Analyze the study guide essay

Base pairs: always occur in a specific way - A(adenine) always pairs with T(thymine) and C(cytosine) always pairs with (G)guanine. Because of this specific base pairing, the base sequence of one DNA strand determines the base sequence of the other strand. Genetic code: the set of rules that determine how a nucleotide sequence is converted into the amino acid sequence of a protein Genotype: an organism's genetic makeup, the info that codes for all the particular characteristics of the organism. Represents the potential properties an organism has. Phenotype refers to the actual, expressed properties. The manifestation of the genotype.

DNA Replication: one " parental" double-stranded DNA molecule Is converted Into two Identical " daughter" molecules Transcription: is the synthesis of a complementary strand of RNA from a DNA template. Translation: protein synthesis by decoding the " language" of nucleic acids and converting that info into the " language" of proteins. Mutation: a change in the base sequence of DNA Base substitution: aka point mutation. A single case at one point In the DNA sequence Is replaced with a deferent case Missions mutation: when the base substitution results In an amino acid substitution In the synthesized protein

Nonsense mutation: a base substitution resulting in a nonsense code. By creating a nonsense code in the middle of a Mrs.. Molecule, some base substitutions effectively prevent the synthesis of a complete functional protein, only a fragment is synthesized. Frameset mutation: one or a few nucleotide pairs are deleted or inserted in the DNA. Causes deferent amino acid sequences than the original Mrs... Nucleotide analogs: structurally similar to normal nitrogenous bases but have slightly altered base palling

properties. When given to growing cells, the analogs are randomly incorporated into cellular DNA in place of the normal bases.

Then during DNA replication, the analogs cause mistakes in base pairing. Intercalating agents: can cause frameset mutations. Frameset mutagens are usually the right size and have the right chemical properties to slip between the stacked base pairs of the DNA double helix. They may work by slightly offsetting the two strands of DNA, leaving a gap or bulge In one of the strands when these strands are copied during DNA synthesis, one or more base pairs can be inserted or deleted. Often potent carcinogens. UP radiation: causes the formation of harmful covalent bonds between certain bases.

Ex) adjacent thymine's in a DNA strand can cross-link to form thymine dimmer. If not corrected, this can cause serious damage or even death to the cell. X- rays/Gamma rays: can cause the breakage of covalent bonds In the sugar-phosphate backbone of DNA, which causes physical breaks In chromosomes. Spontaneous lab technique that can be used to identify mutants. Take cells that originally can not synthesize histamine on its own in agar that has histamine. Blot with velvet and put onto new agar with and without histamine. The colony that grows on the agar without histamine can be compared to the colony of the masterpiece and it the mutant.

Ames test: the way that bacteria are used to screen chemicals for being carcinogens. If the substance being tested is antigenic, it will cause the reversion at a rate higher than the spontaneous reversion rate. DNA repair is possible, but it not 100% effective. Koch's postulates: 1) the same pathogen

must be present in every case of the disease 2) the pathogen must be isolated from the diseased host and grown in pureculture3) the pathogen from the pure culture must cause the disease when it is inoculated into a healthy, susceptible lab animal.) the pathogen must be isolated from the inoculated animal ND must be shown to be the original organism It is difficult to apply Koch's postulates to some infectious diseases because some microbes have unique culture requirements (can't grow on artificial medias). Vertical gene transfer: occurs when genes are passed from an organism to its offspring Horizontal gene transfer: the transfer involves a donor cell that gives a portion of its total DNA to a recipient cell. (Transformation (mix some DNA with a different cell. New cell integrates new DNA into chromosome), Conjugation (F pills pulls cells together to form mating bridge),

Transduction (generalized: bacterial DNA injected into new cell and it's taken up by the new cells DNA, bringing in new random genes. Specialized: DNA next to phage only), Plasmids/Transposes (plasmids can transfer from one cell to another but can't get into chromosome so when it's replicated one cell loses the resistance. Transposes are implicated in the antibiotic resistance of pantomimic-resistant s. Erasures) Type of horizontal gene transfer Starts with: Has to have to make it work. Transformation Naked DNA Competent cell Conjugation F plasmid F+ cell with F plasmid and sex pills Transduction Virus

Lit: generalized Lessoning: specialized Plasmid/transpose Plasmid (circular)/transpose (linear) Plasmid: ORR, ROT Transpose: transposes (an enzyme that allows it to pop in/out of plasmid to chromosome) Normal microbial disease under normal conditions Transient microbial may be

present for several days, weeks, or months and then disappear. Commercialism one of the organisms benefits and the other is unaffected Mutuality type of symbiosis that benefits both organisms Parasitism one organism benefits by deriving nutrients at the expense of the other, many disease causing bacteria are parasites.

