NUTRITIONAL ASPECTS OF LIPIDS

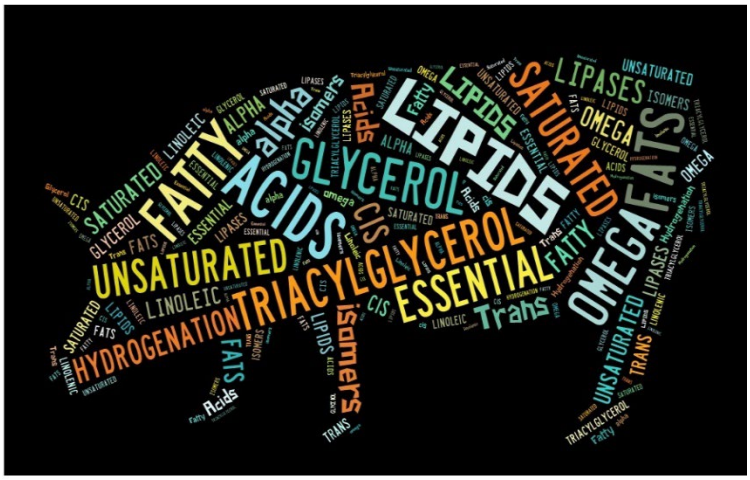
HUN 6301

3 CREDIT HOURS

SPRING 2022

ZOOM (link to room provided via canvas account)

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: 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 journal articles published instead of a textbook:

Presenter	Article #	Citation
Saiid	Article 1	**90423** **A roadmap for the characterization of energy metabolism in human cardiomyocytes derived from induced pluripotent stem cells** G. Emanuelli, A. Zoccarato, C. M. Reumiller, A. Papadopoulos, M. Chong, S. Rebs, et al. J Mol Cell Cardiol 2021 Vol. 164 Pages 136-147
Jeremy	Article 2	**90425** **Lauric Triglyceride Ameliorates High-Fat-Diet-Induced Obesity in Rats by Reducing Lipogenesis and Increasing Lipolysis and beta-Oxidation** J. Xia, P. Yu, Z. Zeng, M. Ma, G. Zhang, D. Wan, et al. J Agric Food Chem 2021 Vol. 69 Issue 32 Pages 9157-9166
Melissa	Article 3	**90424** **Structural Modifications Yield Novel Insights Into the Intriguing Pharmacodynamic Potential of Anti-inflammatory Nitro-Fatty Acids** N. Hellmuth, C. Brat, O. Awad, S. George, A. Kahnt, T. Bauer, et al. Front Pharmacol 2021 Vol. 12 Pages 715076
Lois	Article 4	**90426** **Decreased plasma n6: n3 polyunsaturated fatty acids ratio interacting with high C-peptide promotes non-alcoholic fatty liver disease in type 2 diabetes patients** H. H. Luo, M. D. Zhao, X. F. Feng, X. Q. Gao, M. Hong, M. L. Liu, et al. J Diabetes Investig 2021 Vol. 12 Issue 7 Pages 1263-1271
Saiid	Article 5	90317 **Omega-3 PUFAs Suppress IL-1beta-Induced Hyperactivity of Immunoproteasomes in Astrocytes** E. Zgorzynska, B. Dziedzic, M. Markiewicz and A. Walczewska Int J Mol Sci 2021 Vol. 22 Issue 11
Jeremy	Article 6	90411 **Decanoic Acid Stimulates Autophagy in D. discoideum** E. C. Warren, P. Kramar, K. Lloyd-Jones and R. S. B. Williams Cells 2021 Vol. 10 Issue 11
Melissa	Article 7	90267

		Low glycaemic diets alter lipid metabolism to influence tumour growth E. C. Lien, A. M. Westermark, Y. Zhang, C. Yuan, Z. Li, A. N. Lau, et al. Nature 2021 Vol. 599 Issue 7884 Pages 302-307
Lois	Article 8	90429 **The Role of Dietary Fats in the Development and Prevention of Necrotizing Enterocolitis** B. N. Alshaikh, A. Reyes Loredo, M. Knauff, S. Momin and S. Moossavi Nutrients 2021 Vol. 14 Issue 1
Saiid	Article 9	90431 **Dietary Supplementation throughout Life with Non-Digestible Oligosaccharides and/or n-3 Poly-Unsaturated Fatty Acids in Healthy Mice Modulates the Gut-Immune System-Brain Axis** K. Szklany, P. A. Engen, A. Naqib, S. J. Green, A. Keshavarzian, A. Lopez Rincon, et al. Nutrients 2021 Vol. 14 Issue 1
Jeremy	Article 10	90341 **Impact of Individual Dietary Saturated Fatty Acid Replacement on Circulating Lipids and Other Biomarkers of Cardiometabolic Health: A Systematic Review and Meta-analysis of RCTs in Humans** L. Sellem, M. Flourakis, K. G. Jackson, P. J. Joris, J. Lumley, S. Lohner, et al. Adv Nutr 2021
Melissa	Article 11	90432 **Effect of fat reformulated dairy food consumption on postprandial flow-mediated dilatation and cardiometabolic risk biomarkers compared with conventional dairy: a randomized, controlled trial** O. Markey, D. Vasilopoulou, K. E. Kliem, C. C. Fagan, A. S. Grandison, R. Sutton, et al. Am J Clin Nutr 2022
Lois	Article 12	90430 **Effects of changing from a diet with saturated fat to a diet with n-6 polyunsaturated fat on the serum metabolome in relation to cardiovascular disease risk factors** K. Pigsborg, G. Gurdeniz, O. D. Rangel-Huerta, K. B. Holven, L. O. Dragsted and S. M. Ulven Eur J Nutr 2022

