problem will replace the traditional exams.

COURSE GOALS AND/OR OBJECTIVES: By the end of this course, students will:

- Practice reading and evaluating, in an organized written format, the current literature concerning the nutritional aspects of lipids.
- Demonstrate their skills at leading and participating in oral discussions concerning nutritional aspects of lipids.
- Apply some nutritional aspect of lipids to a current research problem facing the nutritional community.
- Provide editorial assistance to another student's application of some nutritional aspects of lipids to a current research problem facing the nutritional community.
- Demonstrate ability to communicate via a graphical abstract and a video abstract that are being used by more and more journals.

INSTRUCTIONAL METHODS: This class is designed to increase our knowledge of the nutritional aspects of lipids, to facilitate our critical thinking and application of our knowledge to a real world nutrition issue, and to provide opportunities for us to communicate our ideas.

Class presentation and participation - You will be assigned 2 recent articles which will be read by all the class before your presentations. Each article was published or accepted for publication in 2018 and addresses a current question about the nutritional aspects of lipids. You will present the information in the article and any relevant information that you choose. You will be graded on your presentation of the information and your ability to lead a discussion among your classmates on the topic.

For the class periods that you are a reader, you will post to the assignment tool in Canvas your review of the article using the following outline:

I. Questions being addressed by authors

II. Why the authors did what they did

III. What the authors did

IV. What the authors found

V. Authors' take home message

VI. My comments

VII. Contribution to our understanding of the nutritional aspects of lipids

You will also be graded on your verbal participation in the class discussion.

Class Project –David Ludwig, Walter Willett, Jeff Volek, and Marian Neuhouser, who have widely varying perspectives, published a review article in Science on November 16, 2018. In the article they summarized existing evidence to identify areas of broad consensus amid ongoing controversy regarding macronutrients and chronic disease. The first six controversies are listed below:

1. Do diets with various carbohydrate-to-fat proportions affect body composition (ratio of fat to lean tissue) independently of energy intake? Do they affect energy expenditure independently of body weight?
2. Do ketogenic diets provide metabolic benefits beyond those of moderate carbohydrate restriction? Can they help with prevention or treatment of cardiometabolic disease?
3. What are the optimal amounts of specific fatty acids (saturated, monounsaturated, polyunsaturated) in the context of a very-low-carbohydrate diet?
4. What is the relative importance for cardiovascular disease of the amounts of LDL cholesterol, HDL cholesterol, and triglycerides in the blood, or of lipoprotein particle size, for persons on diets with distinct fat-to-carbohydrate ratios? Are other biomarkers of equivalent or greater importance?
5. What are the effects of dietary fat amount and quality across the lifespan on risk of neurodegenerative, pulmonary, and other diseases that have not been well studied?
6. What are the long-term efficacies of diets with different carbohydrate-to-fat proportions in chronic disease prevention and treatment under optimal intervention conditions (designed to maximize dietary compliance)?

The purpose of this project is for each student to choose one of the controversies and address the issues listed as well as any other related issues identified by the student.

Graphical Abstracts - Even before wide use of written language by the general population, concepts and stories were communicated by drawings and oral communication. Scientific papers published before the widespread use of computers to prepare manuscripts had hand drawn figures and diagrams. Today every graduate student uses computers to generate graphs, tables, and diagrams. For quite a while many of us have looked at the inviting illustrations in textbooks and mechanistic cartoons in papers before reading the text. In recent years several scientific publishing companies have required or suggested a "graphical abstract" (http://www.cell.com/pb/assets/raw/shared/figureguidelines/GA_guide.pdf) and a "video abstract" (<http://www.cell.com/video-abstract-guidelines>) for each manuscript. As readers we can quickly look at the graphical abstract and video abstract to decide if we want to read the paper and then look at it again after reading the paper as a quick review of what we have just read. It is not easy to prepare a graphical abstract and video abstract. One has to have a very clear idea before preparing a very clear picture that communicates the idea to others. The process of preparing the graphical abstract and video abstract can assist in clarifying the idea in the author's mind.

It is a skill that is important to develop for many reasons including that it is likely to be required by more and more journals. For this class we will prepare graphical abstracts and video abstracts for the class project. For the first "exam", you will be assigned as an editor for another student's documents and you will be graded on the quality of the editorial advice you provide. For the second "exam" you will post your graphical abstract and video abstract that has benefitted from your editor's input and your continued development of your thoughts. You will be graded on the scientific quality of the information.

Some publisher websites with their specific information about graphical abstracts are:

<http://www.elsevier.com/authors/journal-authors/graphical-abstract>

http://www.cell.com/pb/assets/raw/shared/figureguidelines/GA_guide.pdf

https://www.thieme.de/statics/dokumente/thieme/final/de/dokumente/zw_synthesis/CFZ-Sample-Graphical-Abstracts.pdf

http://www.scilogs.com/on_the_road/software-for-drawing-graphical-abstracts/

<http://cmsw.mit.edu/glance-at-graphical-abstracts/>

<http://www.fems-microbiology.org/journals/graphical-abstract.html>

COURSE POLICIES:

ATTENDANCE POLICY: You have to be present in class in order to participate in class discussion

COURSE TECHNOLOGY: HUN 6301 is a blended course utilizing both Canvas and face to face lectures.

UF POLICIES:

UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES: Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

UNIVERSITY POLICY ON ACADEMIC MISCONDUCT: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

****NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. [Describe what is expected and what will occur as a result of improper behavior] <http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf>

GETTING HELP:

For issues with technical difficulties for E-learning in Sakai, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

**** Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.**

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources

- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

GRADING POLICIES:

Grades will be determined by adding the points obtained for each activity listed in the following table.

