

## NUTC 0285: Current Controversies in Nutrition Science Summer 2024

### Welcome to NUTC 0285!

Welcome to Current Controversies in Nutrition Science! We're going to have a great time this semester exploring controversial topics in nutrition science and how to approach sources of nutrition information with a critical eye. My name is Dr. Nicole Schultz Nintean and I'll be your professor. You can call me Nicole. I've been teaching this course for 4 years. I always enjoy teaching Current Controversies in Nutrition Science because students leave the course empowered to answer common nutrition questions from family and friends.

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. There are [confidential resources](#) available at Tufts that can assist you in managing these challenges.

### Important Information:

**Class Meetings:** Online, via Canvas

**Instructor(s):** Dr. Nicole Schultz Nintean, PhD, MPH (she/her/hers)  
Email: [nicole.schultz@tufts.edu](mailto:nicole.schultz@tufts.edu)

Pre-recorded lectures are presented by Dr. Adela Hruby and Dr. Nicole Nintean

**Semester Hour Units:** 3

**Prerequisites:** None

### Course Communications:

I appreciate hearing questions from students. If you are unable to meet with me during office hours, you are welcome to email questions to me or email to set up an alternative time to speak.

### Office Hours:

**Instructor:** Wednesdays, 2-4pm Eastern Time, Zoom: <https://tufts.zoom.us/my/n.schultz>

Weekly office hours are a dedicated time that I am available to answer your questions, discuss course content, and generally be of support. Please email me to if you'd like to attend. If you would like help in the course but have a scheduling conflict that prevents you from attending my regular office hours, please email me to schedule an appointment at an alternative time. Talking with students is a highlight of my job — I look forward to speaking with you!

## Course Summary:

Virtually no discipline attracts more public attention or generates more controversies than nutrition. The reasons for this vary. Food and nutrition can be viewed through multiple lenses: the personal, familial, communal, cultural, political, historical, and scientific. This course explores the scientific underpinnings of several hot topics and controversies, which will be examined from the perspectives of scientists and consumers (of food and media), with an undercurrent fostering self-understanding of implicit biases. The class will engage in debates and discussions designed to illuminate different perspectives. Students will have the opportunity to research, evaluate, and present their findings on a nutrition-related topic that is of concern to them.

## Course Goals:

By the end of the course, you will:

1. Critically appraise your own biases in approaching current hot topics and controversies, in approaching sources of information about these topics, and where such biases originated
2. Critically evaluate sources of non-scientific nutrition information and misinformation, including traditional and “new” media, as well as the nutrition information itself, to become more informed consumers
3. Summarize the state of scientific evidence and the gaps in knowledge of a given topic
4. Ascertain the scientific, cultural, media, and/or political origins of nutrition controversies

## Texts or Materials:

With the exception of the book (below), all assigned readings listed on the schedule will be available for the duration of the semester on Canvas (<https://canvas.tufts.edu>), or via the Hirsch Health Sciences Library access system, in cases where finding the literature is part of the assignment. In this course, we rely primarily on popular media and similar readings, supplemented with peer-reviewed articles published in major medical and nutrition journals for those hoping to gain more depth of understanding (these are marked as “Optional”). Reading studies will be new to most of you, and you are not expected to approach these articles as scientists, or to understand every part of them. You will be briefly introduced to how to scan a paper and how to approach it for the purposes of this course.

The required book, available on Amazon or from your favorite bookseller:

Levinovitz, Alan. *The Gluten Lie: And Other Myths About What You Eat*. Regan Arts, New York, NY. 2015. ISBN-10: 1941393063. ISBN-13: 978-1941393062.

## How to be Successful in this Course:

### Assignments and Grading:

Your grade in this course will be determined by reflections, discussions, and a variety of assignments. Points will be awarded for each, and an overall course score will be calculated from the weights given below:

Reflections (10 total, 2.5 points each)	25%
Discussions (6 total, 5 points each)	30%
Assignments (9 total, 5 points each)	45%

**Reflections:** Weekly 3-2-1 reflections ask you to share 3 things you learned, 2 examples of how these ideas, issues and insights could or do apply in your personal life, and 1 unresolved “something,” which you can express as a question, name as an area of confusion, or point to as a difficulty in your understanding. A rubric will be used and made available to you for you to see ahead of time.

**Discussions:** You will complete an online discussion after each controversy. You are required to submit an original post as well as reply to two students. Discussions allow you to engage with other students and learn from their insights and experiences.

**Assignments:** The assignments in this course are designed to allow you to practice and demonstrate that you understand the course and module objectives. They are both reflective and evaluative. Your Final Project will allow you to explore a controversy that is of interest to you. Rubrics will be used and made available to you for you to see ahead of time.

