

Comments

1. Acknowledgement of sources is critical in all endeavors here at Bowdoin. There are many resources available to help you figure out how to cite different materials (see the handbook “Sources: Their use and Acknowledgement” Dartmouth College (1998) or the library site “Using and Citing Information”: <http://library.bowdoin.edu/1st/citation.shtml>). Proper citations will be essential for your group projects at the end of the term. For the discussion preparations, please make sure you put phrases or sentences in quotes when they come from the readings and give page # (e.g. “high-speed, biological copying machine” Hall, p. 18).
2. Good writing counts, even in discussion preparations. Try to express yourself clearly and concisely while making sure subjects and verbs agree.
3. When you think of an interesting question about the readings, spend some time thinking about your questions and speculating about how they might be addressed (possible answers, what you would need to know to find an answer, other questions that they raise etc.)
4. In the same vein, make sure after your highlighted passage that you include **why** you chose it. What makes it interesting? What questions did it raise in your mind? Can you relate it to something that might be happening here in Maine, at Bowdoin or in your life?

Explanations

For terms you don't understand, get use to checking the Oxford English Dictionary online: <http://dictionary.oed.com/entrance.dtl>

Strain vs. strand: Different types of the same species of bacterium are referred to as “strains” not “strands.” If a drug-sensitive form of *M. tuberculosis* mutates to become drug-resistant, you have the original sensitive strain and a new drug-resistant strain, but they are both still *M. tuberculosis*.

Vaccine vs. drug: Vaccines are substances given to an animal to cause an immune response to a certain microbe, so that when the animal encounters the microbe its immune system can fight the invader. Drugs are chemicals that interfere with the ability of a microbe to function (grow or replicate) or to cause disease. We will discuss these treatments more later in the semester.

Tuberculosis: The disease vs. the bacterium. *Mycobacterium tuberculosis* is the bacterium that causes the disease called tuberculosis. The bacterium can mutate to become drug-resistant, which means that the disease can no longer be treated with that drug.

Directly observed therapy: A program in which people being treated with antibiotics for tuberculosis must take the drugs in a clinic under observation, to ensure all doses are taken.

“Turn-on-the-light” assay: There is a piece of DNA (that codes for an RNA) that encodes a protein called luciferase, which is what makes fireflies glow. This DNA is inserted into the DNA of a virus (called a “bacteriophage”) that specifically infects bacteria. The phage can only grow and make luciferase if the bacterium it infects is alive. Therefore, if a drug works it will kill the bacterium, the phage won't be able to make luciferase, and the culture won't glow. If the bacteria are resistant to the drug, the phage will be able to multiply in the live bacteria and the culture will glow.

Exposed vs. infected: Being “exposed” to a pathogenic microbe generally means that one has come into contact (of a sort that might cause transmission) with an infected individual. Being “infected” means that the microbe has invaded one’s body. These terms are frequently used more loosely.

“Tubercle virus” When Koch was doing his experiments, no one knew about the differences between bacteria and viruses, so the term “virus” was used for many infectious agents, including mycobacteria. What we now call viruses were referred to as “filterable viruses,” since they could pass through filters that stopped bacteria. Colloquially, both bacteria and viruses are sometimes referred to as “bugs” or “microbes.”

Staining By discovering a way to stain mycobacteria, Koch allowed the microbe to be **identified**. To **isolate** the bacterium, he had to grow pure cultures.

Koch's experimental tools: *Methylene blue* and *vesuvin* are dyes whereas Koch used potassium/sodium/ammonium hydroxide, alcohol, clove oil and Canada balsam to obtain optimal staining conditions. A *precipitate* is a solid chemical that has separated from a liquid solution. *Coverslips* are pieces of glass to which the bacteria are attached for staining. *Serum* is the non-cellular (liquid) component of blood. In solid media, *meat infusion* and *peptone* can provide nutrients for the bacteria while *agar* makes the medium solid (like jello).

Medical terms: The *inguinal* gland is in the groin, *bronchial* glands are in the lungs, and *axillary* glands are in the armpits. *Scrofulous* glands are enlarged, diseased glands. *Phthisistic* refers to wasting. *Nodules* are lumps. Injections can be given under the skin (*subcutaneously*) or into the abdominal (*peritoneal*) cavity.

Just to make sure: Guinea pigs are rodents (smaller than rabbits, larger than mice), not pigs.