

Review sheet for immune system - sensory input (nervous system)

WARNING: I have tried to be complete, but I may have missed something. You are responsible for *all* the material discussed in class. This is only a guide.

1) Immune system:

What is a immune response?

What are non-specific defenses?

What defenses non-specific defenses do you have?

How can non-specific defenses destroy bacteria or viruses (careful here - some defenses only work on one or the other).

What is an inflammatory response?

What are phagocytes? Macrophages?

Make sure you can describe all steps in this response. Understand complement proteins and interferon.

What function does the lymphatic system play in the immune system?

What are lymphocytes? Lymph nodes?

What is an antigen? Antibody?

Know how and where B and T cells develop.

How many different kinds of B and T-cells do we have?

How do B-cell defenses work?

What is an effector cell? What are memory cells? Clones?

Why is the immune response so much faster the second time you are exposed to a specific antigen?

What do effector cells make?

Know the structure and function of antibodies (in what four ways do they help the immune system?)

What role do phagocytes play in all of this?

How do T-cells work?

How can they attack infected body cells?

What are APC's?

What does a helper T-cell do when presented with an antigen?

What are cytotoxic T-cells and how do they kill cells?

Why are organ transplants so difficult?

What happens when the immune system attacks your own body?

Be able to recognize and give some examples.

What happens when the immune system overreacts to harmless antigens (e.g. pollen)?

What is one possible very serious outcome of allergies?

What is the problem with AIDS? How is it different from HIV?

Can AIDS be cured? treated?

How does the virus overwhelm the immune system?

What parts of the immune system are attacked?

What does malaria do? What are some symptoms? How is it transmitted?

How is the immune system compromised by the malaria parasite?

Why is the malaria parasite able to hide from the immune system?

What is the problem with drugs for malaria?

What is sleeping sickness? What causes sleeping sickness? How is it transmitted?

How does it bypass the immune system?

What are the symptoms? What is the outcome?

What treatments are there?

2a) Osmoregulation, and excretion

What problem do terrestrial animals face? How do they restore and conserve water?

What substances are excreted? How are the three substances different?

How do mammalian kidneys work?

What is a nephron?

Be able to describe what happens in each of the following: bowman's capsule, glomerulus, proximal tubule, loop of Henle, distal tubule, collecting duct.

What is special about the membrane in the collecting duct?

What is the role of ADH in the kidney?

What happens when there is too much salt in the body? Not enough?

What does alcohol do to this pathway?

2b) Hormones

What is a hormone? What are endocrine glands?

What are exocrine glands (you only need to know what they are, nothing else)?

What hormones are made by the anterior pituitary?

What hormones are stored in the posterior pituitary?

(Note: the posterior pituitary doesn't actually make any hormones - why?)?

What does each of the hormones do that is released by the pituitary?

What is the function of the hypothalamus in all this?

How is this different in the anterior vs. posterior pituitary?

Know what the pineal gland does.

What hormones does the thyroid release? The parathyroid?

What do these hormones do?

How is blood sugar controlled?

What is the role of insulin? glucagon?

Where are these hormones made and how do they work?

What kinds of diabetes are there? What does diabetes do to the body?

What are the symptoms of diabetes?

What is the difference between the adrenal medulla and the adrenal cortex?

How do these differ in their response to stress?

How do different kinds of stress affect the adrenal glands?

What do corticosteroids do?

What are the advantages/disadvantages of cortisone?

3) Reproduction

What is the difference between sexual and asexual reproduction?

What kinds of asexual reproduction are there?

Be able to give examples of each.

Why do some organisms switch between sexual and asexual reproduction?

What is a hermaphrodite? Why would an animal be a hermaphrodite?

What is sequential hermaphroditism?

What kinds of fertilization are there? What different kinds of birth do vertebrates have?

Understand all parts of the male reproductive system.

Make sure you know what each of the following parts does: testes, epididymis, vas deferens, seminal vesicles, prostate gland, urethra, ejaculatory duct, bulbourethral (= Cowper's) gland.

What do the various gland contribute to the sperm? What is the composition of semen?