## Grading Range:

A passing grade in the course is B- or better. Course grades will be based on the below (subject to revision during the course):

90–100	A range (90–<93 = A-, 93+ = A, A+ given for superlative work)
80–89	B range (80–<83 = B-, 83–<87 = B, 87–<90 = B+)
70–79	C range (70–<73 = C-, 73–<77 = C, 77–<80 = C+)
60–69	D range (60–<63 = D-, 63–<67 = D, 67–<70 = D+)
<60	F

## Instructions for Submission of Assignments and Exams:

Written assignments, except for discussion transcripts/videos, should be submitted in Word, 1-inch margins, 11-point font, single-spaced, on the Canvas site. All assignments, reflections, and discussion postings must be submitted by Sunday the week they are assigned, no later than 11:59PM EST/EDT or your local time, whichever is later, unless otherwise specified. Please let your instructor know if you are taking the course in a time zone other than the east coast of the U.S. Late assignments will be accepted; however, 10% will be deducted for every day late. That said, if you have extenuating circumstances, please notify the instructor.

## Academic Conduct:

You are responsible for upholding the highest standards of academic integrity, as specified in the Friedman School’s Policies and Procedures Handbook located at this web page: <https://nutrition.tufts.edu/about/policies-and-procedures>, as well as Tufts University’s policies (<https://students.tufts.edu/community-standards/support-resources/academic-integrity-resources>). This includes understanding and avoiding plagiarism, which is defined as the unacknowledged use of someone else’s published or unpublished work. It is the responsibility of each student to understand and comply with academic integrity standards, as violations will be sanctioned by penalties ranging from failure on an assignment and the course to dismissal from the school.

## Accommodation of Disabilities:

Tufts University is committed to providing equal access and support to all students through the provision of reasonable accommodations so that each student may access their curricula and achieve their personal and academic potential. If you have a disability that requires reasonable accommodations, please contact the Friedman School Assistant Dean of Student Affairs at 617-636-6719 to make arrangements for determination of appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

## AI Policy:

In this course, you may **not** submit any work generated by an AI program as your own. This is a violation of [Tufts Academic Integrity](#) policies and subject to disciplinary action. However, you may use AI tools for your learning, just as you can collaborate with your peers for things such as brainstorming, getting feedback, revising, or editing your own work. Please note that the material generated by these programs may be inaccurate, incomplete, or otherwise problematic. Many of these AI tools retain the rights to use your information and the content shared with them in a variety of ways. Beware that use of AI may also stifle your own independent thinking and creativity. If you use AI in this course, please follow these guidelines:

- Cite all AI tools when used or referred to in assigned work. In an AI citation, provide (1) the prompt you used, (2) the name of the AI tool and, if available, the version, (3) the company that provides the tool, (3) the date you used it, and (4) the AI url. Note that the AI tool is NOT an author. See also [“How to Cite Generative AI”](#) from the MLA.
- Identify the way it contributed to your work. For example, you can include a statement that you asked an AI to “identify any grammatical or spelling errors” in your writing, or you used it to get started in thinking about topics for your assignment. Any statement directly generated by an AI system should be in quotes. If you have questions, please reach out to the instructor.

## Course Overview:

The course begins on May 22<sup>nd</sup> and continues through “Final Exam Week” (August 19–25). This 14-week course is primarily organized around a handful of current hot topics and controversies, presented as case studies supported primarily by popular media pieces, accompanied by relevant research for those willing to explore and learn at a deeper level. These topics are organized in a way to allow each student to acquire greater skill in understanding the origins of putative controversies, how media often drives controversies, and how nutrition scientists understand and approach these topics.

You will find the course’s Canvas site is organized by weekly modules, with all lectures, readings and assignments for the week released two weeks in advance to accommodate summer schedules.

<b>WEEK OF CLASS &amp; DATE</b>	<b>COURSE TOPIC</b>	<b>ASSIGNMENTS DUE BY END OF WEEK (11:59PM ET SUNDAY)</b>
Week 1 (May 22-26)	Course Introduction	Getting to Know You Survey <b>Discussion: Class Introductions</b>
Week 2 (May 27-June 2)	Personal Biases and Reading Nutrition News	<i>A1. My World View</i> (CO 01)
Week 3 (June 3-9)	Casting a Critical Eye on Nutrition Information	<i>A2. Is This Legit?</i> (CO 02)
Week 4 (June 10-16)	Topic 1: Saturated Fat, Part 1	3-2-1 Reflection 1 (COs 01, 03, 04)
Week 5 (June 17-23)	Topic 1: Saturated Fat, Part 2	3-2-1 Reflection 2 (COs 01, 03, 04)
Week 6 (June 24-June 30)	Topic 1: Saturated Fat, Part 3	3-2-1 Reflection 3 (COs 01, 03, 04) <i>A3. What Topics Do You Think Are Controversial?</i> (COs 01-04)

