

Biology 1202 notes



**ASSIGN
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Thursday January 17 Mastering biology course id= MBPOLLACK01639 Life first appeared on earth about 4 billion years ago Origin of life is a hypothesis not a theory Very little oxygen in early earths atmosphere Spontaneous generation of life- random formation of life Millions of species on earth, up to 100 million the experiment of miller and urey showed what? test question a few centuries ago: eople thought that new living things appeared all of the time(spontaneous generation of life) ex: mold growing on food in the mid 1800s Louis Pasteur refuted the theory of spontaneous generation of life he basically left something out but sealed it off and nothing grew on it, then he left it out without being sealed and stuff grew the cell theory- all existing cells come from pre-existing cells about 50 trillion cells make up the human body but all came from the single diploid cell formed from conception conditions on early earth: tmosphere- similar to Jupiter today, no free oxygen, frequent storms with lots of lightning, volcano eruptions, meteor impacts, UV light from the sun, no ozone layer earth before life arose: about 4. 6 billion years old, known because of radiometric dating of meteorites and moon rocks life arose about 3. 8 billion years ago, known because of chemical traces in the rocks, fossilized bacteria was found in rocks 3. 5 billion years ago no spontaneous generation now but must have happened then how to assemble a living thing: accumulation of organic molecules atalyze reactions reproduce from stored genetic info separate the living thing from the outside environment 3 domains of life- bacteria, archaea, eukarya proteins are needed to synthesize more DNA DNA is used to synthesize RNA which is used to make protein...DNA-RNA-Protein Ribozymes: RNA molecule that can catalyze reactions, especially those involved in synthesis and processing of RNA itself Conclusion- earliest cells used RNA to store info

Ribozymes used to catalyze reactions Thursday January 24th Our species has been here for about 200, 000 years PRINCIPLES OF EVOLUTION

Theory- general explanation of natural phenomena, developed through extensive and reproducible observations Hypothesis- tentative explanation of observations, educated guess The origin of species was a book published in 1859 by Charles Darwin Main points of book: Evolution occurs in populations, not individuals Natural selection is the mechanism Observation 1- living things tend to reproduce as quickly as possible. Observation 2- constant population size over time (carrying capacity) Inference- competition for survival; differential reproductive success “ I don't like dogs.

They all smell like dogs and poop on my lawn” variability in structures and behaviors all of this leads to natural selection, organisms best suited to an environment leave the most offspring evolution- the genetic makeup of a population changes over time, driven by natural selection evolution- a change in the allele frequency of a population over time study pakicetus slide 1/29/13 homologous structures suggest common ancestry some homologous structures look different today because of divergent evolution 300 million years ago is when we started to see the type of mammalian limbs similar to the structure today analogous structures= convergent evolution analogous structure do NOT suggest common ancestry similar environmental forces select for similar structures in unrelated organisms vestigial structures- rudimentary form of and organ more fully formed in ancestor “ evolutionary baggage” vestigial structures are a type of homologous structure WHAT IS DARWINS POINT ON EAR? ON TEST Developmental biology- the biology of studying organisms from the

unicellular stage onward WATCH DARWIN VIDEO All living things have DNA and transcribe it into RNA using amino acids Artificial selection- insecticides, antibiotics etc. Know 3 types of natural selection 1. directional selection 2. stabilizing selection 3. disruptive selection 1/31/13 evolution of populations Gregor Mendel- monk who did pea experiments and shed light on the rules of inheritance He worked at the same time as Darwin but his work was overlooked until the 20th century The modern synthesis(early 1940s) - a conceptual synthesis of Darwinian evolution, Mendelian inheritance, and modern population genetics Evolution- a change in phenotypic constitution of a population owing to a situation on heritable variation among phenotypes that changes the genotypic constitution of the population Phenotype- all expressed traits of an organism

Genotype- the entire genetic makeup of an individual Evolution-a change in allele frequency in a population(change in the gene pool) Population genetics-examines the frequency, distribution, and inheritance of alleles within a population Hardy-Weinberg equilibrium- the population genetics theorem that states that the frequencies of alleles and genotypes in a population will remain constant unless acted upon by non-Mendelian processes Allele frequencies- under strict Mendelian inheritance, allele frequencies would remain constant from one generation to the next(Hardy-Weinberg equilibrium) If there is no change in allele frequency there is no evolution Biological species concept- a population whose members can potentially interbreed in NATURE to produce viable reproductive offspring Reproductive barriers- isolate populations from one another

