

Bt102 objective and subjective notes for final term

1) Chemicals as _____ agents

- a) Microbial
- b) Antimicrobial
- c) Preventable
- d) Both a and c

2) **Alcohols** Require water _____ is more effective than _____?

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- a) 60%, 90%
b) 70%, 100%
c) 80%, 100%
d) 50%, 90%
- 3) Which of the following includes in Heavy Metals ____
a) Ag
b) Hg
c) Cu
d) All of these
- 4) ____ may be used to prevent gonorrheal ophthalmia neonatorum
a) Silver nitrate
b) Mercury chloride
c) Methyl mercury
d) Silver sulphadiazine
- 5) ____ used as a topical cream on Burns and ____ is an algicide
a) Silver sulfadiazine, Copper sulfate
b) Methyl mercury, Silver sulphadiazine
c) Silver nitrate, Copper sulfate
d) None of these
- 6) ____ Inhibit metabolism and Control molds & the bacteria in foods & cosmetics
a) Organic acids
b) Inorganic acids
c) Both of these
d) None
- 7) Which of the following Antibiotic prevent spoilage of cheese?
a) Nisin
b) Natamycin
c) Nitrite
d) Both a and b
- 8) Which of the following used in Medical equipment?
a) Glutaraldehyde
b) Formaldehyde
c) Ortho-phthalaldehyde
d) All of these
- 9) A host of chemicals can be used for
a) Microbial control
b) Ionization
c) Sterilization
d) Denaturation
- 10) Ionizing Radiation are used for ____
a) Damage of DNA
b) Devastation of DNA
c) Destruction of DNA
d) Scratching of DNA
- 11) Nonionizing Radiation are used for ____
a) Devastation of DNA
b) Damage to DNA
c) Scratching of DNA
d) Destruction of DNA
- 12) What are Physical methods of microbial control and their mechanisms of action?
Moist Heat: Boiling includes Protein denaturation (PD), Autoclaving – PD, Pasteurization – PD
Dry Heat includes Direct flaming: Burning to ashes, Incineration: Burning to ashes, Hot air
Sterilization: Oxidation
Filtration includes Physical separation of bacteria from suspending liquid.
High Pressure includes Alteration of molecular structure of proteins and carbohydrates.
Desiccation Disruption of metabolism
Osmotic Pressure Plasmolysis
Radiation: Ionizing – Destruction of DNA, Nonionizing – Damage to DNA
- 13) What are Chemical methods of microbial control and their mechanisms of action?

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1-Phenol and Phenolics: includes Disruption of plasma membrane, Denaturation of enzymes, Bisphenols for example Disruption of PM

2-Biguanides: Chlorhexidine– Disruption of PM

3-Halogens: Iodine and chlorine, Inhibit protein function, Oxidizing agent, Alters cellular components

4-Heavy metals • Protein denaturation

5-Surface Active Agents: Soaps and detergents– Mechanical removal, Acid-anionic sanitizers– May involve enzyme inactivation or disruption, Quaternary ammonium compounds, Quaternary ammonium compounds (cationic detergent) – Enzyme inhibition, – Protein denaturation, – Disruption of plasma membrane

6-Food Preservatives: Organic acids– Metabolic inhibition, Nitrates/Nitrites – Inhibits iron containing enzymes of anaerobes

7-Aldehydes • Protein denaturation

8-Chemical Sterilization: Ethylene Oxide – Inhibits vital cellular function

14) _____ is The study of what genes are, how they carry information, how information is expressed, and how genes are replicated

- a) **Genetics**
- b) Microbiology
- c) Molecular biology
- d) genomics

15) _____ is A segment of DNA that encodes a functional product, usually a protein

- a) **Gene**
- b) Chromosome
- c) Phenotype
- d) Genotype

16) _____ is the Structure containing DNA that physically carries hereditary information; the chromosomes contain the gene

