

## Study guide for biology exam 4

Winslow, 26 April 2011

### Animal physiology--organization, homeostasis, organ systems

#### Circulatory system

Moves stuff around--gas exchange, nutrients, immune cells, hormones, platelets

Open & closed circulatory systems

Arteries & veins, capillaries, pulmonary & systemic circuits

Heart--Chambers, valves, arteries leaving heart, veins entering heart

#### Immune (lymphatic) system

Regulates fluids & fats, produces lymphocytes to fight infection

Bone marrow, thymus, lymph vessels, lymph nodes, tonsils, spleen

#### Respiratory system

Gas exchange, relation with circulatory system, internal & external respiration

Gills in fish

Mammals--trachea, larynx, bronchi, bronchioles, lungs, alveoli

Hemoglobin in erythrocytes, concentration of gases

#### Digestive system

Nutrition--nutrients and energy

Ingestion, digestion, absorption, assimilation

Mouth, teeth, tongue, pharynx, esophagus, stomach, small intestine, colon

Accessory organs: salivary glands, pancreas, liver

#### Urogenital system

Excretory (urinary) system--filters blood, removes wastes, regulates solute concentration

Nitrogenous wastes--uric acid, urea

Kidneys, ureters, urinary bladder, urethra

Reproductive system--fertilization & activation, fast & slow block to polyspermy

#### Internal signaling

##### Nervous system

Neuron, dendrite, nerve cell body, axon, ganglion, nerve

Electrical impulses--membrane potential, depolarization pulse

Chemical signal--synapse, neurotransmitter, receptor

Central nervous system--brain, spinal cord

Peripheral nervous system--sensory & motor nervous systems

##### Sensory system

Photoreceptors, mechanoreceptors, chemoreceptors, thermoreceptors, pain

##### Endocrine system--hormones (chemical messengers that travel systemically)

Positive & negative feedback loops

Hypothalamus & pituitary, gonadotropins & sex hormones

Corticosterone, epinephrine, insulin, glucagon, growth hormone

#### Musculoskeletal system--functions

Muscular--muscles, tendons, contractions, antagonism, sliding filament model, ATP

Innervation of muscles, calcium in muscle contraction

Skeletal--osteoblasts, osteocytes, types of bone, axial & appendicular skeleton, joints

Calcium & osteoporosis

#### Integumentary system (skin)

#### Development--direct or indirect

Zygote--gray crescent, polarity, yolk

Mechanisms of cellular differentiation--cytoplasmic localization, induction

Cleavage, blastulation, gastrulation, neurulation

## Animal behavior

Comparative psychology--conditioning (Pavlov's dogs), reinforcement

Ethology--adaptation, instinct (innate behavior) imprinting

Development of behavior--environmental influences, instinct, sensitive periods

Biological aspects of learning

Behavioral ecology

Decision-making

von Frisch's honeybees--foraging, flower recognition, communication

Optimality--optimality, trade-offs, time & energy budgets

Sociobiology--sexual selection, altruism, mating systems, social structure

Evolution of behavior--behavioral genetics, inclusive fitness, ESS

Physiology & behavior

Neurobiology--nervous system, sensory systems, echolocation

Acclimatization, hibernation, migration, biological clocks

Mentality of animals--language & mental representation, intelligence, tool-use, culture

Animal awareness & emotion--self-awareness, consciousness, fear & suffering