

Study Guide & Review for Animal Digestion & Nutrition

I. Goal: The goal of this unit is to provide a basic understanding of animal digestion and nutrition.

II. Reading(s): Chapter 41 (except pp 894 – 896); Presidential notes – 2 sets given in class; online notes (see link below)

III. Objectives: Upon completion of this unit you should be able to:

Nutritional Requirements of Animals

1. Explain the difference between an autotroph and a heterotroph? Can an autotrophic organism ever be heterotrophic? Can a heterotrophy ever feed autotrophically? Explain.
2. Compare and contrast the different types of feeders (suspension, fluid, bulk).
3. Compare and contrast omnivores, herbivores, carnivores.
4. Animals can be considered "motile guts." Explain.
5. Explain why animals evolved a waste elimination system.
6. Animal digestive tracts have evolved for its particular food type. Describe how tooth type, mouthparts, gut length and the ruminant digestive tract evolved in response to its food source.
7. Name three nutritional needs that must be met by an animal's diet.
8. Define essential nutrients. Describe the main kinds of essential nutrients.
9. Distinguish between water-soluble and fat-soluble vitamins. Explain why megadoses of fat-soluble vitamins are more dangerous than equally large doses of water-soluble vitamins.
10. Distinguish between undernourishment and malnourishment.

Overview of Food Processing

11. Describe what occurs during each of the four main stages of food processing (ingestion, digestion, absorption, and elimination).
12. Explain why animal foods typically need to be digested prior to absorption (hint: polymer)
13. Compare intracellular and extracellular digestion.
14. Distinguish between a complete digestive tract and a gastrovascular cavity.
15. Describe the basic structure of the gut.
16. Describe the major function of each layer (mucosa, submucosa, muscle, serosa) of the gut.
17. Explain how peristalsis works.

The Mammalian Digestive System

18. Identify the functions of saliva.
19. Compare where and how the major types of macromolecules are digested and absorbed within the mammalian digestive system.
20. Explain why pepsin does not digest the stomach lining.
21. Explain how the small intestine is specialized for digestion and absorption.
22. Compare and contrast the hormones: gastrin, CCK and secretin. For each, identify the organ in which they are produced, where they exhibit their action (target), and function.
23. Identify the function of parietal cells, chief cells, goblet cells.
24. Explain why many digestive enzymes are released as zymogens.
25. Identify two different ways that zymogens are activated in the digestive tract
26. What is the function of bile? Hint – surface/volume ratios & solubility
27. Explain why the stomach is acidic. Explain why the small intestine is not.
28. Compare the uptake of an amino acid and a fatty acid in the small intestine. Trace the path of each molecule following its uptake.

29. Describe the substrate, products, source, and site of action for each of the following enzymes:
 pepsin, amylase, lipase, trypsin, enterokinase, chymotrypsin, aminopeptidase,
 carboxypeptidase, sucrase, maltase, lactase
30. Describe the major functions of the large intestine.

Homeostatic Mechanisms and Energy Balance

31. Explain how blood sugar levels are regulated.

IV. Common Terms/Concepts (can you use the following terms/concepts conversationally?)

Autotroph	Fluid feeder	Peristalsis
Bicarbonate	Glycoprotein	Pharynx
Bile	Herbivore	Polymer
Bolus	Heterotroph	Sphincter
Bulk feeder	Monomer	Suspension feeder
Carnivore	Mucin	Zymogen
Epiglottis	Omnivore	
Esophagus	Oral cavity	

V. Learning Activities (some learning activities and tips for studying):

1. Be able to answer the questions on the Square Dude, digestion quiz , and PUD worksheets (links below)
2. Check out the cool video (see link below)
3. Prepare written answers to the objectives
4. Write a dialog using as many of the terms in the chapter as possible
5. Answer the questions at the end of the chapter in the text
6. Visit the text website and work through questions, etc.
7. Write a definition for each of the terms listed in the text/notes above. Give a specific example of each term
8. Spend approximately 2 hours per class studying this material
9. Read the summary at the chapter
10. Meet with one or more members of the class to help assess that you have attained the objective and to help deepen your understanding of the material.
11. Write one or more ways in which you can immediately apply this information to your daily life.

VI. Links:

- Online notes: <http://www.employees.csbsju.edu/ssaupe/biol221/Lecture/Zoology/digestion.htm>
- YouTube Video: http://www.youtube.com/watch?v=Q-n_Q0gKXzg&feature=related
- Square Dude Homework:
http://www.employees.csbsju.edu/ssaupe/biol221/Lecture/Zoology/square_dude.pdf
- Digestion Quiz:
http://www.employees.csbsju.edu/ssaupe/biol221/Lecture/Zoology/digestion_quiz.pdf
- Ulcers:
http://www.employees.csbsju.edu/ssaupe/biol221/Lecture/Zoology/digestion_ulcer_case_study.pdf