Quiz #3 Key – 1:00 lab

1. Define:

Pili and fimbriae – Pili are thin, hair-like strands composed of pilin proteins and used for binding cells together during horizontal gene transfer (sometimes called sex pili). Bacteria capable of forming pili typically form only one or two of these. Fimbriae are shorter and more numerous than pili, are made of curlin proteins and are used for attachment, i.e., cells use fimbriae to attach themselves to various surfaces including other cells. When present on pathogenic bacteria they can significantly enhance virulence.

Heterocysts – Heterocysts are specialized cells formed by certain Cyanobacteria, e.g., *Nostoc* and *Anabaena*. They contain nitrogenase enzymes involved in nitrogen fixation, and cannot reproduce (so are formed by other cells). Heterocysts allow Cyanobacteria to obtain nitrogen (N_2) from the air and use it to form nucleotides, amino acids, glucosamine and other important molecules.

Binomial nomenclature – Binomial nomenclature is a naming system developed by Carolus Linnaeus and applied to all types of living organisms (as well as some no longer living). The first part, or genus name is capitalized, while the second part, or species name (specific epithet) is lower case. Both names are Latinized and italicized when in print or underlined if written by hand. The technical name assigned to each organism type is recognized world-wide, regardless of spoken language, so allows for consistency in organism identification.

2. Chromatin/ nucleolus

3. Microtubules/ centrioles

4. Kinesin and dynein

5. Skeleton

6. Prokaryotic flagella are composed of flagellin proteins (not microtubules), and are attached to the cell membrane by protein rings (not surrounded by it). Bacterial flagellar motion is rotary (spinning) and is driven by a membrane protein complex that is usually powered by a proton motive force (proton flow across the membrane). Bacterial flagella are longer relative to cell length than are eukaryotic flagella.

7. Amphitrichous

8. Glycocalyx

9. Thylakoids

10. Nucleoid/ plasmids

11. Endospores/ Endospores contain more DNA, less RNA, more calcium and dipicolinic acid, and far less water than do vegetative cells. They are metabolically inactive, can remain dormant for millions of years (at least), and are much more resistant to damage from both physical factors (heat, radiation, desiccation, etc.), and toxic chemicals than are vegetative cells. Endospores are much smaller than the vegetative cells that form them, even though each one is surrounded by two layers of wall-like material, and two layers of membrane.

12. Metachromatic granules

13. Taxonomy

The etiological agents of tetanus are identified as *Clostridium tetani*.