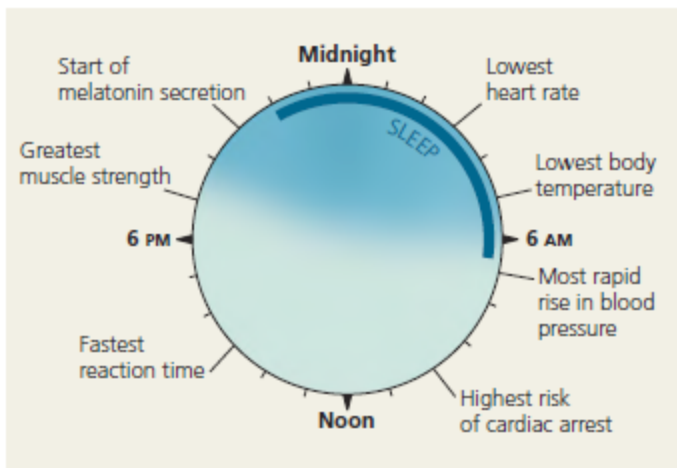


Cheat Sheet

Table 40.1 Organ Systems in Mammals

Organ System	Main Components	Main Functions
Digestive	Mouth, pharynx, esophagus, stomach, intestines, liver, pancreas, anus	Food processing (Ingestion, digestion, absorption, elimination)
Circulatory	Heart, blood vessels, blood	Internal distribution of materials
Respiratory	Lungs, trachea, other breathing tubes	Gas exchange (uptake of oxygen; disposal of carbon dioxide)
Immune and lymphatic	Bone marrow, lymph nodes, thymus, spleen, lymph vessels, white blood cells	Body defense (fighting infections and cancer)
Excretory	Kidneys, ureters, urinary bladder, urethra	Disposal of metabolic wastes; regulation of osmotic balance of blood
Endocrine	Pituitary, thyroid, pancreas, adrenal, and other hormone-secreting glands	Coordination of body activities (such as digestion and metabolism)
Reproductive	Ovaries or testes and associated organs	Reproduction
Nervous	Brain, spinal cord, nerves, sensory organs	Coordination of body activities; detection of stimuli and formulation of responses to them
Integumentary	Skin and its derivatives (such as hair, claws, skin glands)	Protection against mechanical injury, infection, dehydration; thermoregulation
Skeletal	Skeleton (bones, tendons, ligaments, cartilage)	Body support, protection of internal organs, movement
Muscular	Skeletal muscles	Locomotion and other movement



Chapter 40 Questions

1. What is anatomy?
2. What is physiology?
3. What does fusiform mean?
4. What is interstitial fluid?
5. Describe the 11 organ systems in mammals.
6. What are epithelial tissues?
7. What are the 5 types of epithelial tissue?
8. What are the two sides of epithelial tissue?
9. What is connective tissue?
10. What are the 3 types of connective tissue fibers?
11. What is the most widespread connective tissue in vertebrate bodies?
12. What is fibrous connective tissue?
13. How are bones formed?
14. What composes blood?
15. What is cartilage?
16. What is adipose tissue?
17. What two proteins allow muscles to contract?
18. What are the 3 types of muscles?
19. What is nervous tissue?
20. What are the two main cells in nervous tissue?
21. What is the endocrine system?
22. What is the nervous system?
23. What are hormones?
24. What is thyroid stimulating hormone (TSH)?
25. How do nerve impulses travel?
26. What is a regulator?
27. What is a conformer?
28. What is homeostasis?
29. What is a set point?
30. How do animals maintain homeostasis?
31. What is negative feedback?
32. What is a normal range?
33. What is positive feedback?
34. Describe the circadian rhythm of a typical human.
35. What is acclimatization?
36. What is thermoregulation?
37. What does endothermic mean?
38. What does ectothermic mean?
39. What are poikilotherms and homeotherms?
40. What is the integumentary system?

41. What are goosebumps?
42. What is vasodilation?
43. What is the opposite of vasodilation?
44. What is countercurrent exchange?
45. How do birds cool themselves?
46. What is nonshivering thermogenesis?
47. Where are sensors responsible for thermoregulation concentrated?
48. What is fever?
49. What is behavioral fever?
50. What is bioenergetics?
51. What is the metabolic rate?
52. What is the basal metabolic rate (BMR)?
53. What is the standard metabolic rate (SMR)?
54. What is the average BMR in humans?
55. What is the metabolic rate roughly proportional to?
56. How is energy per gram related to body size?
57. In terrestrial animals, what is the average daily rate of energy consumption?
58. What is torpor?
59. What is hibernation?
60. What is estivation?