- a) **Chromosome**
- b) Gene
- c) Phenotype
- d) none

17) _____ defined as All the genetic information in a cell

- a) Chromosome
- b) **Genome**
- c) Gene
- d) None

18) **Genomics** is The molecular study of _____

- a) **Genomes**
- b) Chromosome
- c) Genes
- d) Phenotype

19) **Define genotype and phenotype?**

Genotype: The genes of an organism **Phenotype:** Expression of the genes

20) **What is Gene Transfer**

Vertical gene transfer referred to as Parents to offsprings

Horizontal gene transfer referred to as – From cells to cells within the same generation and From bacteria to bacteria and also contains Donor cell, Recipient cell, Transformation, Conjugation, Transduction

21) **Define Transformation?**

Naked DNA is transferred Frederick Griffith observed this in 1928. For example **Strep pneumonia**. Transformation can occur in vitro• In broth culture, live noncapsulated organisms cultured. Dead capsulated cells mixed with it. Capsulated bacteria were recovered from broth. Research revealed it to be DNA. Competent cells: that take up the DNA Not all cells do it naturally.

22) Transformation is uptake of naked _____ by microbes

- a) **DNA**
- b) RNA
- c) mRNA
- d) ssDNA

23) What is conjugation?

Conjugation: Mediated by a plasmid. Plasmid is an extrachromosomal circular DNA fragment. Replicates independently of chromosome. Genes of plasmids not important for bacterial growth.

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Requires direct cell to cell contact. Opposite mating types cells Plasmids in G⁻ cells have genes that code for sex pili. G⁺ secrete sticky surface molecules. These plasmids are transmissible from one bacterium to another during conjugation. Plasmid is replicated and a single copy of the plasmid is transferred to the recipient bacterium. Complementary copy is then made. Fertility factor carrying plasmid was the first plasmid studied (F).

24) Hfr abbreviated by _____

High frequency recombination cells

25) What do you know about Hfr?

If F factor gets integrated into the chromosome of the recipient cells, the bacterium becomes high frequency of recombination cell (Hfr).

26) _____ can be used for gene mapping on the chromosomes

a) Conjugation

b) Transformation

c) Transduction

d) None

27) Transfer of _____ by a virus called bacteriophages

a) RNA

b) DNA

c) Protein

d) Cell

28) When Phages can transfer DNA the process is called _____?

a) transformation

b) Transduction

c) Renovation

d) Makeover

29) _____ is the science of classifying organisms with orderly arrangements?

a) Converging

b) Transduction

c) phylogeny

d) Taxonomy

30) _____ is The study of the evolutionary history of organisms

a) Systematics

b) Phylogeny

c) Texonomy

d) Both a or b

31) _____ is the Population of cells derived from a single cell

a) Gene

b) Clone

c) Strain

d) All of these

32) _____ Are/is Genetically different cell/cells within a clone

a) Gene

b) Clone

c) Strain

d) All of these

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33) Who gave two kingdoms concept Plantae and Animalia in 1735?

- a) Ernst Haeckel
- b) Carolus Linnaeus
- c) Carl von Nägeli
- d) Edouard Chatton

34) _____ Introduced the term prokaryotes in 1937?

- a) Edouard Chatton
- b) Carl von Nägeli
- c) Edouard Chatton
- d) Ernst Haeckel

35) Robert G.E. Murray Proposed kingdom Prokaryotae in _____?

- a) 1968
- b) 1986
- c) 1896
- d) 1869

36) Carl von Nägeli proposed the concept of Bacteria and fungi in kingdom Plantae in _____?

- a) 1858
- b) 1859
- c) 1985
- d) 1958

37) Ernst Haeckel Proposed Kingdom Protista for bacteria, protozoa, algae, and fungi in _____ and Fungi placed in their own kingdom in _____?

- a) 1863, 1956
- b) 1864, 1957
- c) 1865, 1958
- d) 1866, 1959

38) _____ in 1859 proposed the concept of Bacteria and fungi in kingdom Plantae

- a) Edouard Chatton
- b) Carl von Nägeli
- c) Ernst Haeckel
- d) Both a and b

39) _____, 1969 gave the concept of five kingdom system?

