Section 8
2003
Lectures:

Time: 9:00 am – 10:00 am
LRC 105A & B

Section Director: Rick Samson, Ph.D.
Office: Caroline – Rm. 207A
Phone: 577-8633
E-Mail: samsonwk@slu.edu

Lecturers:
Daniel Scott Zahm, Ph.D.
Office: Doisy Hall – 3rd floor
Phone: 577-8280
E-Mail: zahmds@slu.edu

Michael Ariel, Ph.D.
Office: School of Medicine – Rm. 4th floor
Phone: 577-8278
E-Mail: arielm@slu.edu

Medha Gautam, Ph.D.
Office: School of Medicine – Rm. 470
Phone: 577-8547
E-Mail: mgautam@slu.edu

Joseph Baldassare, Ph.D.
Office: School of Medicine – Rm. 216
Phone: 577-8543
E-Mail: baldasjj@slu.edu

Thomas Westfall, Ph.D.
Office: School of Medicine – Rm. 362
Phone: 577-8553
E-Mail: westfatc@slu.edu

Andrew Lonigro, M.D.
Office: School of Medicine – Rm. 205
Phone: 577-8532
E-Mail: lonigro@slu.edu

Randy Sprague, M.D.
Office: School of Medicine – Rm. 210
Phone: 577-8498
Lecture 1: Dr. Zahm
April 14, 2003 Survey of the Nervous System
- Introduction
- Fundamentals of Human Nervous System Organization
  Neurons
- Supporting Cells
- Ventricular System and Menninges
- Major Divisions and some important structures in the adult
  human nervous system
- Blood supply of the brain
- Some terminology
- Neuroanatomical descriptors of position and orientation

Lecture 2: Dr. Ariel
April 15, 2003 Sensory transduction and perceptual modalities
- General overview of basic concepts of sensory systems
- Sensation versus perception
- Transduction is specific for energy form and receptor cell
  type
- Sensitivity based on transduction mechanism, local density
  of receptor cells and extent of postsynaptic convergence
- Information processing uses convergence, divergence &
  lateral inhibition
- Most sensory systems are topographically organized, using
  multiple maps and parallel pathways
General overview of sensory transduction
- The physics of energy
- Neural membrane potentials
- Effect of an increase in sodium conductance through the
  membrane
Visual transduction
- Ocular anatomy
- Rod and cone photoreceptor morphology
- Rhodopsin and cone opsin
- Transducin and phosphodiesterase
- Shutting off the photoreceptor cascade
Mechanoreceptor transduction: the Pacinian Corpuscle
- Neural membrane response
- Non-neural filtering
- Frequency response relative to meissner corpuscle
- Relationship of mechanoreceptor function to perception


**Lecture 3:**
April 16, 2003
Dr. Zahm
Cortex, Ascending Modulatory Systems, Motor Pathways
- Motor Pathways
- Arbiters of Behavior in the Brain
- Brain components essential for coordinated locomotion
- Cortex
- Subcortical motor systems
Dopamine, Acetylcholine, Serotonin, Norepinephrine and other ascending modulatory systems

**Lecture 4:**
April 17, 2003
Dr. Gautam

**Lecture 5:**
April 17, 2003
Dr. Zahm
Parkinson’s disease and other neurodegenerative disorders
- Introduction to neurodegenerative disorders
- Parkinson’s Disease
- Huntingdon’s Disease
- Alzheimer’s Disease
- Etiologies, mechanisms of degeneration

**Lecture 6:**
April 21, 2003
Dr. Baldassare
Drug effectiveness in tissue culture
- Effect of lipid partition coefficient
- Effect of charge-distribution of charged vs uncharged

**Required Reading:** Goodman and Gilman – The Pharmacological basis of Therapeutics, Chapter 1

**Lecture 7:**
April 22, 2003
Dr. Baldassare
Drug receptor interactions
- Quantitative analysis
Efficacy and potency
- Partial agonist
Agonist/antagonist
Two state model

**Required Reading:** Goodman and Gilman – The Pharmacological basis of Therapeutics, Chapter 2
Lecture 8: Dr. Westfall
April 23, 2003
Drug Biotransformation and Excretion
- Consequences of Biotransformation
- Phase 1 Reactions
- Phase 2 Reactions
- Induction and Inhibition
- Factors Influencing Drug Biotransformation
- Excretion of Drugs

Required Reading: Goodman and Gilman 10th Edition, Chapter 1: p. 11-18 plus Handouts

Lecture 9: Dr. Westfall
April 24, 2003
Anatomical and Physiological Considerations
- Anatomy of the Autonomic Nervous System
- Neurochemical Considerations
- Physiological Considerations

Required Reading: Goodman and Gilman 10th Edition, Chapter 6: p. 115-125 plus Handouts

Lecture 10: Dr. Westfall
April 25, 2003
Cholinergic Neurotransmission
- Synthesis
- Storage
- Release
- Inactivation
- Receptor Activation

Required Reading: Goodman and Gilman 10th Edition, Chapter 6: p. 125-129; 143-149 plus Handouts

Lecture 11: Dr. Westfall
April 28, 2003
Adrenergic Neurotransmission
- Synthesis
- Storage
- Release
- Inactivation
- Receptor Activation

Required Reading: Goodman and Gilman 10th Edition, Chapter 6: p 129-149 plus Handouts

Lecture 12: Dr. Lonigro
April 29, 2003
Introduction to the Circulatory System: Hemodynamics-Derivation of Poiseuille’s Law.

