

Microbiology Pre-Test Study Sheet

Name: ~~XXXXXXXXXX~~

Date: 10/26/20

1. Define (or draw) the following terms:

Prokaryote - small, no nucleus, single celled

Bacillus - long cells, rod shaped, typically solo

Streptobacilli - chain of rods

Photoheterotroph - ES → light, CS → organic compound

Chemoautotroph - ES → inorganic compound, CS → CO₂

Obligate anaerobe - die with O₂, grow by fermentation

R₀ (R naught) - reproductive rate of a virus

WHO - World Health Organization

Prophage - dormant viral DNA in lysogenic cycle is prophage in bacterium

Coccus - cell form is a sphere

Spirillum - long & curved, single arrangement

Chemoheterotroph - ES → organic compound, humans CS → organic compound

Photoautotroph - ES → light, CS → CO₂ plants

Obligate aerobe - needs O₂ to grow

Facultative anaerobe - will use O₂ if present

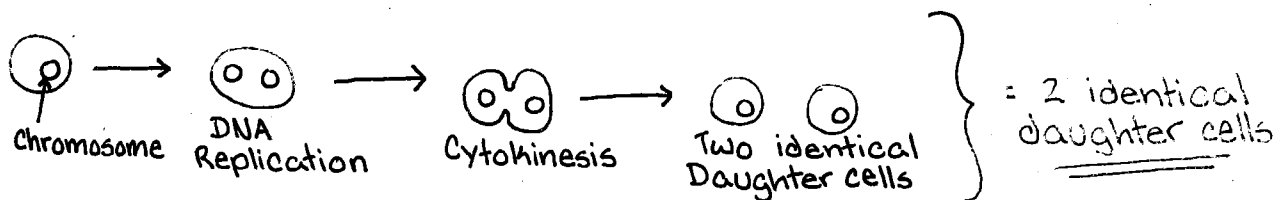
CDC - Centre for Disease Control

Patient zero - first carrier of the disease in an outbreak

Provirus - virus in humans

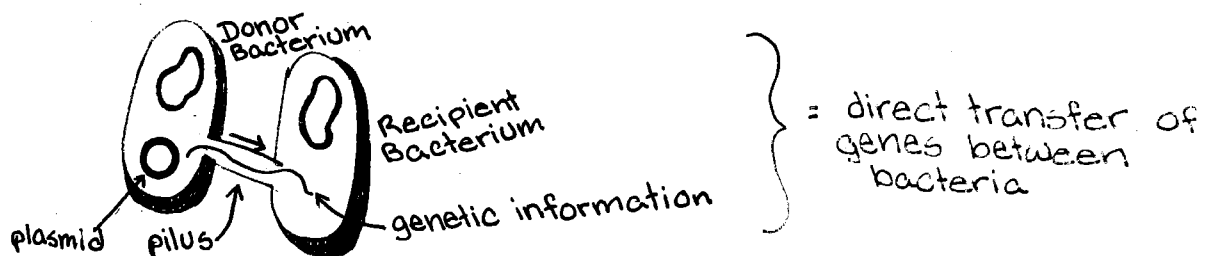
2. Draw the process of binary fission. Label everything! What is the end result?

- Bacteria reproduce asexually via Binary Fission.



3. Draw the process of conjugation below. Label everything!!! Why is conjugation thought of as a form of sexual reproduction?

- Bacterium copies some or all of its DNA and transfers it to another Bacterium that did not have that genetic material before.

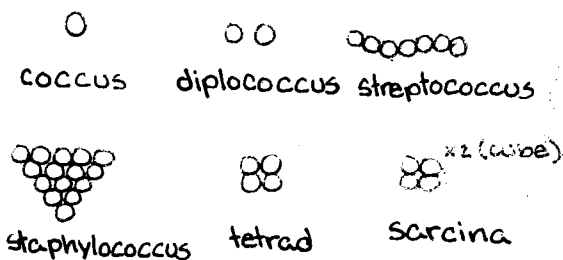


4. Draw a Venn diagram comparing archaeobacteria and eubacteria.

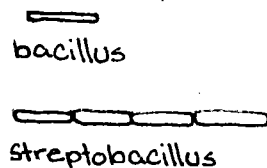
Archeobacteria	Both	Eubacteria
- live in extreme environments	- Prokaryotic	- live in normal environments
- obligate anaerobe	- single celled, microscopic	- obligate aerobe
- cell wall with no peptidoglycan	- some autotrophic, some heterotrophic	- cell wall with peptidoglycan
	- unique DNA	

