BSC 2010-04 Fall 2016 Exam 4 Study Guide
(Lectures 30-38, November 16 to December 9)
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Exam 4 will be held Thursday December 15, 2016 from 10:00 to 12:00 AM in Bio Unit I Rm 208 (our usual class room).

Lecture slides are on Blackboard; recordings are posted at http://www.houptlab.org/courses/bsc2010

NB: Endocrinology (Chapter 45), immune system (Chapter 43), nervous system (49) and muscle (Chapter 50) were **NOT** covered and will **NOT** be on the exam.

Know the definitions of the **boldface terms** in the the text book, and understand the figures.

1. Be able to compare the regulation of prokaryotic and eukaryotic gene expression (Lectures 30 and 31, chapter 18): operons, promoters, transcription factors.

2. Molecular biology of cancer (Lecture 32, Chapter 18). Know the major causes of cancer (in terms of mutations and cell-growth regulation). Review the examples of oncogenes covered in lecture (ras, p53, c-Fos, BRAC).

3. Size and Shape (Chapter 40 p, 852-855) Understand surface to volume ratios. Be able to recognize adaptations that increase surface area for different physiological functions. Know the cellular mechanisms for transport across the cell surface (osmosis, facilitated diffusion, active transport, co-transport).

4. Internal Transport in Plants (Chapter 36) Know the different routes of transport through and between cells. Know the xylem and phloem systems, and the sources and sinks of materials for photosynthesis and metabolism. Understand transpiration of water and translocation of sucrose.

5. Respiration (Chapter 42): Know the different types of respiratory systems (e.g. cutaneous, gills, tracheal, pulmonary). Understand the regulation of breathing in mammals by lung stretch and levels of carbon dioxide/carbonic acid/bicarbonate. Understand the relative concentrations of oxygen and carbon dioxide in the lungs and body. Know the role of hemoglobin and examples of hemoglobin adaptations (e.g. the Bohr shift).

6. Circulation (Chapter 42): Recognize the different forms of circulatory systems (e.g. open vs. closed, amphibian vs. reptile vs. mammal). Know the flow of blood through from the vena cava through the heart and lungs and out the aorta. Know the sequence of events in the cardiac cycle. Know the differences between arteries, veins and capillaries.

7. Digestion (Chapter 41). Know the general anatomy of the digestive system (Figure 41.9). Understand peristalsis. Understand the secretion of acid by the stomach. Recognize different types of digestive enzymes. Know the anatomy of the villi in the intestine, and the pathways for nutrient absorption (e.g. glucose vs. lipids). Be able to recognize adaptations of the teeth or gastrointestinal tract in different species for different diets.