		<b>Canvas Discussion #1</b> (COs 03, 04)
Week 7 (July 1-7)	Topic 2: Grains, Gluten, and Celiac, Part 1	3-2-1 Reflection 4 (COs 01, 03, 04)
Week 8 (July 8-14)	Topic 2: Grains, Gluten, and Celiac, Part 2	3-2-1 Reflection 5 (COs 01, 03, 04) <i>A4. How Has Your Thinking Evolved?</i> (CO 02) <b>Canvas Discussion #2</b> (COs 03, 04)
Week 9 (July 15-21)	Topic 3: Carb-phobia and Associated Diets, Part 1	3-2-1 Reflection 6 (COs 01, 03, 04)
Week 10 (July 22-28)	Topic 3: Carb-phobia and Associated Diets, Part 2	3-2-1 Reflection 7 (COs 01, 03, 04) <i>A5. Identify a Final Project Topic</i> <b>Canvas Discussion #3</b> (COs 03, 04)
Week 11 (July 29-Aug 4)	Topic 4: Dietary Supplements, Part 1	3-2-1 Reflection 8 (COs 01, 03, 04) <i>A6. Supplement Claims</i> (COs 03, 04)
Week 12 (Aug 5-11)	Topic 4: Dietary Supplements, Part 2	3-2-1 Reflection 9 (COs 01, 03, 04) <i>A7. Outline of Final Project Topic</i> <b>Canvas Discussion #4</b> (COs 03, 04)
Week 13 (Aug 12-18)	Topic 5: Organic vs. Conventional Foods, Part 1	3-2-1 Reflection 10 (COs 01, 03, 04) <i>A8. Video Presentation of Final Project</i>
Week 14 (Aug 19-25)	Topic 5: Organic vs. Conventional Foods, Part 2	<i>A9. Final Project due</i> (COs 01-04) <b>Canvas Discussion #5</b> (COs 03, 04) Please complete the Course Evaluation

This schedule is subject to modification at the instructor's discretion.

## Topics, Assignments, and Learning Objectives for Each Class Session:

### Weeks 1 through 3

In this first part of the course, we cover the introduction to the course and the course's theoretical approach, and, moreover, begin to explore the world view with which you enter this exploration of hot topics and controversies. Your own beliefs and biases will predispose you to accepting or arguing against contradictory evidence, information, or sources. Therefore, becoming aware of these is key to your understanding how you approach the topics that follow.

#### Week 1 (May 22-26)

**Course Topic:** Course Introduction

**Required Lectures/Materials:**

Watch 1 lecture:

- Course Introduction

Read:

- Introduction in *The Gluten Lie*.

**Assignments Due:**

**Review the syllabus. Organize your schedule. Get familiar with the work ahead.**

**Complete the "Getting to Know You" survey.**

**Participate in the Class Introductions Discussion.**

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#### Week 2 (May 27-June 2)

**Course Topic:** Personal Biases and Reading Nutrition News

**Learning Objectives:**

- Identify and describe your own personal beliefs about specific topics in food/nutrition.
- Investigate some of the origins of these beliefs and recognize how these beliefs affect your daily dietary practices.
- Explore the rigidity or fluidity of these beliefs in the face of supporting or contradictory evidence.

**Required Lectures/Materials:**

Watch 2 lectures:

- Understanding Your Nutrition and Media World Views
- Wheat from Chaff: How to Read Nutrition News with a Critical Eye and Identify Nutrition Experts and Imposters

Read:

- Chapters 1, 2, and 3 in *The Gluten Lie*.
- Freeman, Andrew M., et al. Trending Cardiovascular Nutrition Controversies. *JACC*. 2017; 69(9). Accessible at <http://www.onlinejacc.org/content/69/9/1172>

**Assignments Due:**

**A1. My World View (CO 01)**

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#### Week 3 (June 3-9)

## Course Topic: Casting a Critical Eye on Nutrition Information

### Learning Objectives:

- Identify signatures of nutrition quackery versus nutrition expertise.
- Review and practice strategies to identify misleading nutrition information in popular and social media, blogs, infomercials, etc.

### Required Lectures/Materials:

Watch 2 lectures:

- Whom Do We Trust and Why?
- Casting a Critical Eye on Nutrition Information

Read:

- Chapters 4, 5, and 6, and the “Unpacked Diet” sections in *The Gluten Lie*.
- “Improving Public Understanding: Guidelines for Communicating Emerging Science on Nutrition, Food Safety, and Health”. *Journal of National Cancer Institute*. 1998, 90(3).

### Assignments Due:

#### A2. Is This Legit? (CO 02)

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## Weeks 4 through 6

During these weeks we begin investigating our first topic: saturated fat and specifically its role in heart health. We begin with a high-level overview of how nutrition science is conducted, how scientists accrue evidence in a given field, and how they rank different kinds of evidence. We then move into an exploration of evidence and arguments for/against the role of saturated fat in human health, including a brief review of basic lipid-related physiology.

