**Study Guide for Bio 101 Lecture Final Exam**

**CUMULATIVE PORTION OF FINAL EXAM**

**Please note that this study guide is a listing of objectives that you are required to master for this course.  However, items mentioned in class or in laboratory as being ‘important for you to know’ may also appear on the exams.  \*\*This is NOT a legal contract – it is a STUDY GUIDE designed to help you focus your study efforts.**

**The Final Exam will be 50% cumulative (lectures 1 – 17) and 50% Nervous System (lectures 18 – 22).  There will be about 50 questions from the cumulative material, which will be multiple choice, matching, diagrams, and true/false questions.**

**THERE IS A LOT OF MATERIAL TO KNOW FOR THE FINAL!!!! DON’T GET BEHIND, AND MOST OF ALL DON’T GIVE UP YET – YOU ONLY HAVE A FEW WEEKS TO GO!  HANG IN THERE AND WORK HARD THESE LAST FEW WEEKS SO YOU CAN ENJOY YOUR VACATION.  **

**\*\*NOTE ABOUT STUDYING FOR THE FINAL EXAM, CUMULATIVE PORTION:** The questions on the final exam dealing with cumulative material will be SIMILAR, but not identical, to the questions on the lecture exams you've taken during the semester.  In addition, you do NOT have to know every single item that you had to know for the lecture exams.  You will be responsible for knowing ONLY the items listed below in this Study Guide.

When you study for the final exam, use the notes you have from your previously completed Study Guides and master that material.  Then use the exams that were returned to you to test yourself (by covering the answers) on the questions that pertain to what you have to know (indicated below).  The questions on the final exam will test the same concepts, but as stated above will not be identical to the questions on Exams 1 through 4, although they will be similar.

**Chapters 1 through 10 (Cumulative part of final exam) – Lectures 1-17**

1. Identify the major parts of the body using anatomical terminology (see Fig 1.7 in Marieb's textbook), and express the relationship of any two of those parts using correct anatomical terms, e.g., superior/inferior, proximal/distal, etc. (see Table 1.1 in Marieb's textbook).

2. Define homeostasis and the identify the types of feedback mechanisms being used when given a situation in which negative or positive feedback is being used.

3. Describe the types of biologically important bonds and, in general, where they are used.

 4. Acids/bases

a. Define the terms electrolyte, acid, and base

b. Define pH; as pH goes up/down, what happens to [H+]?

c. For every jump of 1 unit on the pH scale,  how much does [H+] change?

d. List normal values (the average and the range) for human blood plasma pH.

e. Is the average human plasma pH acidic, basic, or neutral?

5. Identify the general components (building blocks) and major functions of carbohydrates, lipids, and proteins.  What types of bonds join amino acids in proteins?  Identify the names for the different types of carbohydrates and lipids?

6. Identify the movement of solutes or solvent as simple diffusion, facilitated diffusion, osmosis, or active transport.   Describe the effects of a body cell, e.g., RBC, placed in a hypotonic, isotonic, or hypertonic solution.

7. What does the osmolarity of a solution measure?  How is osmolarity related to tonicity (in number 6 above), i.e., as one goes up, does the other go up or down?

8. Define the terms hydrophobic and hydrophilic.  Describe the types of molecules that can/cannot pass the cell membrane without assistance.

9. List/identify the function of the major cellular organelles and structures discussed in class (contained in the two tables on your review slides).

10. Define the terms gene, genome, and genetic code.

11. Define necrosis and programmed cell death (apoptosis), and explain what happens during each process.

12. Transcription/translation

a. Define transcription and translation.

b. Describe the major events that take place in each process and where in the cell they take place.

c. What are the major components required for translation, and what role does each component play?

13. Given either the template or coding strand of a gene, be able to determine what mRNA codons, tRNA anticodons, and amino acids (using a supplied codon table) are produced from the provided DNA region (gene).

14. Describe the structure and function of enzymes, their mechanism of action, and what factors affect their activity.

15. Describe the major components of ATP and explain why it's a useful molecule in cellular metabolism. Draw the reversible reaction in the conversion of ATP <--> ADP + P.