Assignment	Points
2 Class Presentations	40
Class participations	15
8 journal article notes	8
Editorial comments on research partners graphical abstracts (Exam 1)	10
Class project graphical and video abstracts (Exam 2)	27
Total	100

GRADING SCALE:

Final Grade	Total Points
A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62

There will be no curve in this course. Final grades will be simply calculated from the total accumulated points.

COURSE SCHEDULE:**Spring 2019 Course Schedule**

<u>Week 1</u>	
Tuesday January 08, 2019	Introduction to course and class project
Friday –, January 11, 2019	Module 1 Instructor led discussion of “Dietary fat: From foe to friend?” PowerPoint of discussion leader and outlines of the discussants must be posted by noon
<u>Week 2</u>	
Tuesday January 15, 2019	One on One discussion with Instructor concerning class project
Friday –, January 18, 2019	Module 2 Instructor led discussion of Classes, Nomenclature, and Functions of Lipids and Lipid-Related Molecules and the Dietary Lipids
<u>Week 3</u>	
Tuesday January 22, 2019	One on One discussion with Instructor concerning class project
Friday – January 25, 2019	Module 3 Instructor led discussion of Lipid Metabolism: An Overview
<u>Week 4</u>	
Tuesday January 28, 2019	One on One discussion with Instructor concerning graphical abstracts
Friday – February 01, 2019	Module 4 Instructor led discussion of Fatty Acids, Gut Bacteria, and Immune Cell Function
<u>Week 5</u>	
Tuesday February 05, 2019	One on One discussion with Instructor concerning class presentations

Friday – February 08, 2019	Module 5 Instructor led discussion of Omega-3 Fatty Acids and Epilepsy
<u>Week 6</u>	
Tuesday February 12, 2019	One on One discussion with Instructor concerning video abstracts
Friday – February 15, 2019	Module 6 Instructor led discussion of Docosahexaenoic Acid (DHA): A Dietary Supplement With Promising Anticancer Potential
<u>Week 7</u>	
Tuesday February 19, 2019	One on One discussion with Instructor concerning class presentations
Friday – February 22, 2019	Module 7 Instructor led discussion of Strategies to Counter Saturated Fatty Acid (SFA)-Mediated Lipointoxication
<u>Week 8</u>	
Tuesday February 26, 2019	One on One discussion with Instructor concerning graphical abstract
Friday – March 01, 2019	Module 8 Instructor led discussion of "Atlas of Circadian Metabolism Reveals System-wide Coordination and Communication between Clocks." PowerPoint of discussion leader and outlines of the discussants must be posted by noon
<u>Week 9</u>	
<u>Monday</u> <u>March</u> <u>04 –</u> <u>Friday</u> <u>March</u> <u>08, 2019</u>	Have a safe and fun Spring Break!
<u>Week 10</u>	
Tuesday March 12, 2019	Graphical abstract drafts for editor review must be posted to the discussion board by 5:00 PM

Friday – March 15, 2019	<p>Module 9</p> <p>Abdullah Alessa led discussion of "Peroxisomes can oxidize medium- and long-chain fatty acids through a pathway involving ABCD3 and HSD17B4."</p> <p>PowerPoint of discussion leader and outlines of the discussants must be posted by noon</p>
<u>Week 11</u>	
Tuesday March 19, 2019	<p>Editorial review of graphical abstract drafts must be posted to the discussion board by 5:00 PM</p>
Friday –, March 22, 2019	<p>Module 10</p> <p>Taylor Combs led discussion of "High dietary fat intake increases fat oxidation and reduces skeletal muscle mitochondrial respiration in trained humans."</p> <p>PowerPoint of discussion leader and outlines of the discussants must be posted by noon</p>
<u>Week 12</u>	
Tuesday March 26, 2019	<p>Module 11</p> <p>Jennifer Lee led discussion of "Hepatocyte-specific Sirt6 deficiency impairs ketogenesis."</p> <p>PowerPoint of discussion leader and outlines of the discussants must be posted by noon</p>
Friday - March 29, 2019	<p>Module 12</p> <p>Rebecca Solch led discussion of "n-3 Polyunsaturated fatty acids for the management of alcoholic liver disease: A critical review."</p> <p>PowerPoint of discussion leader and outlines of the discussants must be posted by noon</p>
<u>Week 13</u>	
Tuesday April 02, 2019	<p>Module 13</p> <p>Abdullah Alessa led discussion of "Fatty acid oxidation disorders."</p> <p>PowerPoint of discussion leader and outlines of the discussants must be posted by noon</p>
Friday – April 05, 2019	<p>Module 14</p> <p>Taylor Combs led discussion of "Fat composition in infant formula contributes to the severity of necrotising enterocolitis."</p> <p>PowerPoint of discussion leader and outlines of the discussants must be posted by noon</p>

<u>Week 14</u>	
Tuesday April 09, 2019	Module 15 Jennifer Lee led discussion of "The impact of aging, calorie restriction and dietary fat on mitochondrial ultrastructure, dynamics and autophagy markers in mouse skeletal muscle." PowerPoint of discussion leader and outlines of the discussants must be posted by noon
Friday – April 12, 2019	Module 16 Rebecca Solch led discussion of "Lipid metabolism in Alzheimer's disease." PowerPoint of discussion leader and outlines of the discussants must be posted by noon
<u>Week 15</u>	
Tuesday April 16, 2019	Graphical abstracts must be posted to the discussion board and to the assignment tool by noon
Friday – April 19, 2019	Video abstracts must be posted to the discussion board and to the assignment tool by noon
<u>Week 16</u>	
Tuesday April 23, 2019	Celebration of graphical abstracts and video abstracts

Disclaimer: This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.