Speciation- the process by which new species form EXAM 1 Two requirements for speciation- reproductive isolation of populations (gene flow significantly reduced) and genetic divergence (divergent evolution) Tuesday Feb 5

Convergent evolution- no common ancestor with that trait, similar environmental things caused the same evolution Divergent evolution- comes from common ancestors but over time the trait changes Proto means before

External barriers

Skin-physical barrier to microbial entry, inhospitable environment for growth; dry, dead cells at surface ; sweat/sebaceous glands secreting acids and natural antibiotics like lactic acid Mucous membranes of respiratory and digestive tracts well-defined; secretions have antibacterial enzymes Cilia-line the inside of trachea; epithelial cells-smokers cough is from lack of cilia Stomach; if microbes are swallowed, acids (low pH) and protein-digesting enzymes destroy them Lines of defense:

Nonspecific internal defense: Phagocytosis cells: white blood cells in extracellular fluid, amoeboid shape, destroy microbes by phagocytosis-search out bacteria, viral particles, cellular debris-produced in bone marrow. Target stuff that is not in your cells **questions about lymphatic system on exam natural killer cells- white blood cells that destroy body cells infected by viruses and cancerous cells by punching hole in them inflammatory response- caused by large scale microbial invasion through a wound histamine released in response to damage which leads to an increased blood flow at and around the wound in order to wash out the wound. Which leads to inflammation other chemicals-> macrophages blood clotting fever= response to microbes establishing major infection. Low grade fever 100-102

can be beneficial slows down microbial reproduction enhances immune system immune response- reaction to specific type of microbe and provides future protection. Involves 2 types of WBC called lymphocytes-B cells and T cells B cells mature in bone marrow T cells are born in marrow but mature in thymus /26/13 humeral cells is same as B cells its called specific immune response because only the cell with the appropriate antibody responds 23,000 coding genes in our genome 3 types of amino acids- hydrophilic, hydrophobic, and ones that can make hydrosulfide bridges most proteins form well with other proteins an antibody is made of four different types of proteins so it takes 4 specific proteins for it to react? Immune system distinguishes self from non self by destroying cells that respond to the body's own molecules Body randomly makes 100,000,000 different antibodies antigen can bind to 1 specific antibody epitope- the three different site where antibodies can bind on a single antigen allergies: type of immune response allergen-recognized as a foreign antigen and binds to B cell - coordinated by the humoral immunity response B cell makes plasma cells, releasing allergy antibodies into the bloodstream Antibodies bind to histamine-containing cells in connective tissue Cells release histamine causing inflammatory response such as mucus 1. irst exposure to pollen stimulates B cells to produce allergy plasma cell 2. plasma cells produce allergy antibodies 3. allergy antibodies bind to mast cells 4. re-exposure to pollen results in pollen binding to allergy antibodies on mast cells 5. binding f pollen stimulates mast cells to release histamine, triggering the inflammatory response allergy medication antihistamines others inhibit production of histamine producing cells people without allergies lack genes for allergy-causing antibodies, or produce less of the antibody ormation of a

pimple acne develops as a result of blockages in follicles formation of a plug of keratin and sebum (made of fat and the debris of dead fat-producing cells) the natural occurring bacteria propionibacterium acnes can cause inflammation the white blood cells build up (forming a whitehead) and then destroy (by phagocytosis) the bacteria to prevent infection chicken pox and shingles caused by same virus symptoms are very different after you have had the chicken pox, you become immune to the virus.

It is impossible that you may have a slight reaction after re-exposure, such as a few spots and a slight fever. However, you will not get a full blown case of chicken pox more than once shingles: causing agent for herpes zoster is varicella zoster virus, a double stranded DNA virus most people are infected with this virus as children, and suffer from an episode of chickenpox the immune system eventually eliminates the virus from most locations, but it remains dormant in the ganglia adjacent to the spinal cord or the ganglion semilunare in the base of the skull