16. Define the terms: anabolism (anabolic), catabolism (catabolic), and metabolism, aerobic, and anaerobic.

17. Name the two different reaction sequences of cellular respiration that are carried out inside the mitochondria of the cell. Is each of these processes aerobic or anaerobic?

18. What is the purpose of NAD+ and FAD in cellular metabolism?

19. For glycolysis, the citric acid cycle, and the electron transport chain be able to describe/explain/list (see the summary table at the end of the slides for this lecture):

            a. the name (or names) of the process

            b. where in the cell the process takes place

            c. the starting materials that enter the process

            d. the basics of what goes on in each process

e. what products (not the numbers) are produced from each process

f. the processing of pyruvate in the presence or absence of O2.

g. the name of the processes that produces ATP in the electron transport system/chain?

-Which set of metabolic reactions you summarized above generates the most ATP? Where do these reactions take place? What do these reactions require in order to function?

20. Name the parts of the cell nucleus and state the function of each part.

21. Cell Cycle

a. Identify the parts of the cell cycle, and whether each is a part of mitosis or interphase.

b. State briefly what occurs in each stage of the cell cycle.

22. Mitosis/Meiosis

a. Explain the purpose of mitosis.

b. Explain the purpose of meiosis and the purpose of crossing over of chromosomes.

c. Which type cells in the body undergo mitosis? meiosis?

23. Describe the characteristics of epithelial tissue.

24. Describe what a tissue membrane is and where the different types of membranes are used.

25. Explain the role of inflammation in the body, and describe the hallmarks of inflammation and the cell that causes at least three of those hallmarks.

26. Explain the difference between exocrine and endocrine glands.  Provide an example of each.

27. List/identify the main components of CT, the function of each component, and how each type of CT is constructed.

28. Define the terms: cyanosis, diaphoresis, erythema, hyperthermia, hypothermia, and pallor. What is the mechanism of restoring homeostasis following hyper- and hypothermia?

29. List the functions of the different parts of the integument (epidermis, dermis, subcutaneous layer, hair, nails, sweat glands, sebaceous glands, arrector pili muscles)

30. Explain the difference between compact (cortical) and spongy (cancellous) bone, and diagram/label the structure of a long bone.  How do long bones grow in length?

31. Explain how bone functions as a reservoir of calcium.  List the factors (hormonal and physiological) that affect bone resorption/deposition and calcium uptake/release from bone, and the cells that are involved in bone homeostasis.

32. Describe the structure and components of the thoracic cage, and list the number of each of the types of ribs, give their anatomical as well as common names.   Which part of the thoracic cage are they  connected to, and how?

33. List the functions of a synovial membrane.

34. Define the divisions of the pelvis, e.g., pelvic brim, true pelvis, false pelvis, etc., and what bones and landmarks constitute them.

35. Describe the basic structural features and classification of fibrous, cartilaginous, and synovial joints.  Give an example of each type.

36. List/identify the six types of synovial joints and the degree of movement allowed at each.  What are examples of the MAJOR synovial ball and socket joints in the body?

37. Given the name of a muscle or a muscle action (see Muscle Action Table in review slides), identify the movement that will take place at a specified joint. For example, Question: Contraction of the biceps femoris will cause what action to take place at the knee? Answer: Flexion (Thus, the articulations and muscles/muscle actions may be tested together.)

38. Describe the structure of a muscle fiber at the histological (microscopic) and molecular levels.

39. Explain, in detail, the mechanism (physiology) and energy sources of muscle contraction.

40. For skeletal muscle, explain the terms: concentric/eccentric contraction, isotonic/isometric contraction, latent period, motor unit, muscle tone, and recruitment.

41. Given the name of a muscle, describe some of its characteristics that would be evident from its name (see the starred terms in the Martini table in your Review slides), e.g., is it short, long, wide, on the lateral or medial side of the body, does it flex/extend, etc.

42. USE AND APPLY the definitions of the terms agonist, antagonist as they pertain to skeletal muscle (for the muscles listed in the Muscle Action Table in your review slides).

For example: doing a bench press, the agonist would be the pectoralis major, and an antagonist would be the latissimus dorsi.  Thus, you will have to know the names and actions of the muscles in the Muscle Action Table.  (You do not have to worry about knowing the origins and insertions of skeletal muscles for the final exam.)