Microbial antagonism (aka competitive exclusion) once established, the normal macrobiotic can benefit the host by preventing the overgrowth of harmful microorganisms ex) the presence of normal macrobiotic inhibits the overgrowth of the yeast Candida Albanians, which can grow when the balance between normal macrobiotic and pathogens is upset and when pH is altered. If the bacterial population is eliminated by antibiotics or excessive douching, the pH of the vagina reverts to nearly neutral, and C. Albanians can flourish and become the dominant microbe leading to a vaginal infection. Ex) the normal macrobiotic of the rage intestine effectively inhibit C. Difficult, possibly by making host receptors unavailable, competing for available nutrients or producing obstetricians. However, if the normal macrobiotic are eliminated (I. E. : by antibiotics) C. Dif can become a problem. Opportunistic pathogens ordinarily do not cause disease in their normal habitat in a healthy person UT may do so in a differentenvironmentor because of decreased immune system. Ex) E. Oil Predisposing factors make the body more susceptible to a disease and may alter the course of the disease. Includes things like: gender, genetic background, climate and ether, inadequate nutrition, fatigue, age, environment, habits, lifestyle, occupation, preexisting illness, chemotherapy, emotional disturbances. Pattern of disease: Incubation period: period between initial infection and 1st

appearance of an s/sex. Paranormal period: mild s/sex period of illness: most severe s/sex period of decline: s/sex decline period of convalescence: person regains strength. Recovery has occurred.

Alexander Fleming discovered the 1st antibiotic (Penicillin) when he saw the zone of inhibition around a contaminating Penicillin mold colony on his bacterial Petri dish. Most antibiotics start out by bring discovered in " wild" microbes as they fight for survival and compete for nutrients. Narrow spectrum antibiotics: only target gram - or gram + bacteria, typically not both Broad spectrum antibiotics affect a broad range of gram + or gram - bacteria. One possible side effect of using this type of antibiotic is the risk of superscription by normal flora such as that seen in Candida Albanians yeast infections or with C. If bacterial overgrowth. Bactericidal: kill microbes directly Biostatistics: prevent microbes from growing 5 main targets of antibiotic drugs:)inhibiting cell wall synthesis (penicillin, cosponsoring, backtracking, pantomimic) 2) inhibiting protein synthesis (chlorination, erythrocytes, tetracycline, 4) inhibiting nucleic acid synthesis (reframing, questioned) 5) inhibiting synthesis of essential metabolites (sulfanilamide, thermopile) Disk- diffusion method (Kirby-Bauer test): disks soaked in antibiotic are put onto agar that has been uniformly inoculated with bacteria.

During incubation a zone of inhibition forms around the disks that are effective against that particular bacteria. The zone of inhibition can be measured and is compared to a standard table for that drug and incineration. The organism is then reported as sensitive, intermediate, or resistant. Main ways bacteria can become resistant to antibiotics 1) blocking entry of the antibiotic 2) inactivating enzymes that are targeted by the

antibiotic 3) altering the target molecule that the antibiotic binds to 4) efflux of the antibiotic by pumping it back out if it enters the cell Antibiotic misuse: being used without a prescription, physician oversight, using dose regimens that are too low or too short in duration, using out dated or impure antibiotics, using antibiotics for viral infections

Therapeutic index: evaluating the side effects of the drug versus the benefits of use Synergism: the chemotherapeutic effect of 2 drugs given simultaneously is sometimes greater than the effect of either given alone Antagonism: the simultaneous use is often less effective than when either drug is used alone Factors contributing to emerging infectious diseases: new strains resulting from genetic recombination between organisms, new crossovers from changes in or evolution of existing microorganisms, widespread use of antibiotics and pesticides, global warmingand changes in weather patterns leading to increased distribution and arrival of reservoirs and vectors, known diseases spread by modern transportation to new areas, previously unrecognized infections in regions of ecological change brought about by natural disaster, construction, wars, or expanding human settlement, animal control measures leading to rising animal reservoir populations when predators are removed, andfailurein publichealthmeasures such as when people fail to get vaccinated as recommended. How Bacterial pathogens damage host cells Extension: because of the enzymatic nature of most extension, even small amounts are quite harmful because they can act over and over again. Can be gram - or gram . Work by destroying particular parts of the host's cells or by inhibiting certain metabolic functions. They are highly specific in their effects on body tissues. Proteins. Superannuating:

antigens that provoke a very intense immune response. Through a series of interactions with various cells of the immune system, superannuating nonsensically stimulate the proliferation of T cells.