- a) Robert H. Whittaker
- b) Robert G.E. Murray
- c) Ernst Haeckel
- d) Carl von Nägeli

40) Based on ribosomal differences in Prokaryotes – Archaea – Bacteria in Eukarya – Animals, plant, fungi

- a) Robert G.E. Murray, 1969
- b) Carl R. Woese, 1978
- c) Ernst Haeckel, 1954
- d) Carl von Nägeli, 1989

41) Based on similarities in ribosomal RNA living organisms are classified into _____ domains

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- a) Two
 - b) Three
 - c) Four
 - d) Five
- 42) Based on similarities in ribosomal RNA living organisms what are three domains?
Bacteria, archaea and eukarya
- 43) What is Taxonomic Hierarchy
- Domain
 - Kingdom
 - Phylum
 - Class
 - Order
 - Family
 - Genus
 - Species
- 44) infectious viral particle, composed of nucleic acid, surrounded by a protein coat called ____?
- a) Virus
 - b) Capsid
 - c) Virion
 - d) Viriod
- 45) Viruses have an extracellular & an intracellular state. Outside of a cell, in the extracellular state, a virus is called a ____?
- a) Viriod
 - b) Capsid
 - c) Virus
 - d) Virion
- 46) ____ referred to as the infectious circular RNA of plants. Formed of only RNA, Protein coat is absent. Smaller in size than a typical virus. Infects plants only
- a) Viriod
 - b) Virion
 - c) Virus
 - d) capsid
- 47) What is Structure of Virus?
- Nucleic Acid:** Either DNA or RNA (never both) – Single or double stranded, – Circular or linear, – One segment or multiple Segments
- Capsid:** made up of protein subunits, capsomeres. – Capsomeres: subunit proteins can be single type or multiple types.
- Capsid:** made up of protein subunits, capsomeres. – Arrangement of capsomeres is characteristic of a particular type of virus.
- 48) In some viruses, the capsid is May or may not have spikes (carbohydrate-protein complexes) projecting from the surface of the envelope.
- 49) Most viruses infect only specific types of cells in ____ host
- a) One
 - b) Two
 - c) Three
 - d) four
- 50) Host range is determined by ____ attachment sites and cellular factors.
- a) Helical virus
 - b) Specific host
 - c) Capsid virus
 - d) None of these
- 51) Capsid Architecture referred to which of the following options? for example – Rabies virus

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- a) these are Helical Viruses
- b) these are Resemble long rods
- c) these are rigid or flexible
- d) all of these

52) What referred to as Polyhedral Viruses?

- a) Icosahedron
- b) Polyhedron
- c) Tetrahedron
- d) Dihedron

53) Polyhedral viruses have Regular polyhedron with ____ Example Poliovirus.

- a) 20 triangular faces
- b) 12 corners
- c) Both of these
- d) 10 triangle faces

54) Which of the following is Enveloped Viruses?

- a) Herpes virus
- b) Influenza virus
- c) Polio virus
- d) None of these

55) ELISA abbreviated by?

Enzyme Linked Immunosorbent Assay

56) What is Serological Testing?

Some antigen antibody reactions are not visible to the eyes. Such reactions are visualized indirectly using various probes. Probes include enzymes, radioisotopes etc. Enzymes or radioisotopes are conjugated to antibodies Presence of enzymes detected by incubating with substrate that forms colored compounds.

57) ELISA used for ____ detection in a sample.

- a) Antigen
- b) Antibody
- c) Both of these
- d) None

58) Proteins from microbes are separated by ____

- a) Electrophoresis
- b) PCR
- c) Diagnosis
- d) None

59) Which of the following is Nucleic acid base microbial detection method?

- a) DNA probes
- b) DNA chip
- c) PCR
- d) All of these

60) ____ can be used for diagnosing various diseases.

- a) DNA chip
- b) DNA probes
- c) PCR
- d) Blotting

61) What are fungi?

Fungi are eukaryotes, Multicellular except yeasts, Molds and Yeasts

Nomenclature used to define fungi.

General Features Kingdom: Fungi

Chemoheterotrophs Acquire nutrients by absorption. Asexual and Sexual reproduction

Hyphae: Thread like filaments of a fungus

Mycelium: Collection of hyphae

Thallus: Collection of mycelia

Mold: Filamentous fungi

Yeast: unicellular fungus

Mycology: Study of fungi

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62) What are Types of Hyphae

Septate: Cross-walls, divide hyphae into uninucleate cell-like units

Non-septate or coenocytic – No septum

Vegetative Hypha: Absorbs nutrients

Aerial or reproductive hypha: Bears reproductive spores

63) What are Types of Spores?

