Examination #1 Bio 308-General Microbiology—Fall 2014 Steiner **KEY**

If there appears to be more than one answer, choose the **BEST** answer. Chapters 1, 3, 4, 6, 7, and 8

1. In chapter 1 there is a slide entitled “roles of microbes”, which includes the following areas of microbiology (1A-1E). One of these areas includes a subject (i.e., microbiome) that has **relatively recently** become very topical because it has been shown to affect many aspects of our well-being. Which area am I referring to?

A. Pathogens

B. Food chain

C. Digestive\*

D. Foods and fermentation

E. Emerging diseases

2. Koch's postulates were

A. specific to anthrax and tuberculosis but don't apply to other diseases

B. designed to establish a causal relationship between a causative microbe and a disease\*

C. strict in that microorganisms isolated from experimentally inoculated hosts had to be different from the microorganism that was introduced into the host.

D. interpreted as many organisms could cause the same disease

3. Which of the following individuals observed that aseptic technique could essentially eliminate child-birth fever by employing essentially aseptic technique in the newborn wards.

A. Koch

B. Semmelweiss\*

C. Lister

D Pasteur

4. In whose laboratory was agar first used as a means of isolating pure bacterial cultures?

A. Koch\*

B. Semmelweiss

C. Lister

D Pasteur

5. If you consider \_\_\_\_\_\_\_\_\_\_\_, the idea of spontaneous generation does not seem to outlandish in its day.

A. Koch’s postulates

B. Occam’s razor\*

C. the germ theory of disease

D. that viruses are not really living

6. A sample is stained with crystal violet, then treated with iodine and lastly treated with alcohol. With this straining procedure Gm positive organisms would expected to be \_\_\_\_\_\_\_\_\_\_ and Gm negative organisms would expected to be \_\_\_\_\_\_\_\_\_.

A. colorless, purple

B. purple, colorless\*

C. purple, red-pink

D. red-pink, purple

7. The Ziehl-Neelsen stain for acid fast organisms is needed for staining these organisms is because acid fast organisms \_\_\_\_\_\_.

A. do not have a cell wall

B. do not have peptidoglycan

C. have a very waxy cell wall\*

D. do not grow in single cell suspensions

8. The F.D.A. has approved a new type of drug for Type 2 diabetes. This drug designated as Trulicity, functions to\_\_\_\_\_\_\_\_\_\_

A. to increase the number of glucose transporter in the liver

B. trigger the pancreas to create extra insulin after meals\*

C. increase the number of insulin receptors on the liver

D. to block the breakdown of insulin and thereby up the level of insulin in the blood

9. Archaea and Bacteria have been split into two domains (with Eukarya the other domain). Which of the following is **NOT A SIGNIFICANT DIFFERENCE between** Archaea and Bacteria? Archaea but not Bacteria:

A. mostly grow in extreme environments

B. have histone-like proteins

C. have methionine as their initial amino acid at the start of translation

D. lack a nuclear membrane\*

10. If you analyzed a Eukaryotic cell membrane you would find sterols present but in prokaryotic cells, you would not except for the following.

A. *Clostridium tetani*

B. *Mycobacterium tuberculosis*

C. *Mycoplasma pneumonia \**

D. *Proteus mirabilis*

11. The strain of *E. coli* that can cause severe disease is designated as H-7, and O157. The O stands for and antigen associated with:

A. flagellum

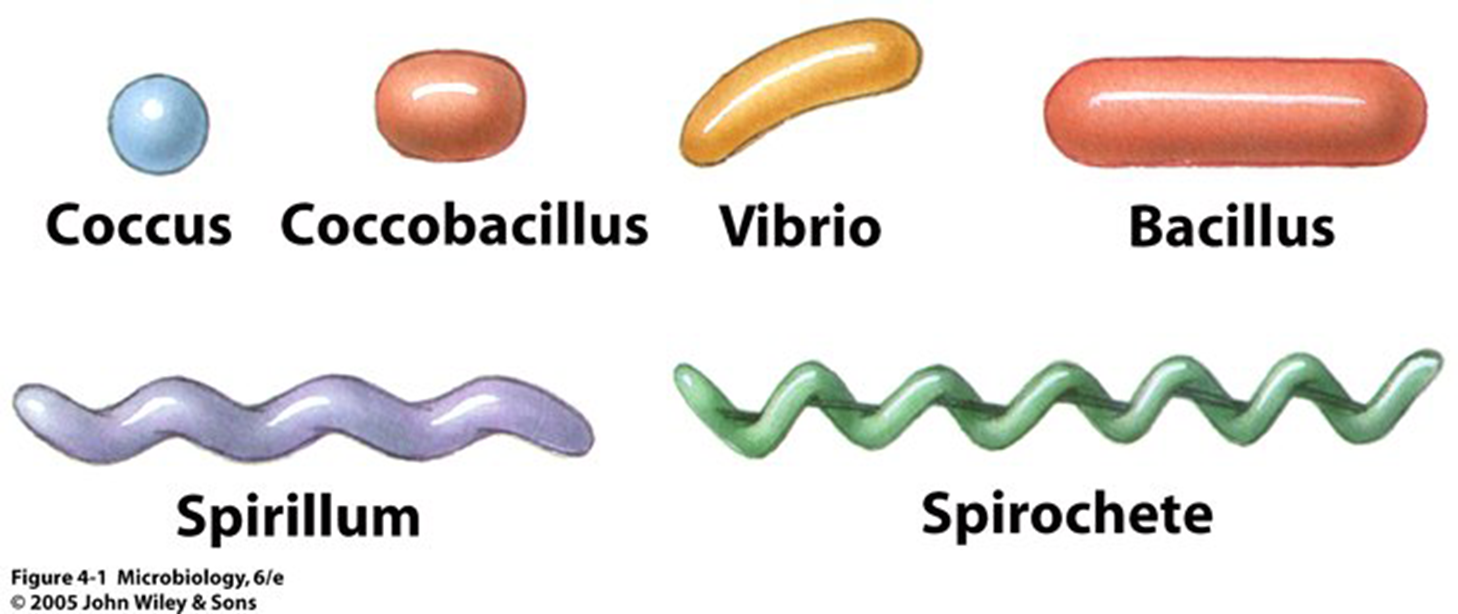
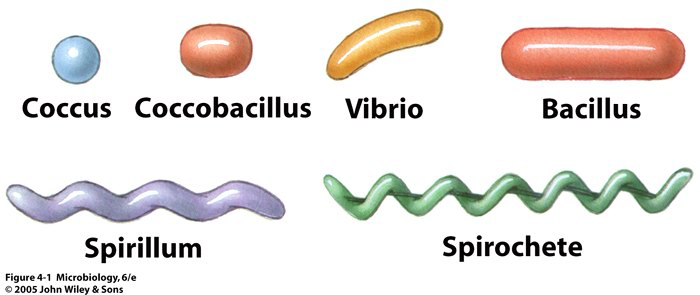
B. cell wall protein\*

C. cytoplasmic membrane protein

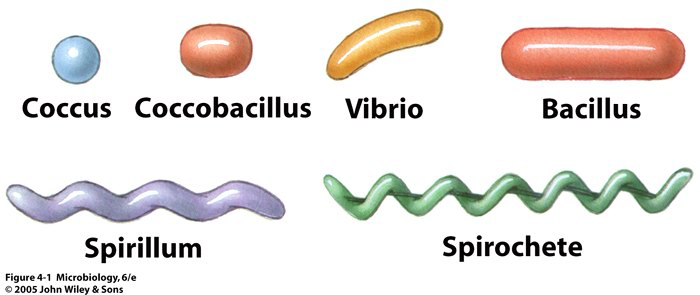
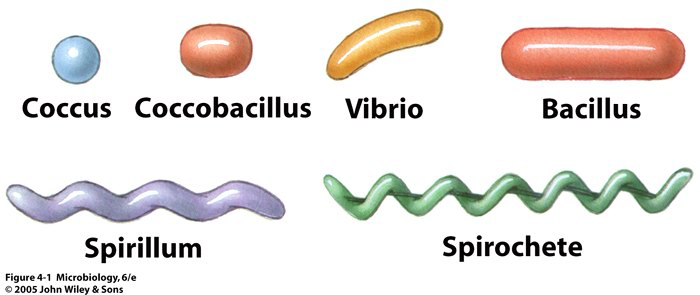
D. pillus protein

12. Methicillin resistant *Staphylococcus aureus* looks most like which of the following?

A. B. C.\* D.

A. B.

C.\* D.

13. Which of the following bacterial structures retards the entrance of penicillin into the cell?

A. pili

B. capsules

C. lipopolysaccharide layers\*

D. peptidoglycans

14. Experiments with prisoners showed that one of the above structures (13 A-D) was very important in infection by *Neisseria gonorrhea*. The structure is:

A. \* B. C. D.

15. Scientists working in Bangladesh have reported that it is imperative to give starving children \_\_\_\_\_\_\_\_\_\_ as well as nutrition.

