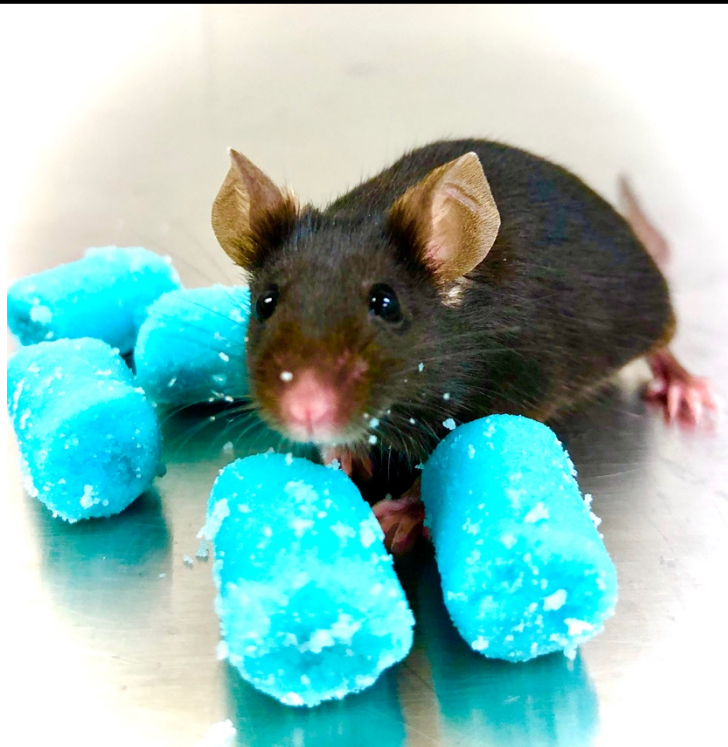


# NRSC 090

## Your Brain on Food

University of Pennsylvania, Fall 2023



**Course Title:** NRSC 090: Your Brain on Food

**Course Credit:** 1 C.U., 3 hours/week

**Course Day/Time:** Monday 3:30-6:20 pm in Fagin Hall 112

**Course Description:** What motivates us to eat? Why do many of us eat even in the absence of hunger? How do our food preferences and habits form? And how can eating transition from regulated to dysregulated? This seminar class investigates these questions and many others, with a focus on how our brains regulate food intake. We will explore the neuroscience behind eating, as well as the genetic, psychological, social, cultural, and societal influences that shape our behavior. Through readings, assignments, and class discussions, we will navigate the biological forces behind normal eating, as well as how eating becomes disordered in diseases like obesity and eating disorders. Through this course, students will learn about behavioral neuroscience research from human and animal studies and will develop critical thinking, reading, and writing skills. There are no prerequisites except for a love of food.

**Instructor:** Dr. Amber L. Alhadeff, Ph.D.; she/her  
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3500 Market Street, Room 453  
Philadelphia, PA 19104

**Office Hours:** By appointment (please email, days/times are very flexible!)

## Course objectives

The overall purpose of this class is to learn about neurobiological, genetic, psychological, social, cultural, and societal influences that shape our eating behavior. Specifically, the course objectives include:

- To learn scientific facts about the brain, eating behavior, and body weight control
- To become familiar with research methods and techniques in the study of feeding behavior
- To evaluate interactions between biological, psychological, and environmental factors on food intake
- To develop the ability to read scientific literature and communicate what you have learned
- To develop the authority to discuss opinions on lectures, readings, and presentations
- To practice scientific writing and presentation skills
- And finally, to develop an appreciation for the complexities of seemingly simple animal and human behaviors, as well as a curiosity for what is yet to be discovered

## Evaluation and Grades

Course grades will be determined based on the breakdown to the right. More detail for each of these categories/assignments can be found below under "Course requirements." Final grades will be as follows: A+ 97-100%, A 93-96.9%, A- 90-92.9%, B+ 87-89.9%, B- 80-82.9% etc., F below 60%. There will be no re-grades unless there is a mathematical error made by the instructor.