In response to superannuating, T cells release enormous amounts of cytokines that enter the bloodstream causing fever, nausea, vomiting, diarrhea, and sometimes shock and death. Antitoxins: are part of the outer portion of the cell wall of gram - bacteria. Alphanumerically. Released with gram - cells die. Exert their effects by stimulating macrophages to release cytokines in very high concentrations. At these levels they are toxic. All antitoxins cause the same signs and symptoms although not to the same degree: chills, fever, weakness, generalized aches, shock and death. Another consequence of antitoxins is the activation of blood-clotting proteins resulting in decreased blood hide from the host's immune system in the host's cells.

Enzyme-linked misbegotten assay (ELISE): direct ELISE: detects antigens such as HOC in pregnancy testing indirect ELISE: detects antibodies such as in the HIVE test HIVE particles attach specifically to receptors on CDC T cells. New HIVE glades (Greek for branches) keep evolving as the virus mutates. Phases of HIVE Phase 1 : symptomatic or chronic lymphocyte's where there is a lot of HIVE in the blood but then immune system causes a sharp depletion in virus numbers in the blood within a few weeks phase 2: symptomatic, where early signs of immune failure are seen. The numbers of T cells declines steadily. HIVE replication continues but at a relatively slow rate. Hash 3: Clinical AIDS emerges, usually within 10 years of infections. T cell numbers are below celled/LU. (200 cells/LU defines AIDS) Important AIDS

indicators appear such as: Candida Albanians infections of the bronchi, trachea or lungs; pneumatics pneumonia, taxonomists of the brain, and kapok's sarcoma. Corrosiveness: A problem with antibody-type testing is the window of time between infection and the appearance of detectable antibodies. This interval can be as long as 3 months. Pneumatics pneumonia is seen in AIDS patients because while the pathogen can be found in human lungs, if the patient is incompetents they will have few or no symptoms.

The loss of an effective immune system defense allowed he activation of a latent infection. Template Process Enzyme Product DNA Replication DNA polymerase Transcription RNA polymerase RNA Translation Ribosome Protein Reverse transcription Reverse transcripts Agonized is used for mycobacterium. Some pathogens use sidestrokes to steal iron from the host. Others use the host cell for nutrients and produce damaging waste products or rupture host cells. Transcription: to turn DNA into RNA, copy the letters but turn It's into Us (RNA is complimentary would be: TAGS AC ACT ACT AT EGG ACT AC 5' transcribed to RNA: 3' I-JAG AC COG AC AAU EGG ICC AC 5' each group of 3 then translated onto an amino acid using a chart.

Communicable disease: any disease that spreads from one host to another, either indirectly or directly Incommunicable disease: not spread from one host to another. These diseases are caused by microorganisms that normally inhabit the body and only occasionally produce disease or by microbes that reside outside the body and produce disease only when introduced into the body such as tetanus. Symptoms: changes in body function Signs: objective changes the physician can observe and measure Syndrome: a specific group of sings or symptoms that may always accompany a particular disease

Incidence: the number of people in a population who develop a disease during a particular time period.

Prevalence: the number of people in a population who develop a disease at a specified time, regardless of when it first appeared. Takes into account old and new cases. Sporadic disease: a disease that occurs only occasionally ex) typhoid fever in the US Endemic disease: a disease constantly present in a population ex) common cold Epidemic disease: if many people in a given area acquire a certain disease in a relatively short period ex) flu Pandemic disease: an epidemic disease that occur worldwide ex) AIDS Acute disease: a disease that evolves rapidly but lasts only a short time ex) flu Chronic disease: develops more slowly and the body reactions may be less severe, but the disease is likely to continue to recur for long periods.

Ex) hepatitis B and TAB Subspace disease: a disease that is intermediate between acute and chronic Latent disease: a disease in which the causative agent remains inactive for a time but then becomes active to produce symptoms of the disease ex) shingles Local infection: one in which the invading microbes are limited to a relatively small area of the body ex) boils and abscesses Systemic infection: microbes or their products are spread throughout the body by the blood or lymph. Ex) measles Focal infection: sometimes agents off local infection enter a blood or lymphatic vessel and spread to other specific parts of the body, where they are confined to specific areas of the body.

