

Three classes over the course of the semester will be devoted to **discussing issues raised in class and in the readings**. For part of the class, we will break into **discussion groups of 4-5 students**; during the remainder of the period each group will **share interesting aspects of their discussion** with the rest of the class. I hope that these discussions with your peers will prove to be an enjoyable and rewarding component of the course. **To prepare for them, it is important that you have listened during lectures, read the assigned material carefully, and thought critically about the issues raised both during class and in the readings.**

To help you learn to prepare effectively for such a discussion, you will be expected to write a "**Discussion Preparation**" that must be **turned in at the end of class** (typed, single-spaced, and no more than 1 page in length).

To help everyone clarify their thoughts prior to the discussion, the "preparation" should consist of **THREE** distinct parts:

(1) **A list of questions, comments, and thoughts related to the material.** These should be issues that you find **interesting** and that seem likely to **evoke discussion**. These points will come to mind while reading the assigned material, during lectures or after careful reflection, so make sure you write them down as they occur to you. The important point is that you are coming to class "armed" with topics for discussion. A few of these may be relatively straightforward **questions** (e.g., Exactly what did Garrett mean when she used the term "xxxxxx" on page XX?). Others should deal with **more complicated issues** (e.g., What were the main reasons that medical microbiology and biology had little overlap until the middle of the 20th century?), or relate to other topics or situations that come to mind (e.g., How much do you have to know about disease processes to develop therapies? What are different ways therapies are developed?). Critiques of the material are also helpful here as long as they are specific (Instead of writing something like "I did not agree with the material on page xxx", you would write something like "I did not find Lederberg's argument on page xxx convincing, since he is assuming blah blah blah.")

(2) **A short summary of the reading.** The summary section of the discussion preparation should help you clarify your thoughts about what was written. To summarize something forces you to go back over the material in your mind, and then to put in the mental effort of constructing a condensed version of the author's arguments in your own words.

(3) **A passage or two highlighted for group consideration.** These passages may be chosen for a variety of reasons. For example, it is possible that you simply found the prose itself worthy of examination (whether for praise or criticism). Perhaps you think that this passage highlights a central assumption or key observation made by the author. Perhaps you were confused by a particular passage and would like the group to discuss possible interpretations of the author's words. For this part of the discussion preparation you should simply list the page and "block out" the quotation (e.g., Lederberg, page 290, "In hindsight...more diffusible forms."), followed by a brief note detailing why you chose this passage (e.g., This passage made me wonder: If a virus that isn't a huge public health risk mutates into a more dangerous form, why would studies of the original form be helpful? Wouldn't important properties of the virus have changed?).

Lederberg “Infectious History;” Garrett, Introduction

Thoughts, questions, comments:

What is the connection between “hair of the dog” and Mithridates habituating himself to poison? (Lederberg p. 287, para. 5)

It is interesting that it took so long after bacteria were seen in a microscope for them to be deemed cells. I wonder which aspects of their biology got them into the club (outer membrane? Internal organelles?)(Lederberg, p. 288, para. 6)

Why are there “fewer routes to remedies” for viral than bacterial pathogens? (Lederberg p. 289, para. 4)

Summary:

Joshua Lederberg *Infectious History*: It took over 3 centuries for scientists to develop the “germ-theory” (p. 288) of disease, stating that microscopic organisms are the source of infectious diseases. Important steps in this process included the development of microscopes (which allowed scientists to see microbes), early therapeutics (such as natural compounds and vaccination), and improved sanitation. In spite of the initial separation of microbiology from cell biology and genetics, discovery of DNA as the genetic material in bacteria combined with chromosome mapping, brought these fields together. The advent of antibiotic drugs, widespread vaccination and other public health measures led to both a decrease in infectious disease-related mortality and an increase in complacency in the 1960’s. Over the rest of the century, there have been numerous “wake-up calls” (p. 289), signs that the world is replete with viruses, bacteria and other microbes that could cause epidemics under the appropriate conditions. Giant strides in monitoring, diagnosing, and fighting disease have been offset by environmental alterations and long-distance travel, which facilitate disease emergence. Although Lederberg pits microbes’ ability to mutate quickly against human wits in the quest for survival, he also emphasizes that war is not the best metaphor for infection. Rather, humans and their microscopic hitchhikers are at a “metastable equilibrium” (p. 292) in which that balance can be tipped to either the host’s or microbes’ advantage. Alternatively, microbes can become commensal, living in the host without causing harm.

Laurie Garrett, *Introduction to The Coming Plague*: At the beginning of the 20th century, doctors (such as the author’s Uncle Bernard) and the general population were exposed to numerous bacterial and viral pathogens. Although people were optimistic about our ability to fight infectious diseases after World War II, numerous outbreaks, culminating with the onset of the AIDS epidemic in the early 1980s, sounded a note of caution and alarm. Global interconnectedness has led to a greater understanding of how environmental, economic, and social factors impact on public and individual health. Although the ability of humans to survive as yet unknown emerging diseases lies in doubt, the end is not completely predestined. In preparation for such likely occurrences we must understand the interactions of humans, microbes, and the environment. This understanding will help us to detect diseases with destructive potential and to cope with alterations in the ecological balance in the future.