5. List three shapes of bacteria and draw them. Draw and label some of the arrangements of the 'spheres' and that you made with playdough.

coccus



bacillus



spirillum



6. What is the difference between autotroph and heterotroph? Chemotroph and phototroph?

Autotroph	Heterotroph	Phototroph	Chemotroph
- Self feeder (requires fixation of inorganic C source: CO ₂)	- Other feeder (requires organic C source: sugar → glucose)	- energy source from the light (light eater)	- energy source from chemicals (inorganic/organic compound)

7. List some benefits of bacteria.

- Decomposition
- Recycle inorganic nutrients
- Industrial Use
- Part of animals first line of defense
- Genetic Research

} = Good

8. List some harmful aspects of bacteria.

- Destruction of food
- Rotting structures
- Disease

} = Bad

9. What is a plasmid? What process of reproduction is it used in?

Plasmid → a small circular piece of DNA separate from the chromosomal DNA which can replicate independently and be transferred between bacterial cells.

Conjugation → the genetic information is copied from the plasmid and transferred through the pilus to the recipient.

10. Draw a prokaryotic cell and label all the parts. Include a function of each.

- Capsule - non protein, thick protective coat
- cell wall - made of peptidoglycan
- plasma membrane - decides what goes in & out
- cytoplasm - jelly that fills the cell
- ribosomes - make proteins
- plasmid - circular DNA, can be transferred
- pili - attach to surfaces, transfers DNA

- flagellum - used for movement
- nucleoid - free floating chromosome of DNA
- endospore - tough coated structures that contain a complete bacteria chromosome, can be dormant until favourable growth conditions.

11. Explain the difference between a Gram positive and a Gram negative bacteria.

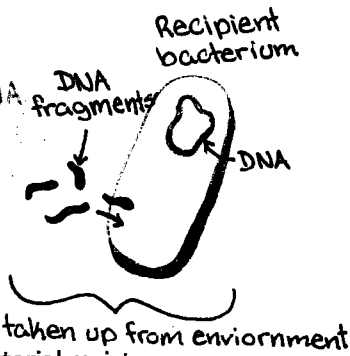
Gram +	Gram -
- thin cell wall with thick layer of peptidoglycan	- thick cell wall with thin layer of peptidoglycan
- susceptible to antibiotics	- resistant to antibiotics
- appear purple after staining	- appear red/pink after staining

Think back to bacteria lab!

12. Explain and/or draw the processes of transformation and transduction.

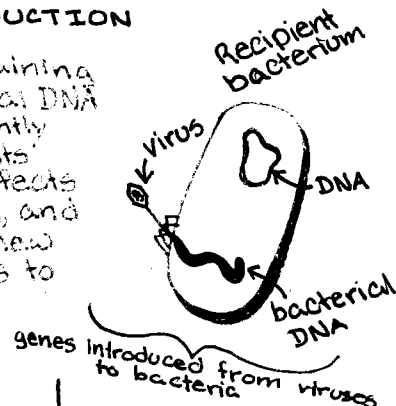
TRANSFORMATION

- After one cell dies and bursts, short lengths of DNA can be taken up by a living bacterial cell and inserted into its own chromosome, potentially adding genes that it did not have before.



TRANSDUCTION

- A virus containing pieces of bacterial DNA that it inadvertently picked up from its previous host infects a bacterial cell, and passes along new bacterial genes to the bacterium.