### Week 4 (June 10-16)

#### Course Topic: Saturated Fat, Part 1

### Learning Objectives:

- Explain the basics of the scientific method/approach.
- Distinguish the major types of research studies and describe the hierarchy of scientific evidence.
- Describe how nutrition scientists tend to view research and accruing evidence.
- List the different types of dietary fat and their dietary sources.
- Broadly summarize the current view of the physiological role of dietary fats in human heart health.

### Required Lectures/Materials:

Watch 3 lectures:

- How Does “Science” Work?
- Getting the Gist of Nutrition Research When You’re Not a Nutrition Scientist
- The Physiology of Saturated Fat and Heart Health, in Brief

Read:

- [Read through the Executive Summary, at least] *Scientific Report of the 2020 Dietary Guidelines Advisory Committee*. 2020. U.S. Department of Agriculture (USDA). <https://www.dietaryguidelines.gov/2020-advisory-committee-report>
- [Review of latest understanding/evidence] Chapter 65: Nutrition in the Prevention of Coronary Heart Disease and the Management of Lipoprotein Disorders. Ed: Ernst J. Schaefer, in Ross, A. Catharine. (2014). *Modern nutrition in*

*health and disease*. (11th ed. / editors, A. Catharine Ross [and others]. ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins. Accessible for free online via Tufts Hirsh Health Sciences Library.

- [Optional in-depth biology review] Chapter 4: Lipids, Sterols, and Their Metabolites. Ed: Peter J. H. Jones and Todd Rideout, in Ross, A. Catharine. (2014). *Modern nutrition in health and disease*. (11th ed. / editors, A. Catharine Ross [and others]. ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins. Accessible for free online via Tufts Hirsh Health Sciences Library.

**Assignments Due:**

**3-2-1 Reflection** (COs 01, 03, 04)

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**Week 5 (June 17-23)**

**Course Topic:** Saturated Fat, Part 2

**Learning Objectives:**

- Summarize the readings from the nutrition science literature.
- Outline the history of dietary fat recommendations in the US, including the general timeline of evidence and the current state of the evidence on saturated fat.

**Required Lectures/Materials:**

Watch 2 lectures:

- Dietary Fat: A Brief History of Guidelines and Recommendations
- Saturated Fat: A Closer Look at the Timeline of Evidence, Part 1

Read:

- [Optional original research] Chowdhury, R, et al. Association of dietary, circulating, and supplement fatty acids with coronary risk: a systematic review and meta-analysis. *Ann Intern Med*. 2014; 160(6): 398-406.
- [Response to Chowdhury, et al.] Bittman, M. "Butter is back." *The New York Times*. March 25, 2014. Accessible at <http://www.nytimes.com/2014/03/26/opinion/bittman-butter-is-back.html>
- [Optional original research] Li, Y, et al. Saturated fat as compared to unsaturated fats and sources of carbohydrates in relation to risk of coronary heart disease: A prospective cohort study. *JACC*. 2015; 66(14): 1538-1548.
- [Response to Li, et al.] Boodman, E. "Replace bad fats with good foods for heart health, study says." STAT. Posted September 28, 2015. Accessible at: <http://www.bostonglobe.com/metro/2015/09/28/replace-bad-fats-with-good-foods-for-healthy-heart-study-shows/PKczKjreFQHfxSdyZ0H1xJ/story.html>

**Assignments Due:**

**3-2-1 Reflection** (COs 01, 03, 04)

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**Week 6 (June 24-June 30)**

**Course Topic:** Saturated Fat, Part 3 (Conclusion)

**Learning Objectives:**

- Examine methods used in the nutrition science literature.
- Outline meta-analytic methods, their uses and their limitations.
- Identify the central arguments for/against current guidelines on saturated fat in human health.

**Required Lectures/Materials:**

Watch 1 lecture:

- Saturated Fat: A Closer Look at the Timeline of Evidence, Part 2



Read:

- [Optional original research] Pimpin L, et al. Is Butter Back? A Systematic Review and Meta-Analysis of Butter Consumption and Risk of Cardiovascular Disease, Diabetes, and Total Mortality. 2016. *PLoS ONE* 11(6): e0158118.
- [Response to Pimpin, et al.] Wessel, L. "Butter doesn't increase risk of heart disease after all." STAT. Posted June 29, 2016. Accessible at <https://www.statnews.com/2016/06/29/butter-cardiovascular-saturated-fat/>
- [Optional original research] Dehghan, Mahshid, et al. Associations of fats and carbohydrate intake with cardiovascular disease and mortality in 18 countries from five continents (PURE): a prospective cohort study. *The Lancet*. 2017; 390(10107): 2050–2062. Accessible at [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(17\)32252-3/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)32252-3/abstract)
- [Response to Dehghan, et al.] "PURE study makes headlines, but the conclusions are misleading." The Nutrition Source. Harvard T.H. Chan School of Public Health. September 8, 2017. Accessible at <https://www.hsph.harvard.edu/nutritionsource/2017/09/08/pure-study-makes-headlines-but-the-conclusions-are-misleading/>
- [Response to Dehghan, et al.] Kahleova, Hana. "PURE Study: Killer Carbs or Poor Living Conditions?" Physicians Committee For Responsible Medicine. September 8, 2017. Accessible at <https://www.pcrm.org/news/news-releases/pure-study-killer-carbs-or-poor-living-conditions>

