



Fast Facts About Pathogens

BACTERIA

There are three basic types of bacteria (cocci, bacilli and spirilla/spirochete.) A bacterium (singular of bacteria) is a one-cell organism made up of:

- A cell wall
- A plasma membrane inside the cell wall which regulates food passage and elimination
- Cytoplasm: the “insides” of each cell.

Quats attack the cell wall and the cytoplasm leaks out. Think “hole in the dike” once the cell wall is breached.

How Quickly Do Bacteria Grow?

Under optimum conditions bacteria can double their number in 15 minutes with or without oxygen. Theoretically, bacteria, under the proper environmental conditions can grow at an exponential rate. A single bacterium can create more than a million bacteria in about five hours.

Not Visible to the Human Eye—But Still There

An average coccus (singular of cocci) magnified 500 times would be about the size of the period at the end of this sentence. Slightly dirty hands might support from 500 to 1,000 bacteria.



VIRUSES

Viruses are the simplest form of life. Their structure, method of replication, and size, among other factors, are different from those of bacteria. While bacteria can multiply almost anywhere, given the right conditions, a virus must get inside other living cells in order to do so.

Viruses are responsible for many diseases. Colds and flu are two of the most common. Nearly 1,000 different types of viruses are known to infect humans and it is estimated that they account for approximately 60 percent of all human infections.¹

How many viral particles are needed to infect someone ? In some instances, as few as 10.

Viruses are broadly categorized as:

Lipophilic – those surrounded by a lipid envelope. Examples: Hepatitis B, Influenza, Vaccinia, Herpes, Respiratory Syncytial Virus (RSV) and Human Immunodeficiency Virus (HIV-1 AIDS Virus). This type of virus is generally easily inactivated by many types of disinfectants, including quats.

Hydrophilic – do not have a lipid envelope. These viruses are very difficult to inactivate. Examples: Poliovirus, Echovirus, and Hepatitis A. High concentrations of ethanol and strong concentrations of chlorine are among the few germicides that will inactivate these viruses. Some quat formulations are registered to be used to eradicate poliovirus and hepatitis A virus.

Intermediate – do not have a lipid envelope but do have some affinity for lipids in their outer coat. Examples: Adenovirus and Rotavirus. Phenolic disinfectants generally inactivate these viruses, although there are also quat formulations registered to kill certain types of adenovirus and rotavirus.

FUNGI

Fungi form mold and mildew. Fungi also produce diseases of the skin, lungs, and mucous membranes and can, in rare cases, actually invade the entire body. These are generally inactivated by many types of disinfectants. Quats are registered to control *Aspergillus fumigatus*, *Aspergillus niger*, *Candida albicans*, and *Trichophyton mentagrophytes* (Athlete's Foot Fungus).

Water, dust, food, airborne droplets, insects, used hand towels, and other animate or inanimate objects can all carry bacteria, viruses, or fungi.



¹ Barker, J.; Stevens, D.; Bloomfield, S.F., Spread and prevention of some common viral infections in community facilities and domestic homes. *Journal of Applied Microbiology*. 91:7. 2001.



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