Ex) can arise from infections in the teeth, tonsils or sinuses Sepsis: a toxic inflammatory condition arising from the spread of microbes (especially

bacteria and their toxins) from a focus infection skepticism: aka blood poisoning is a systemic infection arising from the altercation of pathogens in the blood bacteria: the presence of bacteria in the blood tootsie: refers to the presence of toxins in the blood (as occurs in tetanus) vermin: refers to the presence of viruses in blood primary infection: an acute infection that causes initial illness secondary infection: one caused by an opportunistic pathogen after the primary infection has weakened the body defenses.

Substantial (unapparent) infection: one that does not cause any noticeable illness ex) Heap A and polio can be carried by people who never develop the illness Herd immunity: as long as enough people are vaccinated most of the population will be safe from those diseases Three main ways that the causative agents of an infectious disease can be transmitted from the reservoir of infection to a susceptible host: contact, vehicle, and vector transmission Direct contact agent by physical contact between its source and a susceptible host, no intermediate object is involved ex) kissing, touching and sex Indirect contact transmission: occurs when the agent of the disease is transmitted from its reservoir to a susceptible host by means of a nonliving object (or finite) Droplet transmission: a type of contact remission in which microbes are spread in droplet nuclei (mucus droplets) that travel only short distances ex) discharged by sneezing, coughing, etc Vehicle transmission: the transmission of disease agents by a medium such as water, foodor air. Vectors: animals that carry pathogens from one host to another (arthropods most important) mechanical transmission: the passive transport of the pathogens on the insect's feet or other body parts ex) house flies biological transmission: is an active process and is more complex. The

arthropod bites an infected person or animal and ingests some of the infected blood. The pathogens then reproduce in the vector, and the increase in the number of pathogens increases the possibility that they will be transmitted to another host.

Ex) anopheles mosquito: malaria Epidemiology: thesciencethat studies when and where diseases occur and how they are transmitted in populations Morbidity: the incidence of specific noticeable diseases Mortality: the number of deaths from these diseases Noticeable infectious diseases: are diseases for which physicians are required by law to report cases to the US Public Health Service. As of 2008, a total of 63 infectious diseases were reported at the national level. Cad's (Centers for Disease Control) Morbidity and Mortality Weekly Report (MAR): contains data on morbidity and mortality. These data are organized by state and read by microbiologists, physicians and other hospital and public health professionals. Contributors to pathogenic: capsules: resist phagocytes and promote adherence M protein in the cell wall: helps bacteria bind to host cell and helps bacteria to resist phagocytes by Webs familiar in the cell wall: cause host cells to take up bacteria coagulate enzyme: promotes blood coagulation (clotting).

These clots may protect the actinium from phagocytes and isolate from other defenses streptomycin's enzyme: breaks down fibrin in blood clots hollandaise and collagen's enzymes: break down components of human connective tissue and facilitate the spread of the bacterium Gig protease enzymes: help to destroy human Gig antibodies secreted in some body fluids invasions: promote bacterial uptake via riffing Antigenic variation will help a pathogen hide from the immune system by changing their surface antigens

(shapes) so the immune system can't recognize them. Actions of extension: membrane-disrupting, superannuating that can cause cardiovascular shock due to creased BP.

Psychotic diphtheria toxin botulism toxin that causes flaccid paralysis tetanus toxin causes spastic paralysis cholera toxin causes the secretion of large amounts of fluids and electrolytes into the intestines leading to extreme diarrhea Indention is the lipid A portion of the alphanumerically (ALPS) in gram - cell walls and it causes inflammation leading to dilated capillaries which can lead to septic shock and possibly disseminated providing the immune system with a primary exposure (leading to formation of antibodies and long-term memory cells) so subsequent exposure to a pathogen leads o a secondary immune response which is much more robust. Bastardization: eliminates pathogenic microbes. In milk, it also lowers microbial numbers which prolongs milks quality under refrigeration. Shish toxin causes severe illness and has emerged as a leading cause of bedroom illness. It is found in E. Coli 0147: HUH because of specialized transduction (a form of horizontal gene transfer) so the common 0157: HA strain is the result of a recombination of E. Coli DNA with the gene for Shish toxin from Shillelagh. Shish toxin is from Shillelagh species and destroys tissue in the intestinal wall leading to dysentery.