**Assignments Due:**

**A3. What Topics Do You Think Are Controversial?** (COs 01-04)

**3-2-1 Reflection** (COs 01, 03, 04)

**Canvas Discussion #1** (COs 03, 04)

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## Weeks 7 and 8

Our second topic is the healthfulness of grains, with the related topics of celiac disease and gluten sensitivity. As students are undoubtedly aware, most healthy diet recommendations include avoiding refined grains (white flour, pastries, white bread, etc.). But there are several popular dietary movements that go further and shun grains altogether, whether wheat, oats, rye, etc. The arguments underlying the grain-free approach vary but primarily focus on the evolution of humans and their diets. We explore this literature and some of the popular diets to assess the evidence about the healthfulness of grains.

### Week 7 (July 1-7)

**Course Topic:** Grains, Gluten, and Celiac, Part 1

**Learning Objectives:**

- Distinguish grains from non-grains (i.e., other seeds), including their refining processes, and list what makes a grain a whole grain.
- Describe celiac disease and contrast it with "gluten sensitivity" and related gastrointestinal conditions.

**Required Lectures/Materials:**

Watch 1 lecture:

- Grains, Gluten, Celiac: Understanding the Basics

Read:

- "What's a Whole Grain? A Refined Grain?" Oldways Whole Grains Council. Accessible at <https://wholegrainscouncil.org/whole-grains-101/whats-whole-grain-refined-grain>
- "Celiac Disease. Overview." NIH NIDDK. Accessible at <https://www.niddk.nih.gov/health-information/digestive-diseases/celiac-disease>
- [Optional original research] Biesiekierski, Jessica R., et al. Gluten Causes Gastrointestinal Symptoms in Subjects Without Celiac Disease: A Double-Blind Randomized Placebo-Controlled Trial. *American Journal of*

Gastroenterology. 2011; 106: 501-514. Accessible at: <https://wellspringofhealth.com/wp-content/uploads/2015/08/Gluten-Causes-Gastrointestinal-Symptoms-in-Subjects-Without-Celiac-Disease-2011.pdf>

- [Optional original research] Biesiekierski, Jessica R., et al. No effects of gluten in patients with self-reported non-celiac gluten sensitivity after dietary reduction of fermentable, poorly absorbed, short-chain carbohydrates. *Gastroenterology*. 2013; 145(2): 320-328. Accessible at: <https://www.ncbi.nlm.nih.gov/pubmed/23648697>

### **Assignments Due:**

**3-2-1 Reflection** (COs 01, 03, 04)

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## **Week 8 (July 8-14)**

**Course Topic:** Grains, Gluten, and Celiac, Part 2 (Conclusion)

### **Learning Objectives:**

- Discuss evidence regarding the healthfulness and potential unhealthfulness of grains
- Assess the validity of some of the arguments for/against including grains in the diet

### **Required Lectures/Materials:**

Watch 1 lecture:

- Gluten: Hypotheses vs. Hysteria?

Read:

- Specter, Michael. "Against the Grain: Should you go gluten-free?" *The New Yorker*. November 3, 2014. Accessible at: <https://www.newyorker.com/magazine/2014/11/03/grain>
- Fasano, Alessio, et al. Nonceliac Gluten Sensitivity. *Gastroenterology*. 2015; 148(6): 1195-1204. Accessible at <http://www.sciencedirect.com/science/article/pii/S0016508515000293>
- [Optional original research] Kim, Hyun-seok, et al. Time Trends in the Prevalence of Celiac Disease and Gluten-Free Diet in the US Population: Results From the National Health and Nutrition Examination Surveys 2009-2014. *JAMA Intern Med*. 2016; 176(11): 1716-1717. Accessible at <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2547202>
- Talley, Nicholas J., et al. Celiac Disease and Nonceliac Gluten or Wheat Sensitivity: The Risks and Benefits of Diagnosis. *JAMA Intern Med*. 2017; 177(5): 615-616. Accessible at <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2611959>

### **Assignments Due:**

**A4. How Has Your Thinking Evolved?**

**3-2-1 Reflection** (COs 01, 03, 04)

**Canvas Discussion #2** (COs 03, 04)

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## **Weeks 9 and 10**

Now that you have a deep understanding of the controversies surrounding saturated fat and grains, we will explore carbohydrates as a whole, beyond just grains. While clinical applications of the ketogenic diet have been around since the 1920s, the low-carbohydrate craze emerged in the 1980s, with Dr. Robert Atkins' *Diet Revolution* books. Given his success, many quickly followed suit, such as the Zone Diet, South Beach Diet and nowadays, the Paleo and Whole30 Diets. We will begin this section by reviewing carbohydrate sources, function, physiology and health implications. Then we will explore "carb-phobia," from past to present, analyze the state of the evidence, and determine whether or not low carbohydrate diets are the panacea for good health and longevity.