Asexual spores formed by mitosis of hyphal cells

Conidiospores: Unicellular or multicellular spore not enclosed by a sac

Sporangiospores: Enclosed by a sac

Conidiospores **Conidia:** Chain of spores at the end of a conidiophore *Aspergillus*

Arthroconidia: spores formed by fragmentation of septate hypha – *Coccidioides immitis*

Blastoconidia: spores as budding of the parent cells – *Candida albicans*

Chlamydoconidia: spores formed by rounding and enlargement within a hyphal segment – *Candida albicans*

Sporangiospores: Formed within a sporangium or sac at the end of an aerial hypha called sporangiophore – *Rhizopus*

64) Write a note on Sexual Spores

Plasmogamy: A haploid nucleus of a donor cell (+) penetrates the cytoplasm of a recipient cell (-).

Karyogamy: The (+) and (-) nuclei fuse to form a diploid zygote nucleus.

Meiosis: The diploid nucleus gives rise to haploid nuclei (sexual spores).

65) What is a yeast?

Also called Dimorphic fungi

66) These have Sexual Spores, Non-filamentous fungi, Unicellular, Reproduce by budding (asexually) or sexually Some are dimorphic for example Yeast: at 37°C and Molds at Room temp. Yeasts are Larger than bacteria No flagella or cilia these are Facultative anaerobes these are Larger than bacteria these have No flagella or cilia Facultative anaerobes, Gram positive, Yeasts are unicellular Some are dimorphic these have Both sexual and asexual reproduction these are Bigger than bacteria Yeast can ferment & can produce various products • Biochemical testing is used for yeast identification.

67) _____ Identified by morphology, not by biochemical testing

- a) **Aspergillus**
- b) **Filamentous fungi**
- c) **Trichophyton**
- d) **None of these**

68) _____ is used for yeast identification

- a) Morphology
- b) Blotting
- c) **Biochemical testing**
- d) All of these

69) Which of the following is included in uses of yeast?

- a) *Saccharomyces* for alcoholic beverages
- b) Anaerobic conditions for alcohol
- c) Aerobic conditions for Bread making
- d) **All of these**

70) PAMPs means _____?

Pathogen associated molecular patterns

71) What are uses of Fungus

- **Citric acid:** *Aspergillus niger*
- **Cellulase:** *Trichoderma* (plant cell digestion to clear fruit juices)
- **Taxol:** *Taxomyces* (anticancer)
- **Biological pest control:** Entomophaga (kills gypsy moth)
- **Penicillin:** *Penicillium*

72) What Diseases by Fungi can occur?

- **Mycosis** is a general term used for fungal diseases
- **Systemic mycosis:** Deep within the body for example– histoplasmosis and coccidioidomycosis
- **Subcutaneous Mycosis:** Beneath the skin for example– Sporotrichosis in gardeners and farmers
- **Cutaneous Mycosis:** – *Trichophyton* use keratinase to degrade keratin in nails, hair and skin – Ringworm infections

73) Write a note on Lichens Uses of lichens

Combination of green alga or a cyanobacterium (phycobiont) & a fungus (Mycobiont)

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Symbiotic relationship, Partners do not grow alone, Grow where no other microbes can grow, Grow on bare rocks, tree trunks & house roofs & bare soils, Typically grow extremely slowly 1 mm to 3 cm per year, Classified on the basis of the fungus, Dyes for clothes, Usnic acid as antiseptic in China
• Erythrolitmin: for Litmus paper, Can cause allergic contact dermatitis.

Types of Lichens • **Crustose**: forms a thin crust, **Foliose**: Leaf-like, **Fruticose**: Finger-like projections

74) Write a note on Algae and its reproduction?