Required Reading: Berne and Levy, Cardiovascular Physiology, 8th Edition, Mosby, Chapter 1 (pp 1-6); Chapter 5 (pp 115-134)
Additional Source Material: Guyton and Hall, Medical Physiology, 10th Edition, Saunders, Chapter 14 (pp 144-151; Chapter 17 (pp175-183; Chapter 19 (pp 195-209).
Lecture 13:  Dr. Lonigro  
April 30, 2003  
Determinants of Cardiac Output: The Frank-Starling Law  
**Required Reading:** Berne and Levy, Cardiovascular Physiology, 8\textsuperscript{th} Edition, Mosby, Chapter 9 (pp. 199-226).  
**Additional Source Material:** Guyton and Hall, Medical Physiology, 10\textsuperscript{th} Edition, Saunders, Chapters 20 & 21 (pp 210-234).

Lecture 14:  Dr. Lonigro  
May 1, 2003  
**Required Reading:** Berne and Levy, Cardiovascular Physiology, 8\textsuperscript{th} Edition, Mosby, Chapter 8 (pp. 175 – 197).  
**Additional Source Material:** Guyton and Hall, Medical Physiology, 10\textsuperscript{th} Edition, Saunders, Chapters 17, 18, 19 (pp 175-182; 184-191; 195-205).

Lecture 15:  Dr. Sprague  
May 2, 2003  
The Pulmonary Circulation. Regulation of Pressure & The Intrapulmonary Distribution of Flow.  
**Required Reading:** J.B. West, Respiratory Physiology: The Essentials, 6\textsuperscript{th} Edition, Chapter 4, (pp 29-44).  
**Additional Source Material:** Guyton and Hall, Medical Physiology, 10\textsuperscript{th} Edition, Saunders, Chapter 38, (pp 444-451).

Lecture 16:  Dr. Sprague  
May 5, 2003  
The respiratory Function of the Lungs: How Alveolar PO\textsubscript{2} is Maintained; How Intrapulmonary Flow and Alveolar Ventilation Are Matched.  
**Required Reading:** J.B. West, Respiratory Physiology: The Essentials, 6\textsuperscript{th} Edition, Chapter 5, (pp 45-62).  
**Additional Source Material:** Guyton and Hall, Medical Physiology, 10\textsuperscript{th} Edition, Saunders, Chapter 39, (pp 452-462).

Lecture 17:  Dr. Sprague  
May 6, 2003  
The Regulation of pH: Physiologic Buffering Mechanisms  
**Required Reading:** Guyton and Hall, Medical Physiology, 10\textsuperscript{th} Edition, Saunders, Chapter 30 (pp 346-363).  
**Additional Source Material:** J.B. West, Respiratory Physiology: The Essentials, 6\textsuperscript{th} Edition, Chapter 6, (pp 63-77).

Lecture 18:  Dr. Lonigro  
May 7, 2003  
Introduction to Renal Function: Perfusion and Filtration
Required Reading: Guyton and Hall, Medical Physiology, 10th Edition, Saunders, Chapter 26 (pp 279-294).


Lecture 19: Dr. Lonigro
May 8, 2003
Tubular Function: Filtrate Reabsorption, Tubular Secretions, Excretion of Urine.

Required Reading: Guyton and Hall, Medical Physiology, 10th Edition, Saunders, Chapter 27 (pp 295-312).

Lecture 20: Meghan Taylor
May 9, 2003
Hypothalamus and Pituitary Gland


- Chapter 6 The Anterior Pituitary Gland and Hypothalamus, pp. 143-161
- Chapter 7 The Posterior Pituitary Gland and Water Metabolism, pp 163-169
- Chapter 12 Growth Regulation, pp 286-293 (only)

Lecture 21: Meghan Taylor
May 12, 2003
Hypothalamus and Pituitary Gland


- Chapter 6 The Anterior Pituitary Gland and Hypothalamus, pp. 143-161
- Chapter 7 The Posterior Pituitary Gland and Water Metabolism, pp 163-169
- Chapter 12 Growth Regulation, pp 286-293 (only)

Lecture 22: Dr. Samson
May 13, 2003
Adrenal Hormones


<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 14, 2003</td>
<td>Dr. Samson</td>
</tr>
<tr>
<td></td>
<td>Glucose Homeostasis</td>
</tr>
<tr>
<td>Suggested Reading:</td>
<td>Textbook of Endocrine Physiology, edited</td>
</tr>
<tr>
<td></td>
<td>by JE Griffin and SR Ojeda, Oxford Press 4th edition, Chapter 16:</td>
</tr>
<tr>
<td></td>
<td>Glucose, Lipid and Protein Metabolism, pp 393-419.</td>
</tr>
<tr>
<td>May 15, 2003</td>
<td>Study Day</td>
</tr>
<tr>
<td>May 16, 2003</td>
<td>Exam</td>
</tr>
</tbody>
</table>