A. antibiotics

B. vaccination against childhood diseases

C. gut bacteria\*

D. Vitamin D

E. Vitamin C

16. My peptidoglycan layer is in the periplasmic space therefore I am a:

A. Gram negative organism\*

B. Gram positive organism

C. Acid fast organism

D. obligate intracellular organism

17. My cell wall contains lipoteichoic acid therefore I am which of the above organisms?

A. Gram negative organism

B. Gram positive organism\*

C. Acid fast organism

D. obligate intracellular organism

18. Lipoarabinomannan is an important virulence factor for *Mycobacterium tuberculosis. This* membrane component mostly functions by:

A. killing infected lung cells

B. preventing phagocytosis by macrophages\*

C. trigger release of mycotoxins

D. making the organism an obligate aerobe

19. Which of the following cell components is unique to Gram negative organisms as compared to Gram positive or acid-fast organisms?

A. endotoxin\*

B. peptidoglycan

C. presence of lipid

D. exotoxin

20. Channel proteins sometimes called Porins were discussed in class not only for their ability to transport nutrients into cells but also because some mutated forms:

A. can contribute to antibiotic resistance\*

B. strengthen the LPS layer of Gm – organisms

C. allow organisms to live in high salt

D. allow organisms to live in high sugar solutions

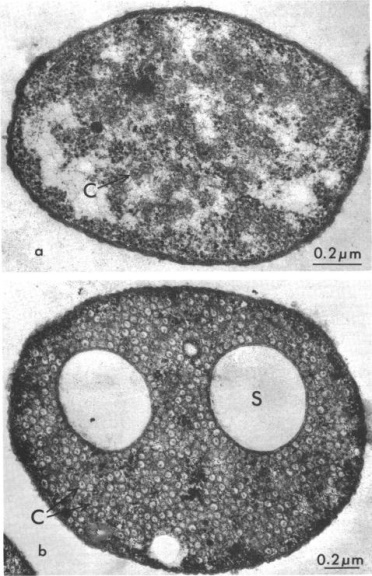
21. The structures below (not the S which stands for sulfur droplets. illustrates:

A. metachromatic granules

B. chromatophores (photosynthetic vesicles).\*

C. glycogen deposits

D. lipid deposits



22. The Rac A protein that was shown in the video of the other “old guy”, is important in sporulation and is involved with:

A. remodeling of the DNA into a linear form\*

B. forming the basis of the spore cortex

C. the most important protein associated with the heat resistance of spores

D. forms the spore outer coat

23. A primary deterinat of heat resistance is?

A. dipicolinic acid is a primary determinant of heat resistance

B. dehydration is a primary determinant of heat resistance\*

C. the Spore coat is a primary determinant of heat resistance

D. the spore cortex is a primary determinant of heat resistance

24. We are advised to brush our teeth twice a day because some oral bacteria produce \_\_\_\_\_\_\_\_\_\_ which can lead to the formation of dental carries.

A. capsules

B. a slime layer\*

C. pili

D. coat proteins

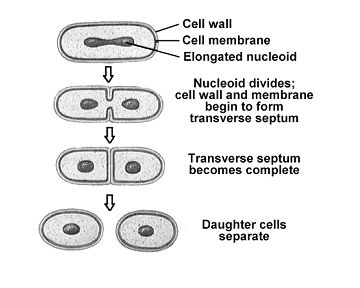
25. The video of binary fission includes an important general step that is not present in the text figure in your text of binary fission shown below. The omitted step involves:

A. rounding of the cell

B. extensive remodeling of the plasma membrane

C. attachment of the DNA to the plasma membrane\*

D. movement of ribosomes to the area in which the nucleoid divides



26. A major reason for using a chemostat (or biostat). is to  
 A. shorten the doubling time

B. to grow cells continuously in the log phase, which most often results in much higher yields\*

C. increase the ease of collecting bacterial products

D. make the viewing of the growing culture much easier

27. Which of the following bacterial counting techniques relies on a statistical estimate to determine the number of bacteria in a culture?

A. direct microscopic count

B. standard plate count

C. spread plate

D. most probable number\*

28. An obligate psychrophile would produce a turbid culture at \_\_\_\_\_\_\_\_ degrees Celsius.

A. 15\*

B. 30

C. 45

D. 60

29. Most human pathogens are

A. psychrophiles

B. mesophiles\*

C. thermophiles

D. acidophiles

30. Which of the following types of organisms would be most likely to have evolved to live in the large intestine, where there is a complete lack of free oxygen?