Simple eukaryotic cells, Some are unicellular, others are multicellular (thallus). Lack tissues (roots, stem & leaves) seen in plants. Absorb nutrients from water through their surfaces. Mostly photoautotrophs, a few are chemoheterotrophs mostly aquatic (water is necessary for physical support, reproduction and diffusion of nutrients). Cell covering thallus can carry photosynthesis. Some algae float by gasfilled bladders. Their location in oceans depends on the availability of nutrients, wavelength of light and the surface on which to grow.

Reproduction: All algae can reproduce asexually for example- Multicellular algae: a fragment can form a new thallus- Unicellular algae: mitosis followed by cytokinesis

Sexual reproduction: Alternation of generations of haploid and diploid individuals

75) What is Algae, Types of algae, Uses of algae?

Phaeophyta (Kelp): these are Brownish in color, Cellulose and alginic acid cell walls, Multicellular Chlorophyll a and c, xanthophylls, Store carbohydrates, Harvested for algin

Rhodophyta: these are Reddish in color. Cellulose cell walls, Most are multicellular, Chlorophyll a & d, phycobiliproteins, Store glucose polymer, Harvested for agar & carrageenan

Chlorophyta: these are Green algae. Cellulose cell walls, Unicellular or multicellular, Chlorophyll a and b. Store glucose polymer, Believed to have given rise to terrestrial plants

Bacillariophyta: these are Brownish in color, Pectin & silica, cell walls, Unicellular, Chlorophyll a & c, carotene, xanthophylls, Store oil, Fossilized diatoms formed oil. Produce domoic acid.

Dinoflagellata Brownish in color, Cellulose in plasma membrane, Unicellular, Chlorophyll a & c, carotene, xanthins, Store starch, Some are symbionts in marine animals, Neurotoxins cause paralytic shellfish poisoning.

Oomycota: these are Colorless, white Cellulose cell walls. Multicellular, Chemoheterotrophic.

Produce zoospores, Decomposers and plant parasites, *Phytophthora infestans*: responsible for

Irish potato blight Decomposers and plant parasites, *P. cinnamomi* infects Eucalyptus. *P. ramorum* causes sudden oak death

76) What are Complex Viruses?

Their Head is polyhedral for example N.Acid Tail sheath is helical. Bacteriophage

77) In _____ Family names end in -viridae. Genus names end in -virus. Herpesviridae, Herpesvirus

- Viral Taxonomy
- Complex classifications
- Genes classification
- All of these

78) Define Viral species?

A group of viruses sharing the same genetic information and ecological niche (host). Common names are used for species. Subspecies are designated by a number. Human herpes virus HHV-1, HHV-2, HHV-3.

79) What do you know about Viral Multiplication

Attachment: Viruses attach to cell membrane. Host cell receptors (determines the range of infectivity) **Entry**: Penetration by **pinocytosis** (plasma membrane folds inwards to form a vesicle)

Fusion: Viral envelope fuse with plasma membrane & releases the capsids into the cell's cytoplasm.

Uncoating: Separation of viral NA from its protein coat by viral or host enzymes. (undergoes eclipse period) **Biosynthesis**: Production of nucleic acid and proteins. **Maturation**: Nucleic acid and capsid proteins assemble. **Release** by budding (enveloped viruses) or rupture. Early proteins, Late proteins, Genome replication, Assembly, Release

80) Consequences of Viral Infection includes _____

- Lysis of cell occur
- Are Microscopic and macroscopic
- Degenerative changes
- All of these

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81) Latent infection means ____?

Virus does not replicate

82) Persistent infection can be explained that ____?

Virus replicates but slowly

83) Transformation means ____

a) Carcinogenic cell transfer

b) Tumor cells

c) Live cell

d) None of these

84) What is Cultivation of Viruses?

Need live cells to grow and Animals Embryonated eggs Cell Cultures for example Plants and animal

85) Write note on Virus Enumeration

Plaques formation: – It is equivalent to bacterial colony – Plaque is an area where the virus infection has lysed the cells. Plaque assay: Plaque forming units are counted. Infectious dose 50% (ID50) – TCID₅₀. Lethal dose 50% (LD50)

86) What are Virusoids?

Also called Satellite RNA, circular ssRNA, Encode one or two genes products, Need helper virus to infect host cells, Human hepatitis D virusoid, Uses hepatitis B virus as helper Prions, Proteinaceous infectious particles, Cause neurodegenerative diseases– Scrapie in sheep, – Bovine spongiform encephalopathy, Kuru in humans Abnormal form of cellular proteins How this happens, not clear, Genetic component involved.