Highlighted Passage:

"Nature isn't benign . . . or even frequently" Garrett, p. 6. This Lederberg quote brought together many interesting concepts including evolution (“natural selection”), molecular biology (“DNA”), genetics (“variation”) and probability (“what happens routinely”). I have learned that DNA is found within cells, yet he says it is not packaged in discrete organisms. Is this because organisms can exchange genetic material? I wonder what such exchange would require. Perhaps two microbes need to infect the same host or even the same cell. These requirements may be different between bacteria and viruses, since the latter can only reproduce within cells. How frequent would a certain mutation need to be for a “new trick” virus to cause an epidemic?

References

- Garrett, L. (1994) *The Coming Plague: Newly Emerging Diseases in a World out of Balance* (New York: Penguin Books).
- Lederberg, J. (2000) "Infectious History" *Science* **288**: 287-293.

Discussion Grading

Attendance and **active participation** in discussions is the *most* important part of the class participation grade. **Submitting a discussion preparation** is the next most important. Actual **marks** on the discussion preparations come third.

Marks on the discussion preparations indicate how you can improve your preparation to enhance subsequent discussions.

√ is for a **good job**--interesting questions/thoughts, thorough summaries, and a quote with explanation about why you chose it. (most complete preps will be in this category)

√- means that there were **problems**--usually either an absent summary, a quote without an explanation, and sometimes a summary missing important points.

√+ indicates that you have either come up with a **fascinating idea**, usually one that goes **beyond what we have talked about**, or (more rarely) that you have done an **outstanding job describing your thoughts**--a clear, well-written, concise summary and presentation of your ideas.

Guidelines for Effective Discussions:

Most of these apply to class-wide discussions as well as the small-group discussions.

1. All members of the group should be **respectful** of all other members at all times.
2. **Learn the names** of group members as soon as possible.
3. **No individual should dominate** the discussion. Instead, always strive to include the entire group and involve everyone.
4. Be **encouraging** and **polite** to all members of the group. All group members should feel free to remind the group of discussion guidelines politely.
5. **Take turns speaking**. With only one person from the group speaking at any one time, there should be no reason to raise one's voice in order to be heard. Following this guideline will also help keep the total volume in the room low enough that everyone within the group should be able to hear the entire discussion.
6. **Respect the opinions of others**. Everyone should feel comfortable disagreeing or presenting a divergent opinion, but the atmosphere should never become aggressive or offensive.
7. Come to class **prepared** both to **talk** and **listen**. Listen carefully to what each person says.
8. Agree upon a **group moderator** at the beginning of each session. This responsibility should change often, so everyone has a chance to lead the group in this manner. The moderator should try to make sure that **everyone in the group is heard**, and they should try to help **guide the group by posing open-ended questions** and **occasionally summarizing progress** before moving on.
9. Groups should try to **stay focused** on specific topics until the group decides to move to a different topic. Recognize that it usually takes practice for a group to arrive at the right balance of flexibility and structure.
10. One person in the group (it could be the moderator, or it could be someone else) should take **brief notes** during the discussion. The group should spend the **last five minutes** trying to **summarize the most interesting questions or discussions** that came up. These points should be **written down** and **handed in** at the end of class (please **write the names of all the group members** at the top of the sheet). Group members will often be asked to share these topics for general discussion at the end of class.
11. Each group will have one student who has a **background in biology**. This person can serve as the moderator for the first session and subsequently can help explain biological processes being discussed.

Discussion Skills

You will find that the ability to function effectively in discussion groups is useful in many situations, both during your college career and beyond. Indeed, many would argue that this is one of the most valuable abilities to be gained from a good education.

With that in mind, here are some "Discussion Skills" that you will have the opportunity to hone this semester:

1. **Effective Questioning:** asking different types of questions, including those requiring higher-level thought processes (e.g., analysis or synthesis of the readings).
2. **Active Listening:** hearing what a person is trying to say, and trying to assess their understanding of the subject and how it may differ from your understanding.
3. **Including Everyone:** trying to see and hear the entire group, encouraging participation from reluctant members, discouraging aggressive or offensive responses.
4. **Empathy:** seeing things from the other person's perspective and encourage the contribution of opinions that are not popular or in the majority.
5. **Sense of Timing:** knowing when to intervene with a question, summary, or bridge from an earlier remark, and when to remain silent.
6. **Clarity:** knowing how to convey information in a way that is easy to understand.
7. **Differentiation:** separating yourself and your personal feelings from the group discussion so that you can facilitate the group process without taking things personally.
8. **Variability:** sensing when to be serious or humorous, thought-provoking or supportive, depending on the circumstances.
9. **Connecting with the Group:** reaching each participant in the discussion, accounting for the emotional and intellectual state of each individual in the group.
10. **Self-disclosure:** willingness to share some feelings, thoughts, and appropriate personal information with the group if that will enhance communication.
11. **Flexibility:** willingness to make changes in the discussion format and content in order to accommodate the interests of group members.