

OUR MICROBIAL PLANET

MICROBES—life forms too tiny to see—play a surprisingly large role in life on Earth. Microbes are everywhere, and they do a lot of good for human health and our planet. In fact, disease-causing microbes make up only a very tiny fraction of the millions of types of microbes. Microbes. . .

Think microbes are bad guys? Think again.

Keep us healthy. Amazingly, only about 1 out of 10 cells in the human body is actually a human cell: most of the cells in our bodies are microbes! Some of the microbes living in our bodies actually help us fight disease-causing microbes by competing against them for space. This mutually beneficial relationship helps to protect us from getting diseases while giving the “good” microbes a place to live.

Make air breathable. Without microbes, we wouldn't have oxygen to breathe. This is because many microbes are photosynthetic—like plants, they harvest their energy from the sun, releasing oxygen into the air. Billions of years ago, photosynthetic microbes gradually added oxygen to Earth's atmosphere, making it possible for larger forms of life—including humans—to live.

Provide sources of new medicines. Hundreds of medicines available today were derived from chemicals first found in microbes. Microbes naturally produce an amazing variety of chemicals, which scientists can use to create new medicines.

Help us digest food. Many of the foods we eat would be indigestible without the 10-100 trillion microbes living within our guts. Microbes also play a major role in creating many of the foods we love, such as cheese, yogurt and bread.

The science of metagenomics is shedding new light on the microbial world.

Scientists estimate that less than 1% of Earth's millions of microbial species can be grown in the laboratory. Using metagenomics, scientists can now study how whole communities of microbes function without having to grow each species separately—making more microbes accessible to science than ever before.

Keep our environment clean.

Because of their special adaptations, some microbes can help clean up gasoline leaks, oil spills, sewage, nuclear waste, and many other types of pollution.

Support and protect crops.

Microbes living in soil help protect plants from pests and diseases. They also are essential for converting nitrogen and other nutrients into forms that plants can use to grow.

Living in a microbial world...

Visit www.nationalacademies.org/microbes to learn more!

This poster was derived from the National Research Council report *The New Science of Metagenomics: Revealing the Secrets of Our Microbial Planet* (2007). Reports from the National Academies are available from the National Academies Press, 500 Fifth St., NW, Washington, DC 20001; 800-624-6242; <http://www.nap.edu>. Reports are available online in a fully searchable format.

Support for this publication generously provided by the Presidents' Circle Communications Initiative of the National Academies. Artwork by Nicole Rager Fuller (www.savo-art.com). Bacteria photo at left by Tina Carvalho, University of Hawaii at Manoa. Bottom photo by Jeff Miller, University of Wisconsin — Madison.

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