Saiid	Article 13	90475 **Effects of n-3 Fatty Acid Supplements in Elderly Patients After Myocardial Infarction: A Randomized, Controlled Trial** A. A. Kalstad, P. L. Myhre, K. Laake, S. H. Tveit, E. B. Schmidt, P. Smith, et al. Circulation 2021 Vol. 143 Issue 6 Pages 528-539
Jeremy	Article 14	90476 **Small Amounts of Dietary Medium-Chain Fatty Acids Protect Against Insulin Resistance During Caloric Excess in Humans** A. M. Lundsgaard, A. M. Fritzen, K. A. Sjoberg, M. Kleinert, E. A. Richter and B. Kiens Diabetes 2021 Vol. 70 Issue 1 Pages 91-98
Melissa	Article 15	90474 **Long-chain monounsaturated fatty acids improve endothelial function with altering microbial flora** R. Tsutsumi, Y. Yamasaki, J. Takeo, H. Miyahara, M. Sebe, M. Bando, et al. Transl Res 2021 Vol. 237 Pages 16-30
Lois	Article 16	90027 **Peroxidation of n-3 and n-6 polyunsaturated fatty acids in the acidic tumor environment leads to ferroptosis-mediated anticancer effects** E. Dierge, E. Debock, C. Guilbaud, C. Corbet, E. Mignolet, L. Mignard, et al. Cell Metab 2021 Vol. 33 Issue 8 Pages 1701-1715 e5

Feel like you many need a little background review and update on the current knowledge concerning the nutritional aspects of lipids? There are PowerPoint files on the course Canvas account about the following topics 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.myilibrary.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 social media. 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.

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 4 recent articles which will be read by all the class before your presentations. Each article 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 – Important questions concerning nutritional aspects of lipid metabolism include the following what, why, how, and who questions dietary intake:

What:

- Saturated fatty acids? / Does it make a difference which one?
- Monounsaturated fatty acids? / Does it make a difference which one?
- Omega 3 polyunsaturated fatty acids? / Does it make a difference which one?
- Omega 6 polyunsaturated fatty acids? / Does it make a difference which one?

Why:

- Synthesis/essentiality
- Metabolism for energy
- Metabolism for structure
- Metabolism for regulation of mammalian metabolism
- Metabolism for regulation of microbiome
- Metabolism increasing or decreasing risk for disease

How: Consult FoodData Central

- What specific foods do you recommend emphasizing in the diet?
- What specific food do you recommend de-emphasizing in the diet?

Who:

- Preterm Neonates in Neonatal Intensive Care Unit
- Healthy Full-Term Neonates from birth to 2 years of age and the same population with a diagnosis of overweight/obesity
- Healthy Children and the same population with a diagnosis of overweight/obesity
- Healthy Adolescents and the same population with a diagnosis of overweight/obesity
- Healthy Young Adults and the same population with a diagnosis of overweight/obesity
- Healthy Mature Adults and the same population with a diagnosis of overweight/obesity
- Healthy Elders and the same population with a diagnosis of overweight/obesity

Audience:
Students, healthcare professionals, and scientists that view the website at https://borum.ifas.ufl.edu/ looking for a page entitled Why The Individual Fatty Acids In The Diet Matter". The information should be presented as text, diagrams, and short videos.

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
4Class Presentations	40
12 journal article notes and class participation	12
Website text / diagram for class project	24
Video for class project	24
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 2022 Course Schedule

