

The Physiology of Motivated and Emotional Behaviors (Psych 127 - BBB 227)

Syllabus: FALL 2006

Professor Harvey J. Grill

Teaching Assistant: Xun Wan

B-21 Stiteler Hall, TTh 3-4:20

There is a Blackboard Site for this course. It contains important information for the class and we advise you to consult it often. Pdfs of the slide presentations from lectures will be found there and, when possible, files of other types of demonstration material. An annotated version of this syllabus (and any revisions that may arise) can be found there, as well as other information on Course Goals, Student, Professor, and TA responsibilities, etc..

Readings come from a BulkPack (Campus Copy) and a Text (Carlson, Physiology of Behavior, BookStore). Supplemental reading or revisions to readings will be posted on the Blackboard Site.

1. Sept 7: Introduction and Orientation to the Course –

review course content, goals, readings, exams, responsibilities
regulatory physiology. homeostasis, input [sensory], output [motor], 3 motor or effector systems.
behavior, autonomic, neuroendocrine
begin overview of organization of nervous system – focus on spinal and cranial nerves, input-output; amygdala, hypothalamus, caudal brainstem.

Read- Excerpt from W.B. Cannon's book The Wisdom of The Body

Important Note- Except for the introductory lecture, students are strongly encouraged to read the specified material *prior to the lecture*.

Background Lectures

2. Sept 12: Background Necessary to Appreciate Course; Theme I: Brain Structure and Introduction to Brain Systems of Key Relevance to Course Themes

Read- Text - Chapter 3 (Structure of the Nervous System), Bulkpack- Hypothalamus: An Overview. Note for both readings – it is an overview of the material I seek, not a detailed knowledge of the large number of terms that are covered.

3. Sept 14: Background Necessary to Appreciate Course; Theme II: Neuron Function and Principles of Neurotransmission

Read- TEXT Readings that provide background on nervous system - neural cells, their basic function, neural communication (electrical and chemical elements of neural transmission. TEXT Chap 2 – pages 28-31; 45-61)

4. Sept 19: Background Necessary to Appreciate Course; Theme III: Methods Used in the Neural Analysis of Behavior

Read-TEXT Chapter 5-Methods and Strategies of Research

FIRST THEME- The Neural Basis of Emotion: Fear and Stress

5. Sept 21: Emotion and the Brain- A Focus on Fear and the Neurobiological Function of the Amygdala

Read-- M. Davis minireview (bulkpack); TEXT - Chp 11 Emotion- 343-355

6. Sept 26: Emotional Function Assessed in the Human Amygdala: Data from Normal and Brain Damaged Humans

Read- LeDoux and Phelps review Neuron 2005; TEXT - Chp 11 - 361-365;.

SECOND THEME- Stress and Pharmacological Approaches to Stress-related Psychopathology; Animal Models of Depression, The Neuropathological Basis of Depression

7. Sept 28: Stress, The Stress Response, The CRF System

Read- TEXT Stress Disorders Chp 17 p 560-70, 548-49; Figs- 17.7; 17.14 and interim summary; an overview of the information rich Bale and Vale in bulkpack

8. Oct 3: Animal Models of Depression

Read- Cryan et al (bulkpack); TEXT 532-541

9. Oct 5: An Hypothesis For the Neuropathology Underlying Human Depression- first of 2 lectures. Students should be prepared to discuss material in Czeh and Shirayama papers

Read- Czeh et al paper; Shirayama et al paper; Santarelli et al paper ; all in bulkpack

10. Oct 10: An Hypothesis For the Neuropathology Underlying Human Depression- second of 2 lectures. Students should be prepared to discuss material in Santarelli as well as Czeh and Shirayama papers

Read- Czeh et al paper; Shirayama et al paper; Santarelli et al paper ; all in bulkpack

11. Oct 12: FIRST EXAM

THIRD THEME- Food Aversion and Emesis (vomiting): Neural Systems and Pharmacology

12. Oct 17 Naturally Occurring Food Aversion in People and Food Aversion Induced by Chemotherapy

Read- Pelchat and Rozin article and **two** short papers by Bernstein in the BulkPack

No Class on Oct 19 or Oct 24

13. Oct 26: Animal Models of Food Aversion and Introduction to the Neural Analysis of Behavior

Read- Pelchat et al paper and Sclafani paper in bulkpack, TEXT – review Chp 5 Methods and Strategies of Research; Chap 2 Structure and Functions of Cells of the Nervous System p 27 - 47, 50-57.

