

# INFECTIOUS AGENTS

## HOW THEY MAKE US SICK

There are many types of infectious agents that pose serious health risks to humans. Infectious agents can enter the body through the mouth or nose or even through bites or wounds. They can also be transmitted through direct contact, ingestion, via the air, or via a vector, like a tick or mosquito. Infectious agents cause a wide variety of diseases affecting various parts of the body. The five main types of infectious agents are bacteria, protozoa, viruses, parasitic worms, and fungi.

### Bacteria

**What they are:** Unicellular, prokaryotic organisms found in large numbers all over the planet. They come in three shapes: spherical, curved, and rodlike.

**How they infect:** Bacteria can invade cells, damage tissues, and produce harmful toxins. Bacterial infections can be introduced to the body through a wound, ingestion or inhalation, or by an imbalance of bacteria already present in the body.

**Treatment and Prevention:** Improved sanitary conditions can prevent infection. Antibiotics are typically used as treatment.

**Example:** Staphylococcus bacteria can cause a staph infection. Typically, the bacteria infect the skin, causing conditions like boils. These bacteria can infect the bloodstream, lungs, heart, and bones; such deeper infections can be deadly. Staph infection can be treated with antibiotics or through draining the boils.

### Protozoa

**What they are:** Single-celled, animal-like organisms, protozoa, unlike bacteria, are eukaryotic.

**How they infect:** Protozoa can infect the digestive tract, blood, and other parts of the body. Protozoa can deprive the host's cells of nutrients.

**Treatment and Prevention:** The best method of prevention is improved hygiene and avoiding contamination through direct contact. Some infections can be treated with medication.

**Example:** A protozoa called plasmodium causes malaria. First, plasmodium infects mosquito salivary glands. Then, it infects humans when mosquitoes feed on human blood and travels to the liver where it multiplies. In the bloodstream, plasmodium reproduce in red blood cells, eventually causing them to burst. Malaria is often fatal. Symptoms include anemia, fever, and an enlarged spleen.

### Viruses

**What they are:** Extremely small (20–400 nanometers in diameter) and made up of an outer protein shell, DNA or RNA, and sometimes fatty molecules known as lipids. They typically come in two shapes: rods and spheres.

**How they infect:** Since viruses cannot reproduce on their own, they take over the host's cells and use cellular resources to replicate. Then they can burst from the hijacked cells to infect other cells.

**Treatment and Prevention:** Vaccines are typically used to prevent viral infection. Antivirals can sometimes be used to treat them, but some viral infections are difficult to treat.

**Example:** The influenza virus ("the flu") affects the respiratory system, causing sore throat, runny nose, coughing, muscle aches, fever, and fatigue. The virus is acquired from inhaling infected droplets in the air.

### Parasitic Worms

**What they are:** Multicellular and visible without a microscope, parasitic worms include flatworms and roundworms, among others.

**How they infect:** Humans can be affected by various life stages from egg, to larva, to adult. These parasites can latch onto a host's tissues to steal nutrients and cause intestinal blockage. They often infect the digestive system causing nausea, vomiting, and diarrhea.

**Treatment and Prevention:** Deworming medication is available for treatment. Maintaining personal hygiene and improving sanitation is ideal for both treatment and prevention.

**Example:** Tapeworms are a type of flatworm that can occupy the digestive tract and inhibit proper nutrient absorption. Symptoms of infection include nausea, weight loss, and abdominal pain. Tapeworms have segments, each producing eggs that are excreted in fecal material and infect hosts when ingested.

### Fungi

**What they are:** Multicellular, eukaryotic organisms that include yeasts, molds, mildews, and mushrooms. They vary significantly in size, from mushrooms that are visible to the naked eye to microscopic yeast. Most fungi are made up of hyphae, which branch off into a larger network known as mycelium. They use spores to reproduce. Other fungi like yeast reproduce by budding, where the offspring grows off the parent.

**How they infect:** Some types of fungi can infect humans when their spores are released into the environment and land on the skin or are inhaled.

**Treatment and Prevention:** Treatments include antifungal creams or powders and oral medications. Fungal infections are best prevented by avoiding contact with an infected person or animal and minimizing contact with fungus in the environment.

**Example:** Athlete's foot is caused by the tinea pedis fungus. This infection starts between the toes. Sweaty feet confined in tight shoes are susceptible to athlete's foot. Skin on the feet becomes scaly and itchy. Athlete's foot can be treated with antifungal cream.