Category/Assignment	%
Attendance and Participation	25
Course Journal	10
Project 1: Biological mechanism of the week	15
Project 2: Creative SciComm	15
Project 3: Presentation on controversial topic	15
Final Exam	20

## Course requirements

**Attendance.** Showing up to class prepared is the easiest way to succeed in this course. Everyone is allowed one unexcused absence over the course of the semester (unless you have a scheduled presentation for that class). Every absence beyond that will result in 2 percentage points off of your final grade. Exceptions will be made in case of illness or emergency.

**Participation.** A major goal of this class is to have an interesting and engaging discussion on the topic material. Therefore, you will be evaluated on your ability to thoughtfully participate in the class discussions. Some tips for thoughtful participation:

- Think of this class as a safe space to discuss thoughts and ideas, even if they are not fully developed. As you progress through college and beyond, it will be important for you to assert yourself in many different situations. Use this class as an opportunity to practice engaging material that you have just learned, that you find interesting, and/or that you disagree with.
- Participation means more than just talking, it also means actively listening and seeking opinions from others. I understand that some students are not as outgoing as others. More talkative students can help balance conversations by drawing less outgoing students into discussion via interesting questions.
- Participation includes listening, commenting, and asking questions both when I am leading a presentation as well as when fellow classmates are giving presentations.
- Always be respectful of classmates' comments, questions and diverse perspectives.

**Readings.** There will be required readings for each class. Most readings will be available online on the Canvas site. The exceptions to the online readings are the following two books:

Yeo, Giles (2018). "Gene Eating: The Science of Obesity and the Truth About Dieting."

[https://www.amazon.com/gp/product/1643131273/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/1643131273/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

Shepherd, Gordon (2013). "Neurogastronomy: How the Brain Creates Flavor and Why It Matters."

[https://www.amazon.com/gp/product/0231159110/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/0231159110/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1)

**Course Journal.** To help consolidate the plethora of information we will learn and discuss in each class, you will keep a "course journal." Sometimes we will dedicate a few minutes at the end of each class to writing in the journal to jot down ideas, but you should also write in the journal in between classes when you have the time to synthesize what you have learned. Occasionally, this journal may be used for homework assignments. Keep your journal entries in a format (i.e., Word) that you can easily submit for grading. Important: journal entries are separate from notes that you take during class, but good notes will of course help you write a good journal entry.

A good journal entry will:

- Include a summary of what you learned during the class
- Include a summary of class discussion
- Present at least one new thought, idea, or question, based on that class's material, that is unique to you
- Be at least ½ single-spaced typed page, or equivalent, per class

You will turn in these journals to me twice for grading: on **October 20** and **November 24**.

**Project 1: Biological Mechanism of the Week.** This project is designed to challenge your scientific reading and presentation skills. At the beginning of the semester, you will sign up for a class to present a scientific paper to the class (this will be required reading for the rest of the class, too). You will be responsible for presenting the main findings of the paper/review and leading a discussion in class. Depending on the paper, you may also choose to include more background information that you research independently. Presentations should be 20-30 minutes including any questions and discussion. Sign up for a date on the Google Doc on Canvas (Collaborations) before **September 4**.

**Project 2: Creative SciComm.** Effective science communication is more important than ever now that we are inundated with news and social media from so many different sources. The food and dieting industries, in particular, are notorious for perpetuating myths that are not scientifically based. For this project you will communicate information that you learned in class and readings through your media of choice. The project is due on Canvas on **November 6**. Acceptable formats for this project include (but are not limited to): newspaper article, video (news segment, TikTok series, commercial), podcast, blog post, etc. Be creative and have fun with this project!

**Project 3: Group presentation on a controversial topic in feeding behavior.** Each student will choose a group to perform research and present on a controversial topic related to eating behavior (see "Project 3 Details" document on canvas for potential topics. You will independently research this topic (we will discuss how to perform scholarly research in class), and then work together with your group to create and give a ~30 min lecture on your topic. Due dates for this project are:

**October 16:** Send me your group/topic

**November 27:** Class presentations

**Final exam.** The final exam for this course will be in class on December 4. No exceptions will be made for make-up exams.

## Expectations, accommodations and etiquette

**Friendly discussion.** I expect that all students are supportive, positive, and respectful during class discussions. Disagreements are welcome and are often the basis for new scientific ideas, but make sure to critique the argument, and not the person making the argument.