## **Week 9 (July 15-21)**

**Course Topic:** Carb-phobia and Associated Diets, Part 1

**Learning Objectives:**

- List the different types of carbohydrates and their sources.
- Describe the key functions of carbohydrates.
- Broadly summarize the digestion, absorption and metabolism of carbohydrates.
- Explain the relationship between carbohydrates and human health.

**Required Lectures/Materials:**

Watch 3 lectures:

- What are Carbohydrates?
- Carbohydrate Metabolism
- Carbohydrates and Health

Read:

- Ludwig DS, Hu FB, Tappy L, Brand-Miller J. Dietary carbohydrates: role of quality and quantity in chronic disease. *BMJ*. 2018;361:k2340. Published 2018 Jun 13. doi:10.1136/bmj.k2340. Accessible at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5996878/>
- Seidelmann, Sara B et al. Dietary carbohydrate intake and mortality: a prospective cohort study and meta-analysis. *The Lancet Public Health*. 2018;3(9): e419 - e428. Accessible at: [https://www.thelancet.com/article/S2468-2667\(18\)30135-X/fulltext](https://www.thelancet.com/article/S2468-2667(18)30135-X/fulltext)
- Jefferson, RS. 'Most Comprehensive Study of Carb Intake' Seems to Confirm And-Old Idea of Everything in Moderation. *Forbes*. August 22, 2018. Accessible at: <https://www.forbes.com/sites/robinseatonjefferson/2018/08/22/most-comprehensive-study-of-carb-intake-seems-to-confirm-age-old-idea-of-everything-in-moderation/?sh=30bb14b549e7>

**Assignments Due:**

**3-2-1 Reflection** (COs 01, 03, 04)

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**Week 10 (July 22-28)**

**Course Topic:** Carb-phobia and Associated Diets, Part 2

**Learning Objectives:**

- Describe the origin of the low carbohydrate diet and how it has evolved.
- Compare and contrast trending low carbohydrate diets.
- Discuss the challenges of evaluating the efficacy of low carbohydrate diets with scientific rigor.
- Assess the validity of the arguments for/against low carbohydrate diets, including consideration of the population of interest.
- Interpret the evidence and develop an informed recommendation about whether or not one should follow a low carbohydrate diet.

**Required Lectures/Materials:**

Watch 2 lectures:

- Carb-phobia and Low Carbohydrate Diets: Past to Present
- Weight Loss versus Health Promotion: A Review of the Evidence

Read:

- Oh R, Gilani B, Uppaluri KR. Low Carbohydrate Diet. [Updated 2020 Jul 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK537084/>
- Paoli A, Rubini A, Volek JS, Grimaldi KA. Beyond weight loss: a review of the therapeutic uses of very-low-carbohydrate (ketogenic) diets [published correction appears in *Eur J Clin Nutr*. 2014 May;68(5):641]. *Eur J Clin*

Nutr. 2013;67(8):789-796. doi:10.1038/ejcn.2013.116. Accessible at:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3826507/>

- Mazidi M, Katsiki N, Mikhailidis DP, Sattar N, Banach M. Lower carbohydrate diets and all-cause and cause-specific mortality: a population-based cohort study and pooling of prospective studies. *Eur Heart J.* 2019 Sep 7;40(34):2870-2879. doi: 10.1093/eurheartj/ehz174. PMID: 31004146. Accessible at: <https://academic.oup.com/eurheartj/article/40/34/2870/5475490>
- Taubes, Gary. The Case Against Sugar excerpt. 2017. Available at: <https://aeon.co/essays/sugar-is-a-toxic-agent-that-creates-conditions-for-disease>
- **Optional:** Branco AF, Ferreira A, Simões RF, Magalhães-Novais S, Zehowski C, Cope E, Silva AM, Pereira D, Sardão VA, Cunha-Oliveira T. Ketogenic diets: from cancer to mitochondrial diseases and beyond. *Eur J Clin Invest.* 2016 Mar;46(3):285-98. doi: 10.1111/eci.12591. PMID: 26782788. Accessible at: <https://onlinelibrary.wiley.com/doi/full/10.1111/eci.12591>

## A5. Identify a Final Project Topic

3-2-1 Reflection (COs 01, 03, 04)

Canvas Discussion #3 (COs 03, 04)

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## Weeks 11 and 12

In these two weeks, our attention turns to multivitamins in an attempt to answer the seemingly simple question: should I take one? Perhaps unsurprisingly, the evidence isn't clear cut, particularly when it comes to potentially elevated risk of certain cancers due to select dietary supplements. On the other hand, in certain populations that are at risk of being undernourished, multivitamins are likely beneficial... But can they optimize health or promote longevity in generally healthy people? That's a multibillion-dollar question the supplement industry wants to answer in the affirmative.

