GLOSSARY

Compiled for the understanding of work in the Lennon Lab

This is a small list of terms that you (Nicole) might have learned or heard while in the Lennon Lab. You will NOT be tested or graded on your knowledge of them. But, part of being a good scientist is knowing the words and terms that scientists use to perform research, to understand scientific phenomena, and to communicate with other scientists. Knowing the words in this glossary will help you understand the work you did in the Lennon Lab and will help you represent your knowledge and communicate your experience more precisely.

These terms are not in alphabetical order. Instead, they are order in a way that related terms are placed closer together.

1. **Great Plate Count Anomaly** — The widespread observation that most microorganisms sampled from environments or seen under the microscope cannot be cultured using modern lab techniques.

2. **Dormancy** — A reversible state of metabolic inactivity. Dormancy is widespread among many organisms, big and small. However, dormancy among microorganisms is especially notable. Dormant microbes can persist for many thousands to millions of years. Dormant microbes can be extremely resilient to hostile environmental forces. Dormancy is one of the great survival strategies of microorganisms.

3. **Resuscitation** — The transition from dormancy to activity.

4. **Ecology** — The study of interactions between organisms and their environment.

5. **Evolution** — Changes in allele frequencies over generations. An allele is one or more alternative forms of a particular gene.

6. **Microorganism** — A general term for microscopic organisms. Depending on its use, the term “microorganism” encompasses bacteria, archaea, viruses, protists, some fungi (e.g., yeast), and some microscopic plants and animals. In the Lennon Lab, we typically use the term “microorganism” to refer to bacteria, archaea, and viruses.

7. **Bacteria** — A type of microorganism and also an entire domain of life. Bacteria are single-celled organisms with no organelles (e.g., mitochondria, vacuoles, etc.). Bacteria have diversified on Earth for more than 4 billion years and there are an estimated 10^{30} bacteria cells on Earth! Each adult human’s microbiome consists of nearly 10^{14} bacteria cells.

8. **RPF** — Resuscitation promoting factor. An enzyme that resuscitates dormant bacteria. RPF works be

breaking apart (cleaving) molecules of peptidoglycan.

9. **Peptidoglycan** — A polymer consisting of sugars and amino acids that forms a mesh-like layer outside the plasma membrane of most bacteria, forming the cell wall.

10. **Polymer** — A substance that consists mainly or entirely of a large number of similar molecular units bonded together, e.g., RPF.

11. **Enzyme** — Enzymes are biological catalysts that accelerate chemical reactions. The molecules upon which enzymes may act are called substrates. For example, RPF (enzyme) acts on peptidoglycan (substrate).

12. **Cleave** — To break apart.

13. **Petri dish** — A shallow cylindrical glass or plastic dish that biologists use to culture cells. Petri dishes always have lids or covers.

14. **Culture** — Verb: To maintain in conditions suitable for growth. Noun: An artificial environment used to culture cells. In the Lennon Lab, we culture bacteria as well as viruses and protists.

15. **Media** — The physical substance (not the container) within which bacteria are cultured. Media such as agar often contains nutrients.

16. **Agar** — A gelatinous substance obtained from various kinds of red seaweed and used in biological culture media and as a thickener in foods.

17. **Incubate** — To keep at a temperature suitable for growth.

18. **Autoclave** — A strong, heated container used for chemical reactions and other processes using high pressures and temperatures, e.g., steam sterilization. In the Lennon Lab, we frequently use the autoclave to sterilize equipment.

19. **Community** — In microbial ecology, we use “community” to refer to all of the microorganisms that co-occur in an environment.

20. **Microbiome** — In microbial ecology and microbiology, this term is used interchangeably with community. For most intents and purposes, they imply the same thing.

21. **Diversity** — In general, “diversity” refers to the different kinds of things. In microbial ecology and microbiology, microbial diversity relates to the different kinds of microbial taxa (e.g., species), their abundances, and even their traits (e.g., dormancy, responsiveness to RPF) and functions (e.g., which nutrients they use).

22. **Abundance** — Refers to the number of cells, individuals, etc. For example, the abundance of bacteria

in your gut is nearly 10^{13}.

23. **Inoculate** — Verb: To introduce into a culture medium. Example: “We inoculated petri dishes with bacteria sampled from the back of our necks.”

24. **Signal** — Noun: An event that provides the impulse for something to specific happen. Example: “RPF signals bacteria to resuscitate.”

25. **Signaling molecule** — A molecule that serves as a signal. Rpf is a signaling molecule.

26. **Colony-forming units** — CFU’s. A unit used to estimate the number of viable bacteria or cells. CFU’s are usually just the separate “dots” on the petri dish. We assume that each CFU originated from one cell.

27. **Morphology** — A scientific term that refers to the physical appearance of something. Example: “We examined bacteria CFU’s according to their morphology.”

28. **Morphotype** — A type of thing with a specific morphology. Example: “We characterized microbial diversity according to the number of distinct morphotypes.”

29. **Serial dilution** — The stepwise dilution of a substance in solution. Usually the dilution factor at each step is constant, resulting in a multiplicative decrease in concentration.