**Sensitive topics.** In a class about eating behavior, we are bound to discuss some sensitive topics. Indeed, we will be talking a lot about weight control, as well as diseases such as obesity and eating disorders. Make sure to be sensitive when discussing topics to which other students may have personal connections.

**Diversity and inclusivity.** I rely on your diverse backgrounds and perspectives to enhance our class discussions. I am committed to establishing a classroom culture where all students feel valued regardless of gender, race, ethnicity, age, religion, sexual orientation, political affiliation, etc. Disrespectful comments will not be tolerated.

**Video/audio recordings.** Making video or audio recordings of this class is strictly prohibited without prior written permission.

**Disability accommodation.** I will make all accommodations recommended by Penn's Student Disabilities Services (SDS) for documented disabilities. Please contact me and SDS as soon as possible to initiate this process, and we will arrange a meeting to discuss accommodations. All requests for special accommodations must be mediated by SDS to ensure fairness for all students.

**Academic integrity.** All students are expected to adhere to the University of Pennsylvania's Code of Academic Integrity (<https://catalog.upenn.edu/pennbook/code-of-academic-integrity/>). Of particular relevance to this course, plagiarism, fabrication, multiple submission, or facilitating academic dishonesty will not be tolerated. Any cases regarding a breach of academic integrity will be referred to the Office of Academic Integrity for investigation.

## Fall 2022 Schedule

**Classes are in bold.** Classes and reading material are subject to change up to 2 weeks before class.

Required readings are listed under each class topic.

<b>September 4</b>	<b>No class – Labor Day</b> Deadline to sign up for dates for Project 1: Biological Mechanism of the Week ***use Google Doc on Canvas (under “Collaborations”)
<b>September 11</b>	<b>Introduction/Methods</b> <ul style="list-style-type: none"><li>Book: “Gene Eating” pgs ix-58 (Introduction and Part 1: Chapters 1-2)</li></ul>
<b>September 18</b>	<b>Environmental/societal issues around food</b> <ul style="list-style-type: none"><li>Book: “Gene Eating” pgs 59-84 (Part 1: Chapter 3)</li></ul> Article: Johnson, 2013. Eating beyond metabolic need: how environmental cues influence feeding behavior. <i>Trends in Neurosci</i> 36(2): 101-109
<b>September 25</b>	<b>Cultural/social influences on eating</b> <ul style="list-style-type: none"><li>Book chapter: Chapter 20 - Castro, 1995. Social facilitation and inhibition of eating, In: <i>Not eating enough</i>. 373-392.</li></ul>

- Book: "Gene Eating" pgs 87-148 (Part 2: Chapters 4-5)

**October 2**

**Hunger**

- Article: Davis, 2018. Hunger, ghrelin, and the gut. *Brain Res* 1693:154-158.
- Book: "Gene Eating" pgs 148-205 (Part 2: Chapter 6 and Part 3: Chapter 7)

**October 9**

**Satiation**

- Article: Hayes et al., 2010. Role of glucagon-like-peptide-1 receptor in the control of energy balance. *Physiology and Behavior* 100(5):503-510.
- Book: "Gene Eating" pgs 206-252 (Part 3: Chapters 8-9)

**October 16**

**Food reward**

- Article: Roitman et al., 2008. Real-time chemical responses in the nucleus accumbens differentiate rewarding and aversive stimuli. *Nat Neuro* 11(12): 1376-1377.
- Book: "Gene Eating" pgs 253-302 (Part 4: Chapters 10-11)

Select and email me topics/groups for Final Project

**October 20**

Turn in class journal for grading (Canvas)

**October 23**

**Gut-brain communication**

- Article: de Lartigue and Diepenbroek, 2016. Novel developments in vagal afferent nutrient sensing and its role in energy homeostasis. *Curr Opin Pharmacol* 31:38-43.