A. obligate aerobe

B. obligate anaerobe\*

C. facultative anaerobe

D. aerotolerant anaerobe

31. Capnophiles grow best under conditions of

A. high carbon dioxide\*

B. low carbon dioxide

C. high osmotic pressure

D. low osmotic pressure

32. The toxic effects of the byproducts of oxygen metabolism are mitigated by which of the following?

A. catalase

B. superoxide dismutase

C. lactase

D. electron transport system

E. two of the above\*

33. Where would you expect to find a barophile?

A. at the bottom of a lake\*

B. in unpasteurized milk

C. in the large intestine

D. in sewage

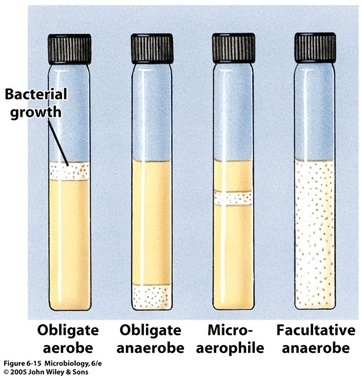
34. Which of the following organisms would grow in tube 3 in the figure below?

A. Pseudomonas sp.

B. Bacteroides sp.

C. Camplyobacter sp.\*

D. Escherichia sp.



1 2 3 4

35. Which of the following organisms would grow in tube 2 in the figure above (Figure 34).

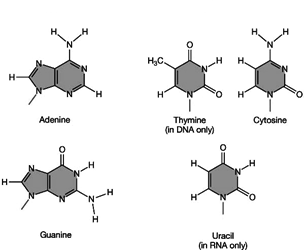
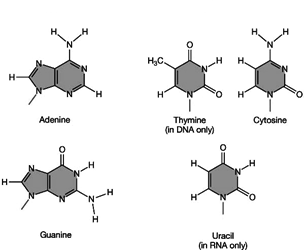
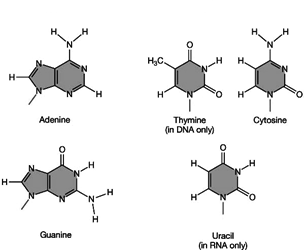
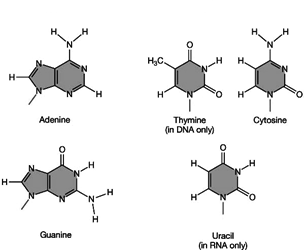
A. Pseudomonas sp.

B. Bacteroides sp.\*

C. Camplyobacter sp.

D. Escherichia sp.

36. Which of the following bases is a Purine?

A. B C. \* D.

37. Which of the following statements about transcription is **NOT** accurate?

A. Initiation of transcription requires the presence of the sigma factor on the RNA polymerase

B. The RNA polymerase binds to the promoter region

C. In prokaryotic cells, both transcription and translation take place in the cytoplasm

D. In prokaryotic cells, both DNA strands can be used to make mRNA\*

E. All of the above statements are accurate (if you believe that all of the above statements are accurate choose this answer).

38. Early experiments to express insulin in bacteria failed largely because the researchers were unaware that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Choose the **BEST** answer).

A. bacterial promoters differed from that of eukaryotic cells

B. eukaryotic DNA contained introns \*

C. bacterial mRNA could not be made using eukaryotic DNA as a template

D. many eukaryotic codons differed from that of prokaryotic codons

39. When an *Escherichia coli* is in medium that contains high levels of lactose, the lactose will bind with the

A. repressor\*

B. operator

C. promoter

D. RNA polymerase

40. Protease inhibitors are useful (in concert with other drugs. for blocking HIV (and hepatitis C. replication). Such drugs do not significantly inhibit eukaryotic cell replication because eukaryotic mRNA (choose the **BEST ANSWER** as there may be more than one correct answer):

A. does not start with formyl-methionine

B. is not polycistronic\*

C. does not have as high a proportion of purines

D. uses somewhat different codons

41. In *Mycoplasma pneumonia,* unlike *Escherichia coli*, UGA is **NOT** a nonsense codon. This means that in *Mycoplasma pneumonia UGA\_\_\_\_\_\_\_\_\_\_*

