

## Chapter 1

# Microbial Life: Origin and Discovery

- 1.1 From Germ to Genome: What Is a Microbe?
- 1.2 Microbes Shape Human History
- 1.3 Medical Microbiology
- 1.4 Microbial Ecology
- 1.5 The Microbial Family Tree
- 1.6 Cell Biology and the DNA Revolution

Life on Earth began early in our planet's history with microscopic organisms, or microbes. Microbial life has since shaped our atmosphere, our geology, and the energy cycles of all ecosystems. A human body contains ten times as many microbes as it does human cells, including numerous tiny bacteria on the skin and in the digestive tract. Throughout history, humans have had a hidden partnership with microbes ranging from food production and preservation to mining for precious minerals.

Yet throughout most of our history, humans were unaware that microbes even existed. To study these unseen organisms required a microscope, first developed in the 1600s. In the nineteenth century—the “golden age” of microbiology—microscopes revealed the tiny organisms at work in our bodies and in our ecosystems. The twentieth century saw the rise of microbes as the engines of biotechnology. Microbial discoveries led to recombinant DNA and revealed the secrets of the first sequenced genomes.



*Lactobacillus salivarius* bacteria grow normally in human skin, where they produce bacteriocins, compounds that protect us from disease-causing bacteria. Their multi-part genome was sequenced by Marcus Claesson and colleagues. (Claesson, et al. 2006, *Proceedings of the National Academy of Sciences* 103:6718.) Scanning electron micrograph is from Sinead Leahy and D. John, Trinity College, Dublin. Cell length, 1–2  $\mu\text{m}$ .

# Microbiology An Evolving Science 3rd Edition

**Xiang Xie**



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