### Week 11 (July 29-Aug 4)

**Course Topic:** Dietary Supplements, Part 1

#### Learning Objectives:

- Describe the supplement market, its major players, and other vested interests.
- Use labels and key online resources to identify quality supplements.
- Identify instances when supplements may be helpful in health and disease.

#### Required Lectures/Materials:

Watch 2 lectures:

- A Glimpse of What Is at Stake in Supplements
- Identifying Quality Supplements and Combating Supplement Quackery

Read:

- Liu, Rui Hai. Health-Promoting Components of Fruits and Vegetables in the Diet. *Advances in Nutrition.* 2013; 4: 384S–392S. Accessible at <https://academic.oup.com/advances/article/4/3/384S/4591619>
- Rautiainen, S., et al. Dietary supplements and disease prevention - a global overview. *Nat Rev Endocrinol.* 2016; 12(7): 407-20. Accessible at <https://www.nature.com/articles/nrendo.2016.54>
- **[Optional original research]** Al-Khudairy, L., et al. Vitamin C supplementation for the primary prevention of cardiovascular disease. *Cochrane Database Syst Rev.* 2017 Mar 16;3:CD011114. Accessible at <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD011114.pub2/abstract>
- Biesalski, HK, and Tinz, J. Multivitamin/mineral supplements: Rationale and safety. *Nutrition.* 2017; 36: 60-66. Accessible at [http://www.nutritionjrn.com/article/S0899-9007\(16\)30092-2/fulltext](http://www.nutritionjrn.com/article/S0899-9007(16)30092-2/fulltext)
- **[Optional original research]** Rangel-Huerta, Oscar D. and Gil, Angel. Effect of omega-3 fatty acids on cognition: an updated systematic review of randomized clinical trials. *Nutrition Reviews,* 2018; 76(1): 1–20. Accessible at <https://academic.oup.com/nutritionreviews/article-abstract/76/1/1/4732611?redirectedFrom=fulltext>

**Assignments Due:**

**A6. Supplement Claims** (COs 03, 04)

**3-2-1 Reflection** (COs 01, 03, 04)

**Continue working on your Final Project (Outline is due next week).**

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**Week 12 (Aug 5-11)**

**Course Topic:** Dietary Supplements, Part 2

**Learning Objectives:**

- Debate for and against taking multivitamin/mineral and/or other dietary supplements.
- Critique nutrition quackery regarding supplements.

**Required Lectures/Materials:**

Watch 2 lectures:

- Understanding the Evidence around the Supplement Debate: Foods vs. Supplements
- Understanding the Evidence around the Supplement Debate: Supplements as Health vs. Disease-Promoters

Read:

- [Optional original research] Issa, O.M. et al. Effect of high-dose oral multivitamins and minerals in participants not treated with statins in the randomized Trial to Assess Chelation Therapy (TACT). *Am Heart J.* 2018; 195: 70-77. Accessible at [http://www.ahjonline.com/article/S0002-8703\(17\)30273-9/fulltext](http://www.ahjonline.com/article/S0002-8703(17)30273-9/fulltext)
- [Optional original research] Zhao, Jia-Guo, et al. Association Between Calcium or Vitamin D Supplementation and Fracture Incidence in Community-Dwelling Older Adults: A Systematic Review and Meta-analysis. *JAMA.* 2017; 318(24): 2466-2482. Accessible at <https://jamanetwork.com/journals/jama/article-abstract/2667071?redirect=true>
- Raymond, Joan. "Is it OK to take vitamin supplements every day?" *TODAY.* March 24, 2017. Accessible at <https://www.today.com/health/it-ok-take-vitamin-supplements-every-day-t1376>
- "Is It a Good Idea for Adults to Take a Daily Multivitamin?" *The Wall Street Journal.* April 11, 2017. Accessible at <https://www.wsj.com/articles/is-it-a-good-idea-for-adults-to-take-a-daily-multivitamin-1491962581>
- Levine, Hallie. "3 Science-Backed Reasons Not To Take A Multivitamin." *Prevention.* April 19, 2017. Accessible at <https://www.prevention.com/health/reasons-not-to-take-multivitamin>

**Assignments Due:**

**A7. Outline of Final Project**

**3-2-1 Reflection** (COs 01, 03, 04)

**Canvas Discussion #4** (COs 03, 04)

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**Weeks 13 and 14**

We will spend these two weeks learning about the health and related effects of organic versus conventional foods, with a slight tangent into the GMO debate. You may be surprised about what the science has to say about differences so far, and this may be one area where personal beliefs and socioeconomic status play bigger roles in food choices than does science.

**Week 13 (Aug 12-18)**

**Course Topic:** Organic vs. Conventional Foods, Part 1

**Learning Objectives:**

- Define the "organic" label.
- Identify characteristics of "organic" foods and food production.