What is the problem that most men have with the prostate gland as they get older?

Understand all the parts of the female reproductive system.

What do the following do: ovaries, follicles, oviducts (= fallopian tubes), uterus, cervix, vagina?

Make sure you understand what follicles are and their role in ovulation.

What is an estrous cycle?

Make sure you know how the menstrual cycle works.

What does FSH do? LH? estrogen? progesterone? How do they interact?

What effect do these have on follicles? On the uterine lining?

What is the Corpus luteum and what does it do?

Make sure you thoroughly understand all parts of this cycle!

What happens during pregnancy? What is the role of estrogen during pregnancy? What is the placenta?

What does oxytocin do? prostaglandins?

What triggers the contractions associated with birth?

Where does the infant get its immunity?

Why doesn't the mother's immune system attack the infant (hint: we don't know!!)?

What are the advantages of breast feeding?

4) Nervous system - overview and neuron function

Why do animals have a nervous system?

What is the CNS? PNS? What is a nerve? Ganglion?

What are the three parts of neurons, and what does each of them do? Do all neurons look alike?

What is a myelin sheath? How is it different in the PNS vs. the CNS?

What do astrocytes do?

What is the main function of neurons?

How is the resting potential in neurons maintained?

What is the resting voltage?

What ions are involved in maintaining this resting voltage? Where are they?

What is an action potential? How is an action potential generated?

Which ions are involved and which direction do they move?

What voltage changes take place?

Which ions cause which voltage changes?

What is the role of the ion gates in all of this?

What is depolarization? Hyperpolarization?

What prevents the signal from traveling backwards?

How fast can the signal travel? What controls the speed of the signal?

What are synapses?

What types of synapses are there, and how do they differ?

Explain how a signal can be transmitted from a pre-synaptic neuron to a post-synaptic neuron.

Which chemicals are involved? What kinds of gates can be opened?

What is a neurotransmitter? Why is it so important that this is broken down quickly?

How does the post-synaptic neuron figure out what to do?

What types of neurotransmitters are there?

Know about acetylcholine, dopamine & serotonin.

What do LSD, morphine & heroin do?

5) Nervous system - sensory input

What are sensory neurons designed to do?

What are the 5 categories of receptors (*not* the “5 senses”)?

How does the sense of touch work?

What kind receptors make up the sense of touch?

What is the function of pain?

Where do we have most of our “touch” receptors?

What are the parts of the outer ear? What is the function of these parts?

What are the parts of the middle ear? What is the function of these parts?

What do the eustachian tubes do?

What is the function of the inner ear?

What is the cochlea? The oval window? Round window? Upper canal? Middle canal? Lower canal?

What is the function of all of these parts?

What is the tectorial membrane and how does it work?

What about the organ of Corti?

How do we determine pitch? Volume?

What is the range of hearing in healthy humans?

Know about bats:

What is their range of hearing? How do they use sound to navigate?

What can they determine about their environment using sound waves?

What are some other animals that use echolocation?

What's unique about elephants?

How do we sense movement? How do we determine our balance?

What are the semi-circular canals? The utricle? saccule?

What is the difference between smell and taste?

What can we “taste”? Smell?

How does the sense of smell work?

Why is a dog's sense of smell usually so much better than ours?

How many “different” kind of sensors do we have? What about dogs? (hint: we have the same number of “different” receptors).

Where are these receptors, and how do they work?

Where do flies have their taste receptors?

What is so impressive about turtles and salmon?

Know the function and structure of all parts of the eye: sclera, choroid, tapetum, cornea, lens, iris, ciliary muscles, retina, aqueous humor, vitreous humor.

How does the shape of the lens change? What happens to the lens as we age?

What are rods? Cones?

How can we see color with cones?

Which is more light sensitive?

Where do we have more rods? More cones?

What about other animals?

What is the fovea (sometimes “fovea centralis”)? Blind spot?

Do we have the best (in terms of resolution) vision of any animal?

Which, if any, animals do better?

How does depth perception work?

Which animals can see infrared? UV?

Which animals have an electric sense, and what is it? A magnetic sense?