

SPRING SEMESTER 2008

PSYCHOBIOLOGY – PSY U458

BLOCK 1. The Cellular Basis of Behavior.

- Neuron Doctrine Versus Reticular Theory.
- The Plasma Membrane.
- Genetics in a Nutshell.
- Some Proteins Important to Cell Function.
- The Active Neuron.

BLOCK 2. Communication Among Neurons: The Membrane Potential.

- The Basics of Chemistry.
- A Semi-Permeable Membrane.
- The Nernst Equation and the Goldman Equation.
- Measuring the Membrane Potential.
- Three Forces and Three Gates.

BLOCK 3. Communicating Among Neurons: The Action Potential.

- The Electrically Excitable Domain.
- The Action Potential Explained.
- Functions of the Sodium Channel.
- Functions of the Potassium Channel. Heterogeneity and Homology.
- Discovering Channel Structure.
- Special Channels for Calcium.

BLOCK 4. Communicating Among Neurons: The Synaptic Potential.

- The Chemically Excitable Domain.
- Summation and Integration.
- Special Channels for Calcium.
- Receptor Theory.
- The Importance of Poisons and Toxins.
- Acetylcholine.
- Gamma-Amino Butyric Acid (GABA) - How GABA Blocks the Action Potential.
- Glutamate,
- Aspartate, and Glycine. Catecholamines, Indolamines, and Histamine.
- Parkinson's Disease and Homeostasis.
- Peptide Synthesis - The Concept of Neuromodulation.
- Criteria for Transmitter Identification.

EXAM 1

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BLOCK 5. The Spinal Cord and Brain

- ❑ A Functional Segregation.
- ❑ Sensory Pathways.
- ❑ Motor Pathways.
- ❑ Diseases of the
- ❑ Upper and Lower Motor Neuron.
- ❑ Integrative Circuits in the Cord.
- ❑ Orientation and Gross Subdivisions of Brain.
- ❑ Brainstem Projections to the Forebrain.
- ❑ Basal Ganglia.
- ❑ Limbic System.
- ❑ Hypothalamus, Pituitary and Thalamus.
- ❑ Neocortex.
- ❑ Ventricles. Meninges and the Blood Brain Barrier.

BLOCK 6. Sensory/Motor Systems.

- ❑ Somatosensory Systems.
- ❑ Homunculi.
- ❑ Auditory System.
- ❑ Olfaction and Gustation.
- ❑ Vision.
- ❑ The Frontal and Parietal Lobes.
- ❑ The Basal Ganglia.
- ❑ The Cerebellum.
- ❑ The Importance of Inhibition.

BLOCK 7. Pleasure and Pain.

- ❑ The Problem of Definitions.
- ❑ Is There a “Pleasure Circuit” in the Brain?
- ❑ Motivation and “Drive”.
- ❑ Ascending Nociceptor Systems.
- ❑ Descending Analgesia Systems.
- ❑ The Mechanism of Opioid Peptide Action.
- ❑ Chronic Pain and Stimulation - Produced Analgesia
- ❑ Placebo and Opioid Peptides.

EXAM 2

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BLOCK 8. Hormones, Sex, and Reproduction.

- ❑ Hormones and “the Master Gland”.
- ❑ The Determination of Gender.
- ❑ Mammals are Basically Female, with Male Characteristics Added
- ❑ Conception, Pregnancy, and Birth. Pheromones. Neural Circuits for Mating and Reproduction.

BLOCK 9. Psychopharmacology.

- ❑ Agonists and Antagonists.
- ❑ Pharmacokinetics.
- ❑ Addiction, Tolerance, and Withdrawal.
- ❑ Central Nervous System Depressants.
- ❑ The GABA Receptor Complex.
- ❑ Central Nervous System Stimulants.
- ❑ The Problem of Specificity.
- ❑ Hallucinogens.
- ❑ Opiates.

BLOCK 10. The Biology of Mental Illness.

- ❑ Taxonomy of Mental Illness: The DSM IV.
- ❑ Schizophrenia.
- ❑ Affective Disorders.
- ❑ John Cade and the Discovery of Lithium.
- ❑ Ugo Cerletti and Electroconvulsive Shock.
- ❑ Anxiety Disorders.
- ❑ The Hazards of Medication

EXAM 3 – DURING FINALS WEEK