87) What is Epidemiology Methods

Descriptive: (recording the data about disease) Location and time of cases of disease, Gender, health, age of patients etc. Analytical: (To determine the cause of disease) – Analysis of data. Mode of transmission & means to prevent disease. Experimental Epidemiology– Hypothesis of a disease is tested– Application of Koch's postulates

88) Define Epidemiology?

Case reporting: Health care workers report specified disease to local, state, and national offices– Incidence and prevalence of disease. Incidence and prevalence of disease– Origin and spread of a disease– Data helpful for control measures. Nationally notifiable diseases: Physicians are required to report occurrence– Highly communicable. Highly communicable Associated with greater economic losses– Belong to diseases that have been eradicated. Morbidity: Incidence of a disease. Morbidity rate: Number of people affected in relation to the total population in a given time period. Mortality: Deaths from a disease. Mortality rate: Number of deaths from a disease in relation to the population in a given time. Pathogenicity: The ability to cause disease. Virulence: The extent of pathogenicity. Pathology: Study of diseases. Cause of the disease: Pathogenesis: how disease establishes itself Structural and functional changes. Infection: invasion by the microbes. Disease: dysfunction. Microbiome: Microbial communities that live in or on humans. Normal microbiota or flora: permanent residence but do not cause diseases under normal conditions. Transient microbiota: present for several days, weeks or months and then disappears

89) What determines the distribution and composition of Microbiota:?

Nutrients, Physical and chemical factors pH, O₂, CO₂ Host defenses, Stress, age

90) What is Symbiosis?

Living together is symbiosis

Mutualism: both are benefited

Parasitism: one is harmed

Commensalism: One is benefited, other is unharmed.

91) What is Microbial antagonism?

It is a competitive exclusion. Compete for nutrients. By chemicals. Bacteriocins by E. coli suppresses Salmonellae. Clostridium difficile: Normal microbiota keeps it low but antibiotics can result in diarrhea

92) What are Opportunistic pathogen?

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Normal microbiota under stress conditions can cause infections. Description of diseases. Stages of diseases. Sources of infection **Endemic**: consistently present, but with low incidence. Infected ones are reservoir of infection **Epidemic**: within an area, unusually high incidence of a disease **Pandemic**: World wide epidemic **Incidence**: # of new cases in a given time period in a population **Prevalence**: New + existing cases

93) What is Disease Progression?

Infection: colonize and grows in body **Incubation period**: time b/w infection and diseases **Acute period**: height of disease

94) What is Disease Progression?

Decline period: Disease symptoms subside **Convalescent period**: patient returns to normal

Reservoir: Sites where organisms of infections remain viable, Act as source of infection. **Inanimate objects**: saprophytic (CI. tetani), Difficult to eradicate **Animate**: live in the body, Spread from person to person, By direct or indirect contact **Single host organisms**, Can be eradicated or controlled

95) What are Zoonosis?

Primarily an animal infection, but can be transmitted to humans, Can assume epidemic proportions in humans, Difficult to control or eradicate.

96) What is a Carrier?

A living carrier is a pathogen infected individual who does not show any signs or symptoms of the disease. A potential source of infection for others. Typhoid Mary story

97) What is Contact Transmission?

Direct: person to person, Physical contact, Influenza **Indirect**: A nonliving object is involved

Fomite: any nonliving object (towel, bedding) **Droplet**: mucus droplets

98) What are Vehicle Transmission Biofilms: Dental plaques are an example of biofilm.

Transmission by a medium: Waterborne, Foodborne, Airborne. Blood, other body secretion.

99) What are Vectors?

Arthropods: **Mechanical** transmission (Passive), **Biological** transmission (Active), Nosocomial Infections

100) What is Adherence?

Adhesion is mediated by adhesins or ligands to the receptors. Adhesins present on glycocalyx, pili, fimbriae, or flagella. These are glycoproteins or lipoproteins. Biofilms Dental plaques is an example of biofilm

101) What is Defense Evasion?

