AP Biology - Immune System Unit 11 NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

TED Talk – Bonnie Bassler: How bacteria “talk”

<http://www.ted.com/talks/bonnie_bassler_on_how_bacteria_communicate.html>

***Answer the questions while you watch the TED talk video. WARNING: Dr. Bassler talks VERY fast! Do not distract your neighbors if you miss an answer to an item on the worksheet. You can discuss the content of the video, as well as supplement your responses with more information, upon its conclusion.***

1. Describe a bacterium’s existence.

2. How many cells make up a human? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. How many bacteria cells live on or inside a human? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_\_ times more bacteria genes are playing a role in shaping your life compared to human genes.

5. What special property do *Vibrio fischeri* exhibit?

6. *V. fischeri* in \_\_\_\_\_\_ density populations produce \_\_\_\_\_\_\_\_ light.

7. *V. fischeri* at a certain number or population \_\_\_\_\_\_\_\_\_\_\_\_\_ all simultaneously produce light.

8. What questions did Dr. Bassler and her research team ask about synchronous lighting in *V. fischeri?*

a. How can bacteria determine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in population density?

b. How can bacteria that exist as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells all do something together?

9. How do bacteria “talk” to each other?

10. *V. fischeri* have a mutualistic relationship with what organism?

11. Describe the selective advantage of the mutualism:

12. All bacteria can turn on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ behaviors.

These behaviors are referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sensing.

13. Bacteria are able to control and coordinate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or pathogenicity via the quorum sensing mechanism.

14. Examination of quorum sensing molecule structure reveals that all bacteria species produce \_\_\_\_\_\_\_\_\_\_\_\_\_, private, unique molecules. The shape of the molecule in each species specifically fits the shape of that species membrane receptor thus facilitating \_\_\_\_\_\_\_\_\_-species communication.

15. However, most bacteria species live in larger, prokaryotic-dominated communities. Therefore, upon examination and research, a chemical used for \_\_\_\_\_\_-species communication was discovered.

16. In order to regulate bacterial growth and virulence, biologists have developed \_\_\_\_\_\_\_-quorum sensing molecules that prevent either intraspecies or interspecies communication between cells.

17. SUMMARY: In addition to filling in the blanks, please feel free to write additional information under each bullet point.

* Bacteria \_\_\_\_\_\_\_\_\_\_\_\_ to each other.
* Bacteria behave as though they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Bacteria can distinguish \_\_\_\_\_\_\_\_\_\_\_\_ from others.
* Biologists have developed strategies to impede or improve bacteria’s \_\_\_\_\_\_\_\_\_\_\_ mechanisms for communication.

I agree with Dr. Bassler’s concluding statements about feeling privileged to work with young people who make tremendous academic discoveries and advancements. Keep asking questions and working smart! Continue being the engines that drive scientific discovery and providing explanations about our natural world!

*(And don’t forget to invite me to your Nobel Prize party! ☺)*