Week 2	
Tuesday January 11, 2022	**Introduction to course and class project** "**The Molecular Nutrition of Fats**" edited by Vinood B. Patel and published in 2018 by Elsevier
Friday –, January 14, 2022	**Dig a little deeper into Class Projects** **Jeremy - Saturated Fatty Acids** **Melissa - Monounsaturated Fatty Acids** **Lois - n6 Polyunsaturated Fatty Acids** **Saiid -n3 Polyunsaturated Fatty Acids**
Week 3	
Tuesday January 18, 2022	Article 1 – **Saiid** A roadmap for the characterization of energy metabolism in human cardiomyocytes derived from induced pluripotent stem cells
Friday –, January 21, 2022	Article 2 – **Jeremy** Lauric Triglyceride Ameliorates High-Fat-Diet-Induced Obesity in Rats by Reducing Lipogenesis and Increasing Lipolysis and beta-Oxidation
Week 4	
Tuesday January 25, 2022	Article 3 – **Melissa** Structural Modifications Yield Novel Insights Into the Intriguing Pharmacodynamic Potential of Anti-inflammatory Nitro-Fatty Acids
Friday – January 28, 2022	Article 4 **– Lois** Decreased plasma n6: n3 polyunsaturated fatty acids ratio interacting with high C-peptide promotes non-alcoholic fatty liver disease in type 2 diabetes patients
Week 5	
Tuesday February 01, 2022	**Saturated Fatty Acids Progress Report 1 - Jeremy** **Monounsaturated Fatty Acids Progress Report 1 - Melissa**
Friday – February 04, 2022	**N6-Polyunsaturated Fatty Acids Progress Report 1 - Lois** **N3-Polyunsaturated Fatty Acids Progress Report 1 - Saiid**
Week 6	

Tuesday February 08, 2022	Article 5 **– Saiid** Omega-3 PUFAs Suppress IL-1beta-Induced Hyperactivity of Immunoproteasomes in Astrocytes
Friday – February 11, 2022	Article 6 **– Jeremy** Decanoic Acid Stimulates Autophagy in D. discoideum
Week 7	
Tuesday February 15, 2022	Article 7 **– Melissa** Low glycaemic diets alter lipid metabolism to influence tumour growth
Friday – February 18, 2022	Article 8 **– Lois** The Role of Dietary Fats in the Development and Prevention of Necrotizing Enterocolitis
Week 8	
Tuesday February 22, 2022	**Saturated Fatty Acids Progress Report 2 - Jeremy** **Monounsaturated Fatty Acids Progress Report 2 - Melissa**
Friday – February 25, 2022	**N6-Polyunsaturated Fatty Acids Progress Report 2 - Lois** **N3-Polyunsaturated Fatty Acids Progress Report 2 - Saiid**
Week 9	
Tuesday March 01, 2022	Article 9 **– Saiid** Dietary Supplementation throughout Life with Non-Digestible Oligosaccharides and/or n-3 Poly-Unsaturated Fatty Acids in Healthy Mice Modulates the Gut-Immune System-Brain Axis
Friday – March 04, 2022	Article 10 **– Jeremy** Impact of Individual Dietary Saturated Fatty Acid Replacement on Circulating Lipids and Other Biomarkers of Cardiometabolic Health: A Systematic Review and Meta-analysis of RCTs in Humans
Week 10	
March 07-11, 2022	**Have a great Spring Break!!**
Week 11	
Tuesday March 15, 2022	Article 11 **– Melissa**

	Effect of fat reformulated dairy food consumption on postprandial flow-mediated dilatation and cardiometabolic risk biomarkers compared with conventional dairy: a randomized, controlled trial
Friday – March 18, 2022	Article 12 **– Lois** Effects of changing from a diet with saturated fat to a diet with n-6 polyunsaturated fat on the serum metabolome in relation to cardiovascular disease risk factors

	<u>Week 12</u>
Tuesday March 22, 2022	**Draft of Saturated Fatty Acids Website Text and Video Script - Jeremy** **Draft of Monounsaturated Fatty Acids Website Text and Video Script - Melissa**
Friday - March 25, 2022	**Draft of N6-Polyunsaturated Fatty Acids Website Text and Video Script - Lois** **Draft of N3-Polyunsaturated Fatty Acids Website Text and Video Script - Saiid**
	<u>Week 13</u>
Tuesday March 29, 2022	Article 13 **– Saiid** Effects of n-3 Fatty Acid Supplements in Elderly Patients After Myocardial Infarction: A Randomized, Controlled Trial
Friday – April 01, 2022	Article 14 – **Jeremy** Small Amounts of Dietary Medium-Chain Fatty Acids Protect Against Insulin Resistance During Caloric Excess in Humans
	<u>Week 14</u>
Tuesday April 05, 2022	Article 15 – **Melissa** Long-chain monounsaturated fatty acids improve endothelial function with altering microbial flora
Friday – April 08, 2022	Article 16 – **Lois** Peroxidation of n-3 and n-6 polyunsaturated fatty acids in the acidic tumor environment leads to ferroptosis-mediated anticancer effects
	<u>Week 15</u>
Tuesday April 12, 2022	**Final Saturated Fatty Acids Video - Jeremy** **Final Monounsaturated Fatty Acids Video - Melissa** **Final N6-Polyunsaturated Fatty Acids Video - Lois** **Final N3-Polyunsaturated Fatty Acids Video - Saiid**

Friday – April 15, 2022	**Final Saturated Fatty Acids Website Text - Jeremy** **Final Monounsaturated Fatty Acids Website Text - Melissa** **Final N6-Polyunsaturated Fatty Acids Website Text - Lois** **Final N3-Polyunsaturated Fatty Acids Website Text - Saiid**
Week 16	
Tuesday April 19, 2022	**Celebration**

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.