Chapter 40 Answers

1. Biological form
2. Biological function
3. tapered on both ends
4. Fluid that fills spaces between cells
5. see picture
6. Sheets of cells that cover outside of body, line organs/cavities of body, closely packed (often by tight junctions)
7. Cuboidal epithelium - Dice-shaped cells, specialized for secretion, epithelium of kidney tubules/glands (e.g. thyroid/salivary)
Simple columnar epithelium - large brick-shaped cells found where secretion/active absorption is important
Simple squamous - single layer of platelike cells, function in exchange of materials by diffusion (thin and leaky)
stratified squamous epithelium - Multilayered, regenerates rapidly, formed by division near basal surface (opposite apical surface), replace cells that are sloughed off, found in places subject to abrasion
pseudostratified columnar epithelium - Single layer of cells with various heights, forms mucous membrane that lines respiratory tract
8. Apical faces lumen or outside of organ, exposed to fluid or air. Often covered by specialized projections. Opposite apical is basal
9. Sparse, scattered through ECM, molds tissues/organs together/in place. Consists of web of fibers in liquid, jelly like, or solid foundation. Fibroblasts secrete fiber proteins, macrophages engulf foreign particles/cell debris by phagocytosis
10. Collagenous - provide strength/flexibility
Reticular - join connective tissue to adjacent tissues
Elastic - make tissues elastic
11. Loose connective tissue, of all 3 fibers, binds epithelia to underlying tissues, holds organs in place, found in throughout body (e.g. skin)
12. Dense with collagenous fibers, found in tendons (muscles to bones) and ligaments (bones at joints)
13. Mineralized connective tissue, osteoblasts deposit matrix of collagen.
Calcium/magnesium/phosphate ions combine into hard mineral in matrix. Mammalian bone has repeating units (osteons, each has concentric layers of mineralized matrix deposited around central canal)
14. liquid ECM called plasma (water, salts, dissolved proteins), erythrocytes (red bcs) and leukocytes (white bcs) and platelets
15. Collagenous fibers embedded in rubber protein-carb complex (chondroitin sulfate).
Chondrocytes secrete collagen/chondroitin sulfate, present in embryos but replaced in adults except at disks between vertebrae
16. Loose connective tissue, stores fat in adipose cells, each cell has a large fat droplet

17. actin/myosin
18. Striated/skeletal muscle - Attached to bones by tendons, consist of bundles of long cells (muscle fibers, form by fusion of many cells). Sarcomeres (contractile units) give striped appearance
Smooth muscle - found in walls of internal organs, spindle-shaped cells, responsible for involuntary movements, not striated
Cardiac - forms contractile wall of heart, striated, has branched fibers that connect via intercalated disks (relay signals to synchronize heart contraction)
19. Functions in receipt, processing, transmission of info
20. Neurons (nerve cells) transmit nerve impulses, receives impulses from extensions called dendrites, transmit impulses to other cells via axons
Glia (glial cells) - support cells, take care of neurons
21. Coordinates/controls responses to stimuli, signaling molecules released into bloodstream by endocrine cells carried to all locations in body
22. Neurons transmit signals along dedicated routes connecting specific locations in body
23. signaling molecules broadcasted by endocrine system
24. Acts solely on thyroid cells, stimulates release of thyroid hormone that acts on nearly every body tissue to increase oxygen consumption/heat production
25. As changes in voltage, information conveyed by path of impulse
26. Animal that uses an internal mechanism to control internal change in face of external fluctuation
27. Animal that allows internal condition to change in accordance with external changes
28. Maintenance of internal balance (maintain "steady state" even when environment changes significantly)
29. Value at which an animal must keep a variable at to achieve homeostasis
30. Fluctuation of variable from set point serves as stimulus detected by sensor that sends signal to control center that generates output that triggers response (physiological activity that helps return variable to set point)
31. Control mechanism that damps its stimulus
32. Upper and lower limit (instead of set point)
33. Control mechanism that amplifies stimulus
34. see picture
35. Animal's physiological adjustment to changes in external environment
36. Process by which animals maintain their body temperature within a normal range
37. Animal that is warmed mostly by heat generated by metabolism (e.g mammals/birds)
38. Most of heat from external resources (e.g. amphibians/fishes/reptiles/invertebrates)
39. Animal whose body temperature varies with environment
Animal with relatively constant body temperature
40. Outer covering of body
41. Vestige of hair raising inherited from furry ancestors
42. widening of superficial blood vessels, increasing blood flow in skin/exchange of heat with environment

43. vasoconstriction, reduces blood flow and heat transfer by decreasing diameter of superficial vessels
44. Transfer of heat between fluids that are flowing in opposite directions, present in sharks, fishes, and insects
45. Using pouch richly supplied with blood vessels, fluttering increases evaporative cooling
46. Increase of metabolic activity and production of heat instead of ATP
47. Hypothalamus (brain region that also controls circadian clock)
48. Elevated body temperature developed in the course of infection, reflects increase in normal range (raising temperature of hypothalamus reduces fever elsewhere)
49. increase of body temperature upon infection, like lizard moving to heat itself up in response to infection
50. Overall flow and transformation of energy in an animal
51. Sum of all the energy an animal uses in a given time interval
52. Minimum metabolic rate of a nongrowing endotherm that is at rest, has an empty stomach, and is not experiencing stress
53. Metabolic rate of a fasting, non stressed ectotherm at rest at a particular temperature
54. 1600-1800 in males, 1300-1500 in females (kcal perday)
55. body mass to the $\frac{3}{4}$ power
56. inversely related
57. 2-4 times BMR or SMR
58. Physiological state of decreased activity and metabolism
59. Long-term torpor that is an adaptation to winter cold and food scarcity
60. Summer torpor