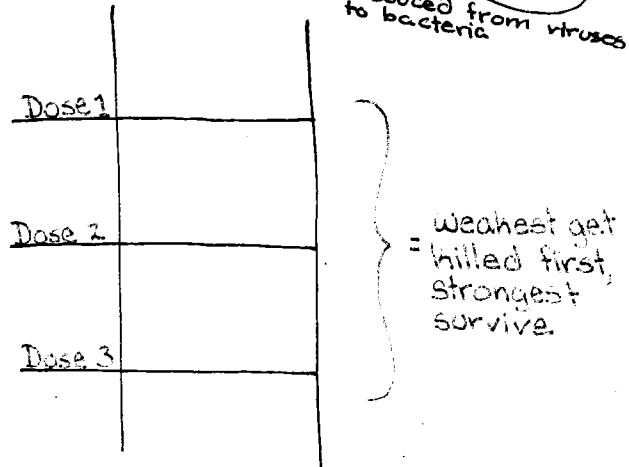


13. Draw and explain how antibacterial resistance can occur.

There are 2 main ways antibacterial resistance can occur:

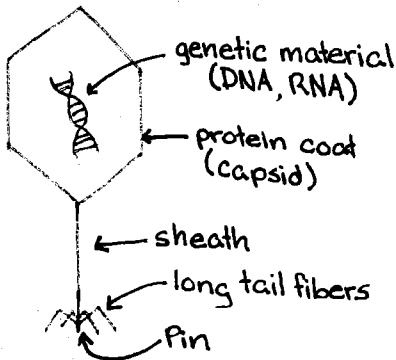
↳ If you take unnecessary antibiotics then your body will become resistant to the bacteria before you encounter it.

↳ If you don't finish your dose of pills, your body will still have bacteria. By finishing your prescription you kill all the bacteria.

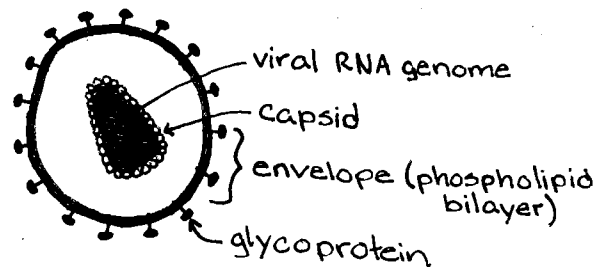


14. Draw and label a bacteriophage. Draw and label an enveloped retrovirus.

BACTERIOPHAGE



ENVELOPED RETROVIRUS



15. A typical virus is composed of a core of DNA or RNA surrounded by a Capsid.

16. What are the characteristics of viruses? Do these support the idea that they are living or non-living?

- viruses are very small microorganisms, they only have 2/8 characteristics of life (able to adapt & evolve, die). Viruses are not living, they aren't cells which means they're neither prokaryote or eukaryote. They have no organelles and no metabolism. Viruses can be crystallized, rehydrated and still be infectious. A host cell is needed for a virus to reproduce, they reproduce quickly and are constantly changing.

17. Describe some of the body's basic lines of defense against infection. (Textbook p. 1036 - 1042 is a helpful read, but you know this already because you did your reading guide! Your notes have just a few of your body's defenses)

Skin - Very few pathogens can penetrate the skin. Skin acts as a barrier against infections, when broken pathogens can enter your body and multiply.

Lysozyme - Secretions in the the body produce lysozymes, an enzyme that breaks down the cell wall of many bacteria.

Inflammatory Response - When pathogens are detected the immune system produces millions of white blood cells which fight the infection. Phagocytes eat & destroy the bacteria.

Antibodies - Once your body has encountered a specific pathogen with antigens on it, it will begin to produce antibodies to fight the infection. Later memory cells will be made for the future.