**October 30**

**Obesity and eating disorders**

- NIMH pamphlet: "Eating Disorders: About More Than Food"
- Article: Friedman, 2019. Leptin and the endocrine control of energy balance. *Nat Metab* 1:754-764.
- Book: "Gene Eating" pgs 303-324 (Part 4: Chapter 12)

**November 6**

**Food aversion and disgust**

- Article: Carter et al., 2015. Parabrachial calcitonin gene-related peptide neurons mediate conditioned taste aversion. *J Neurosci* 35(11):4582-4586.
- Book: "Neurogastronomy" pgs 1-75 (Part I: Chapters 1-7)

Project 2 due (Canvas)

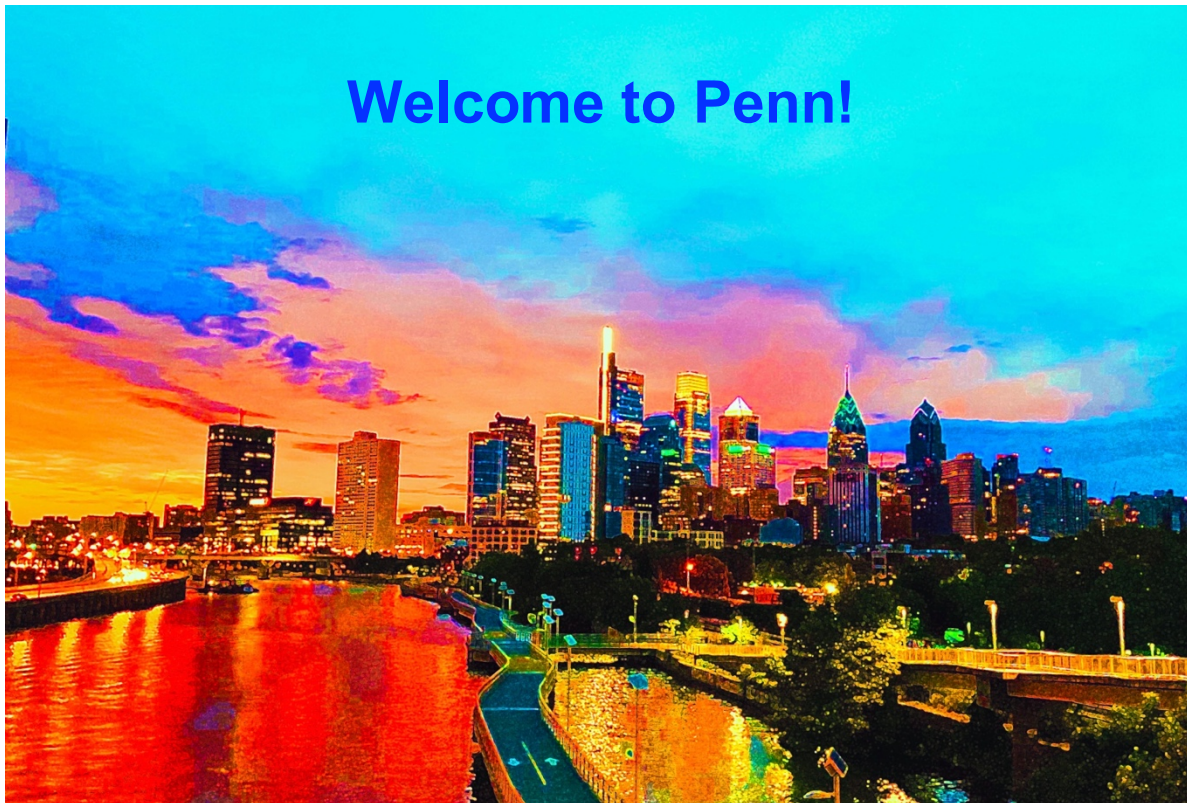
**November 13**

**Taste and Flavor I**

- Book: "Neurogastronomy" pgs 109-162 (Part III: Chapters 12-18)
- Article: Yarmolinsky et al., 2009. Common sense about taste: From mammals to insects. *Cell* 139(2): 234-244.



<b>November 20</b>	<b>Taste and Flavor II</b> <ul style="list-style-type: none"> <li>• Book: “Neurogastronomy” pgs 184-199 (Part IV: Chapter 21-22), 233-241 (Part IV: Chapters 27)</li> <li>• Article: Mori et al., 1999. The olfactory bulb: coding and processing of odor molecule information. <i>Science</i> 286:711-715.</li> </ul>
November 24	Turn in class journal for grading (Canvas)
<b>November 27</b>	<b>Project 3 presentations</b>
<b>December 4</b>	<b>In-class final exam</b>
<b>December 11</b>	<b>No class</b>



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There is no love sincerer than the love of food.

-Bernard Shaw, *Man and Superman*