14. Oct 31: Analysis of the Contribution of the Pontine Parabrachial Nucleus to Food Aversion - A Model for the Assessment of the Contribution of One Brain Area to Food Aversion

Read- Spector review {specified sections}. Should you encounter terms or concepts that puzzle you see if the TEXT glossary or index can help. If you still do not understand a key term or idea after making an effort, contact the TA for assistance. **Be prepared to discuss Spector review**

15. Nov 2: Extra session may be needed on materials in Oct 31 lecture – if not move to next lecture topic

16. Nov 7: Introduction to Neurotransmitters and Their Receptors as an Introduction to the Pharmacology of Vomiting [Emesis]-

Read-TEXT - Chapter 4 Psychopharmacology 107 [interim summary] through 129. Initial reading of Andrews et al..

17. Nov 9: Pharmacology of Emesis- Developing a Drug Treatment for Chemotherapy Induced Vomiting

Read- be prepared to discuss Andrews et al reading in Bulkpack. Consider - the serotonin synapse and serotonin system figures in Chp 4 [previous lecture], the area postrema [chemoreceptive trigger zone], vagus nerve, vagotomy, action of certain chemotherapeutic agents and lithium chloride]. Also consider role of serotonin and vagus nerve in the control of food intake and amount consumed in meals.

18. Nov 14: SECOND EXAM

FOURTH THEME: Food Intake and Obesity: Neural and Chemical Systems

19. Nov 16: Daily Intake is Regulated- The Size of Individual Meals Is Also Controlled

Read- Kaplan et al article (bulkpack) - that article discusses data of relevance to the hypothesis of meal size control and also considers how an anti-obesity drug (one acting on the serotonin system) might work. TEXT introduction to eating 382- 392; eating disorders 401-407

20. Nov 21: What Mechanisms May Account for the Initiation of Meals? I: The Physiology of Ghrelin, Effects of Physiological State on Neuropeptide Y in the Hypothalamus

Read- David Cummings Diabetes paper; also read the subsequent paper by Cummings on a ghrelin level as an explanation for the success of **gastric bypass surgery** for extreme obesity (bulkpack). TEXT-393 - 400.

21. Nov 28: What Mechanisms May Account for the Initiation and Termination of Meals?
II: Interoceptors For Leptin and Glucose Sensing

Read- first reading of Barsh and Schwartz review; Jequir article on leptin (Bulkpack)

22. Nov 30: Which Central Neurochemical Systems Are Hypothesized to Integrate Leptin, Ghrelin and Other Peripheral Signals and Engage Feeding Behavior Control?
Two Nodes in a Distributed System, the Arcuate Nucleus and the Dorsal Vagal Complex.

Read- continue with Barsh and Schwartz review, other reading on Blackboard??

FIFTH THEME Energy Expenditure and The Autonomic Nervous System; Temperature Regulation

23. Dec 5: Body Weight Control Also Involves Energy Expenditure- diet-induced thermogenesis

Read- Chapter in Bulkpack on Autonomic Nervous System; paper by Bachman et al and the brief perspective (Dulloo) that precedes it in Bulkpack. TEXT 96-98

24. Dec 7: Neurobiology of Thermoregulation and Inflammatory Response-Induced Fever

Read- Morrison minireview or other reading as PDF in Blackboard, TEXT 225-226

Final Exam during Exam Period