The Microbes Within

ANTONY VAN LEEUWENHOEK WROTE TO the Royal Society of London in a letter dated September 17, 1683, describing “very little animalcules, very prettily a-moving,” which he had seen under a microscope in plaque scraped from his teeth. For more than three centuries after van Leeuwenhoek’s observation, the human “microbiome”—the 100 trillion or so microbes that live in various nooks and crannies of the human body—remained largely unstudied, mainly because it is not so easy to extract

and culture them in a laboratory. A decade ago the advent of sequencing technologies finally opened up this microbiological frontier. The Human Microbiome Project reference database, established in 2012, revealed in unprecedented detail the diverse microbial community that inhabits our bodies.

Most live in the gut. They are not freeloaders but rather perform many functions vital to health and survival: they digest food, produce anti-inflammatory chemicals and compounds, and train the immune system to distinguish friend from foe. Revelations about the role of the human microbiome in our lives have begun to shake the foundations of medicine and nutrition. Leading scientists, including those whose work and opinions are featured in the pages that follow, now think of humans not as self-sufficient organisms but as complex ecosystems colonized by numerous collaborating and competing microbial species. From this perspective, human health is a form of ecology in which care for the body also involves tending its teeming population of resident animalcules.

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