Summarize the current state of the evidence of organically vs. conventionally farmed foods with respect to the domain of nutritional quality/content.

**Required Lectures/Materials:**

Watch 3 lectures:

- What Does “Organic” Mean?
- Understanding GMOs and “Frankenfoods”
- Evidence on Organic vs. Conventional Foods: Food Quality

Read:

- Greenbaum, Dov, and Gerstein, Mark. “Opinion: GMOs Are Not “Frankenfoods’.” *The Scientist*. August 30, 2016. Accessible at <https://www.the-scientist.com/?articles.view/articleNo/46908/title/Opinion--GMOs-Are-Not--Frankenfoods-/>
- Taylor, Asley P. “Insects Are Increasingly Evolving Resistance to Genetically Modified Crops.” *The Scientist*. October 13, 2017. Accessible at <https://www.the-scientist.com/?articles.view/articleNo/50640/title/Insects-Are-Increasingly-Evolving-Resistance-to-Genetically-Modified-Crops/>
- Barański, Marcin, et al. Higher antioxidant and lower cadmium concentrations and lower incidence of pesticide residues in organically grown crops: a systematic literature review and meta-analyses. *British Journal of Nutrition*. 2014; 112(5): 794-811. Accessible at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4141693/>
- Średnicka-Tober, Dominika, et al. Composition differences between organic and conventional meat: a systematic literature review and meta-analysis. *British Journal of Nutrition*. 2016; 115(6): 994-1011. Accessible at <https://www.cambridge.org/core/journals/british-journal-of-nutrition/article/composition-differences-between-organic-and-conventional-meat-a-systematic-literature-review-and-metaanalysis/B333BC0DD4B23193DDFA2273649AE0EE>
- [Optional original research] Średnicka-Tober, Dominika, et al. Higher PUFA and n-3 PUFA, conjugated linoleic acid, α-tocopherol and iron, but lower iodine and selenium concentrations in organic milk: a systematic literature review and meta- and redundancy analyses. *British Journal of Nutrition*. 2016; 115: 1043–1060. Accessible at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4838834/>
- [Optional original research] Koh, Eunmi, et al. Effect of Organic and Conventional Cropping Systems on Ascorbic Acid, Vitamin C, Flavonoids, Nitrate, and Oxalate in 27 Varieties of Spinach (*Spinacia oleracea* L.). *J. Agric. Food Chem.*, 2012; 60(12): 3144–3150. Accessible at <http://pubs.acs.org/doi/abs/10.1021/jf300051f>

**Assignments Due:**

**A8. Video Presentation of Final Project**

**3-2-1 Reflection** (COs 01, 03, 04)

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**Week 14 (Aug 19-25)**

**Course Topic:** Organic vs. Conventional Foods, Part 2

**Learning Objectives:**

- Summarize the current state of the evidence of organically vs. conventionally farmed foods with respect to the domains of environmental impact and human health.
- Appraise GMO foods and labels and debate the merit of the arguments for/against the use of GMO and respective labeling.

**Required Lectures/Materials:**

Watch 2 lectures:

- Evidence on Organic vs. Conventional Foods: Environmental Impact
- Evidence on Organic vs. Conventional Foods: Human Health

Read:

- Tuomisto, H.L., et al. Does organic farming reduce environmental impacts? – A meta-analysis of European research. *Journal of Environmental Management*. 2012; 112: 309-320. Accessible at <http://www.sciencedirect.com/science/article/pii/S0301479712004264>
- Seufert, Verena, et al. Comparing the yields of organic and conventional agriculture. *Nature*. 2012; 485: 229–232. Accessible at <https://www.nature.com/articles/nature11069>.
- Reganold, John P. and Wachter, Jonathan M. Organic agriculture in the twenty-first century. *Nature Plants*. 2016; 2: 15221. Accessible at <https://www.nature.com/articles/nplants2015221>
- Oates, Liza, et al. Reduction in urinary organophosphate pesticide metabolites in adults after a week-long organic diet. *Environmental Research*. 2014; 132: 105-111. Accessible at <http://www.sciencedirect.com/science/article/pii/S001393511400067X>
- [Optional original research] Baudry, Julia, et al. Association between organic food consumption and metabolic syndrome: cross-sectional results from the NutriNet-Santé study. *European Journal of Nutrition*. 2017. Accessible at <https://link.springer.com/article/10.1007%2Fs00394-017-1520-1>
- Barański, Marcin, et al. Effects of organic food consumption on human health; the jury is still out! *Food & Nutrition Research*. 2017; 61(1). Accessible at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5345585/>
- Mie, Axel, et al. Human health implications of organic food and organic agriculture: a comprehensive review. *Environmental Health*. 2017; 16(1). Accessible at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5658984/>

**Assignments Due:**

**A9. Final Project Essay** (COs 01-04)

**Canvas Discussion #5** (COs 03, 04)

**Please complete the Course Evaluation.**