ABOUT THIS TOPIC

The Basics of Infectious Disease

An infectious disease results from the presence of pathogenic microbial agents, including viruses, bacteria, parasites, and unusual proteins known as prions. Once inside the body, these germs damage tissues while using energy from cells to reproduce and spread.

How Infectious Diseases Spread

The characteristics of the infectious agent will determine how the disease spreads from one person to another. There are various pathways of infectious disease transmission including physical contact with infected individuals, through water, food, contaminated objects, airborne inhalation, or by means of a vector. A vector is an arthropod (insect or tick) that transmits a pathogenic (infectious) microbe to humans or animals, generally through a bite.

In each of these transmission modes, the disease can be triggered by bacteria, viruses, or protozoa. For example, diseases that spread through food or water contamination can be a:

Bacteria
http://www.diseasedetectives.org/stories/salmonella

Virus
http://www.diseasedetectives.org/stories/polio

Parasitic protozoa
http://www.diseasedetectives.org/stories/giardia

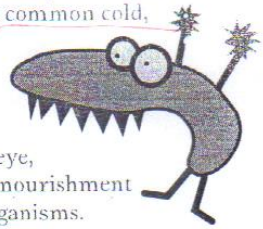
- For activities that help students in grades 4–8 learn more about beneficial bacteria, go to http://www.smm.org/mathpacks/cells/before/bacteria.php
- For basic information about disease and microbes, a free on-line copy of *Understanding Microbes in Sickness and in Health*, a 51-page booklet, is available from the National Institutes of Health. http://www3.niaid.nih.gov/healthscience/healthtopics/microbes/PDF/microbesbook.pdf

What kinds of germs (microbes) cause infectious disease?

Bacteria are single-celled organisms without a nucleus (and not all single-celled organisms are bacteria). Most bacteria do not cause disease in humans. In fact, bacterial action is needed to produce or modify many foods.

Strep throat, TB, pneumonia, and some of the gastrointestinal diseases ("food poisoning") like *Salmonella* or *E. coli* contamination are examples of disease caused by bacteria.

Viruses are tiny bundles of genetic material (DNA or RNA) within a protein coat that are not cells, or living organisms. They infect the cells of a host and use the host cells to replicate themselves, and disrupt the working of the host cells. Examples of virus-caused diseases are chickenpox, the common cold, and influenza.



Ranging in size from tiny, single-celled organisms (usually with nuclei) to worms visible to the naked eye, **parasites** are organisms that derive nourishment and protection from other living organisms. Examples of diseases caused by parasites are malaria, giardiasis, and Chagas disease.

Prion—what is it? A group of diseases that affect nervous system tissue are believed to be caused by an agent that causes strange folded proteins in its victims. Prions were only recently described in the 1980s and still poorly understood. Prions are believed to cause diseases like Bovine Spongiform Encephalopathy (BSE or "mad cow" disease) and Creutzfeldt-Jakob disease.