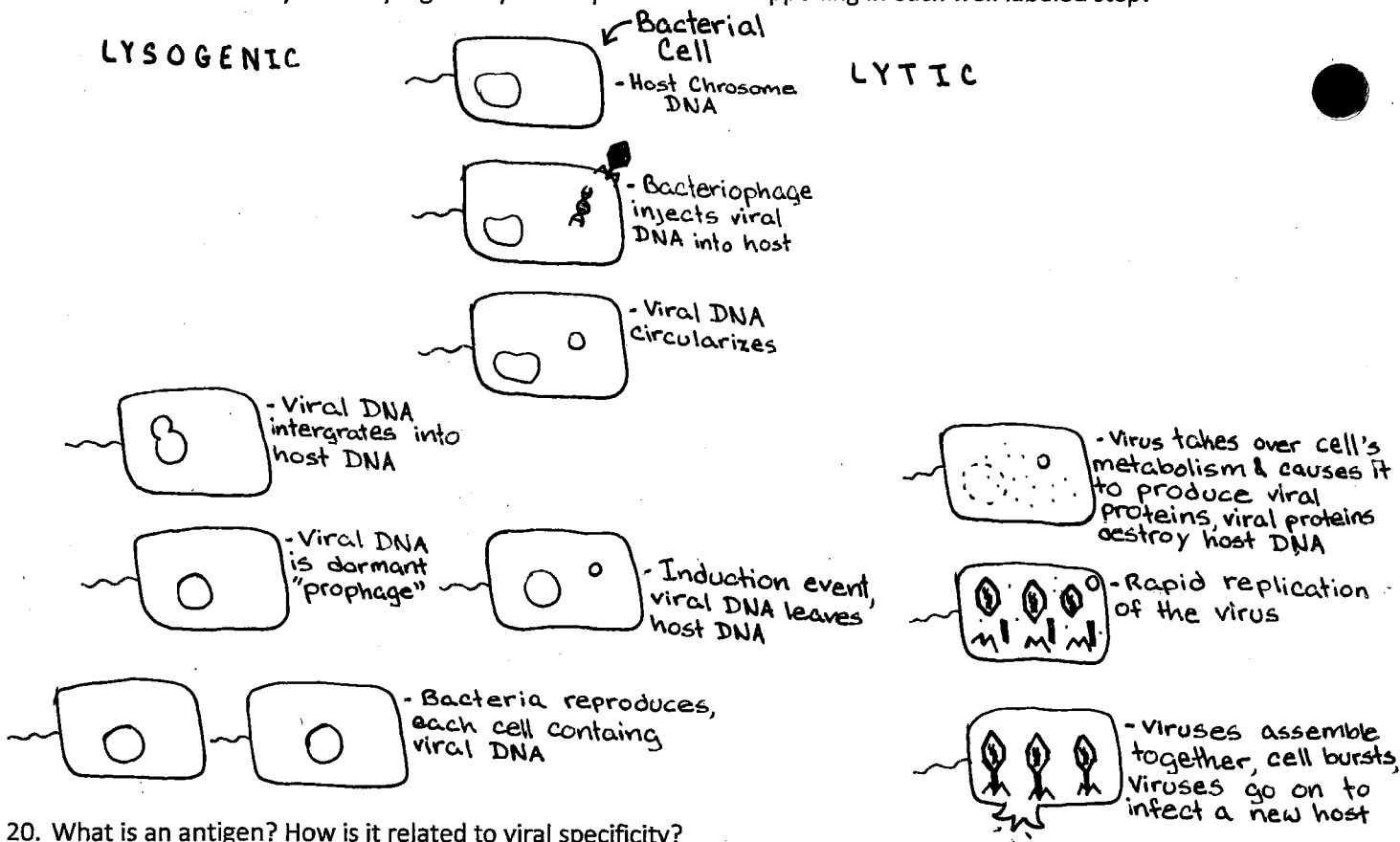
Cell Mediated Immunity - T cells become helper T cell and helper T cell becomes killer T cell. Killer T cells destroys the infected cell.

18. What is an advantage to having a viral envelope? What are ~~two~~ advantages that retroviruses have over normal viruses?

Viral Envelope - viruses take outer membrane from past host, this helps the virus enter a host cell. This tricks the host cell into recognizing it as a regular cell and not a virus. Viral Envelope acts as a camouflage.

Retrovirus - RNA acts as a template to make DNA. Since the RNA is single stranded it can replicate faster, this allows the virus to evolve/mutate quickly.

19. Draw and label the lytic and lysogenic cycles. Explain what is happening in each well labeled step!



20. What is an antigen? How is it related to viral specificity?

Antigen - A pathogen (virus) has specific identifying markers unique to it called antigens. Antigens are specific to each pathogen, once your body encounters a pathogen it produces antibodies which fight the virus. After the infection is over, memory cells are made. These cells remember the antigens structure, and are prepared to fight in the future. Antibody and antigen act as a lock and key.

Specific { antibody antigen virus