Capsule: Impairs phagocytosis, Antibodies can help, Only a few bacteria produce capsule, *Strep pneumonia*, *Klebsiella pneumonia* **Cell wall components**: **M protein** Found on cell surface and fimbriae. Resists phagocytosis. *Strep pyogenes* **Cell wall components**: **Mycolic Acid**: Resists phagocytosis **Enzymes**: (exoenzymes) **Coagulase**: blood clotted Bacteria is trapped or hides itself in the clot, Staphs produce it. **Hyaluronidase**: Dissolves CT, Bacteria can spread easily. **Collagenase**: Breaks down collagen, **IgA protease**: Digests IgA antibodies **Antigenic variation**: Influenza virus, *Neisseria gonorrhoeae*

102) How organisms cause damage to the body?

Factors that aid in setting up of an infection.

Damage by Microbes: Nutrient depletion, Siderophores for iron, Direct damage by invasion, Toxins, Hypersensitivity reactions, Nutrient depletion, Siderophores for iron, Lactoferrin,

Transferrin, ferritin, **Direct damage**: Bacteria that grows in host cells rupture the cells and spread further.

Toxin production: Exotoxins Antitoxins, Toxoid, A-B toxins, Toxin Types: A-B toxins:

diphtheria toxin: Membrane disrupting toxins: Cause lysis of cells, Leukocidins, Hemolysins, Toxin Types: Superantigens: Provoke intense immune response Cytokines are released by T cells. **Toxin**

production: Endotoxin, Fever, Shock, Limulus amoebocyte lysate assay (LAL), Hemolymph from horseshoe crab

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103) What is immunity?

Immunity: Ability of the body to protect itself from harmful effects of diseases. Susceptibility: lack of immunity

104) What are Types of immunity

Innate: Present at birth, Adaptive: Acquired by experience, Innate Immunity: Present at birth, Rapid to respond, Nonspecific, Do not increase in response with repeated exposures to the same agent, Have no memory

105) What are lines of defense?

1st Line of Defense: Physical Factors: Skin, Mucus membrane, mucus, Lacrimal apparatus, Cilia, Urine, Earwax, Peristalsis, Vomiting, Diarrhea & Defecation. **Chemical Factors:** Cebum, pH of the skin (3-5), Lysozyme in sweat, tears, saliva, body fluids and urine, Acidic pH of stomach **2nd Line of Defense: Leukocytes**, Granulocytes, Neutrophils, Eosinophils, Basophils

106) What are immunities?

Adaptive Immunity: Specific, Have memory, Increase with repeated exposure, Slower to respond, **Humoral immune response** **Cellular immune response** **Innate Immunity: Toll like receptors (TLRs):** Protein molecules on defensive cells, **Pathogen associated molecular patterns (PAMPs):** Formed by LPS, flagellin, peptidoglycan, DNA, RNA, **Cytokines** are released as a result of defense cell, stimulation by PAMPs and TLRs interactions. Cytokines recruits more immune cells and also stimulate adaptive immune response.

107) What are types Leukocytes?

Agranulocytes, Monocytes, Lymphocytes, Natural killer, B cell, T cell

108) Write note on Inflammation?

Damage to body tissues triggers a local defensive response, **Redness, Pain, Swelling, & Heat.** Histamine, Kinins, Prostaglandins by damaged cells, Leukotrienes by mast cells. Cytokines are released (**TNF-alpha**), Causes release of acute phase proteins from liver.

109) What is Fever, Complement System and Interferons?

Systemic response, Controlled by hypothalamus, Pyrogens by microbes, IL-1, TNF alpha, Growth of microbes arrested. **Complement System:** More than 30 different proteins make complement system. It complements the cells of the immune system in destroying microbes **Interferons:** Antiviral proteins, Produced by macrophages and lymphocytes in response to viral infections (**fibroblasts**), Interfere with viral replication. Species specific, Not viral specific Types: Alpha (infected cells), Beta (infected), Gamma (lymphocytes)

110) What are Antimicrobial Peptides?

12 - 50 amino acid long peptides, Defensins by neutrophils, Dermcidin by sweat glands, Thrombocidins by platelets