A. terminates mRNA

B. codes for an amino acid\*

C. initiates mRNA transcription

D. does not have a known function

42. Which of the following types of RNA ends in CCA?

A. mRNA

B. tRNA\*

C. rRNA

D. RNAi

43. In prokaryotic cells the initiation complex consists of mRNA attached to:

A. the small ribosomal subunit

B. a ribosome which contains both the small and large subunit

C. the large ribosomal subunit which also contains Formyl-methionyl tRNA

D. the small ribosomal subunit which also contains Formyl-methionyl tRNA\*

44. Pyrimidine dimers are a type of mutation most commonly caused by

A. alkylating agents

B. deaminating agents

C. ultraviolet light\*

D. acridine

45. In the lactose operon, which of the following is a protein (the others are segments of the DNA).

A. repressor\*

B. operator

C. regulator

D. promoter

46. The fluctuation tests done by Luria and Delbruck illustrated that:

A. the growth of bacteria fluctuates based on the concentration of antibiotics

B. mutations occurs randomly and spontaneously\*

C. antibiotics induce the development of resistance in bacteria

D. the concentration of antibiotics fluctuates in response to the number of bacteria in the sample

47. A rat liver extract is used in the Ames test to:

A. provide needed nutrients not present in artificial media

B. activate procarcinogens

C. provide a dark background in the agar plate so that bacterial colonies can more readily be visualized

D. decrease the rate of “false” mutations

48. In an experiment, such as Griffith's pneumococcal experiment, infection of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into a mouse would result in its death?

A. heat killed smooth pneumoccocci

B. live rough pneumococci

C. a mixture of heat killed smooth pneumococci and live rough pneumococci\*

D. a mixture of heat killed rough pneumococci and live rough pneumococci

49. Which of the following steps is **NOT** accurate for the description of bacterial transformation?

A. DNA is released from lysed cells

B. a protein called competence factor is released into the medium

C. a receptor site binds the DNA

D. only one strand enters the cell

E. All of the above steps in bacterial transformation are accurate (if you believe that all of the above steps are accurate choose this answer).\*

50. “Specialized” transduction refers to the fact that

A. it only happens at specific times in the cell cycle

B. only specific bacteria take part as hosts

C. only specific genes are transferred\*

D. only specific viruses take part in the process

51. Which of the following statements regarding high frequency recombination is **NOT** accurate?

A. Hfr recombinations x F-, as compared to F+ x F- recombinations occur at a high frequency

B. the entire information from F+ plasmid information is almost never transferred to the F- strain

C. Genes are transferred in a linear sequence and the number of genes transferred depends on the duration of the conjugation and whether the DNA strand breaks or remains intact

D. All of the above statements are accurate (if you believe that all of the above statements are accurate choose this answer)\*

52. The Ti plasmid is known primarily for its ability to

A. direct synthesis of conjugation pili

B. provide resistance to certain antibiotics

C. induce the formation of tumors in plants\*

D. induce the production of flowers

53. Bacteria that contain recombinant plasmids can be easily isolated because (choose the **BEST ANSWER)** they:

A. they are larger than nonrecombinant bacteria

B. they are designed to be resistant to certain antibiotics\*

C. they grow much faster than nonrecombinant bacteria

D. they are smaller than non-recombinant bacteria

54. In many cases diagnosis of the organism that causes encephalitis (and other deep seated infections) is not made because of the difficulty in obtaining samples. A new procedure termed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to identify a pathogen involves extraction of as much DNA from

a patient as they can get (blood, cerebrospinal fluid, or stool) and then “sifting” through the material to identify genetic fragments belonging to the pathogen.

A. pathogenic PCR ID

B. unbiased next generation sequencing\*

C. computerized data bank identification of DNA fragments

D. biome identification sequencing

55. Florida is currently facing a threat from two mosquito-borne diseases: dengue fever and \_\_\_\_\_\_\_\_\_\_\_.

A. Malaria

B. Venezuela equine encephalitis

C. Chikungunya\*

D. St. Louis encephalitis

E. polio virus

56. So far, 2014 is shaping up as the worst year for confirmed cases of \_\_\_\_\_\_\_\_ since it was declared eliminated as an endemic disease in the U.S in 2000.

A. polio

B. chicken pox

C. mumps

D. measles\*

E. influenza

57. Scientists working in Bangladesh have reported that it is imperative to give starving children \_\_\_\_\_\_\_\_\_\_ as well as nutrition.

A. antibiotics

B. vaccination against childhood diseases

C. gut bacteria\*

D. Vitamin D

E. Vitamin C