

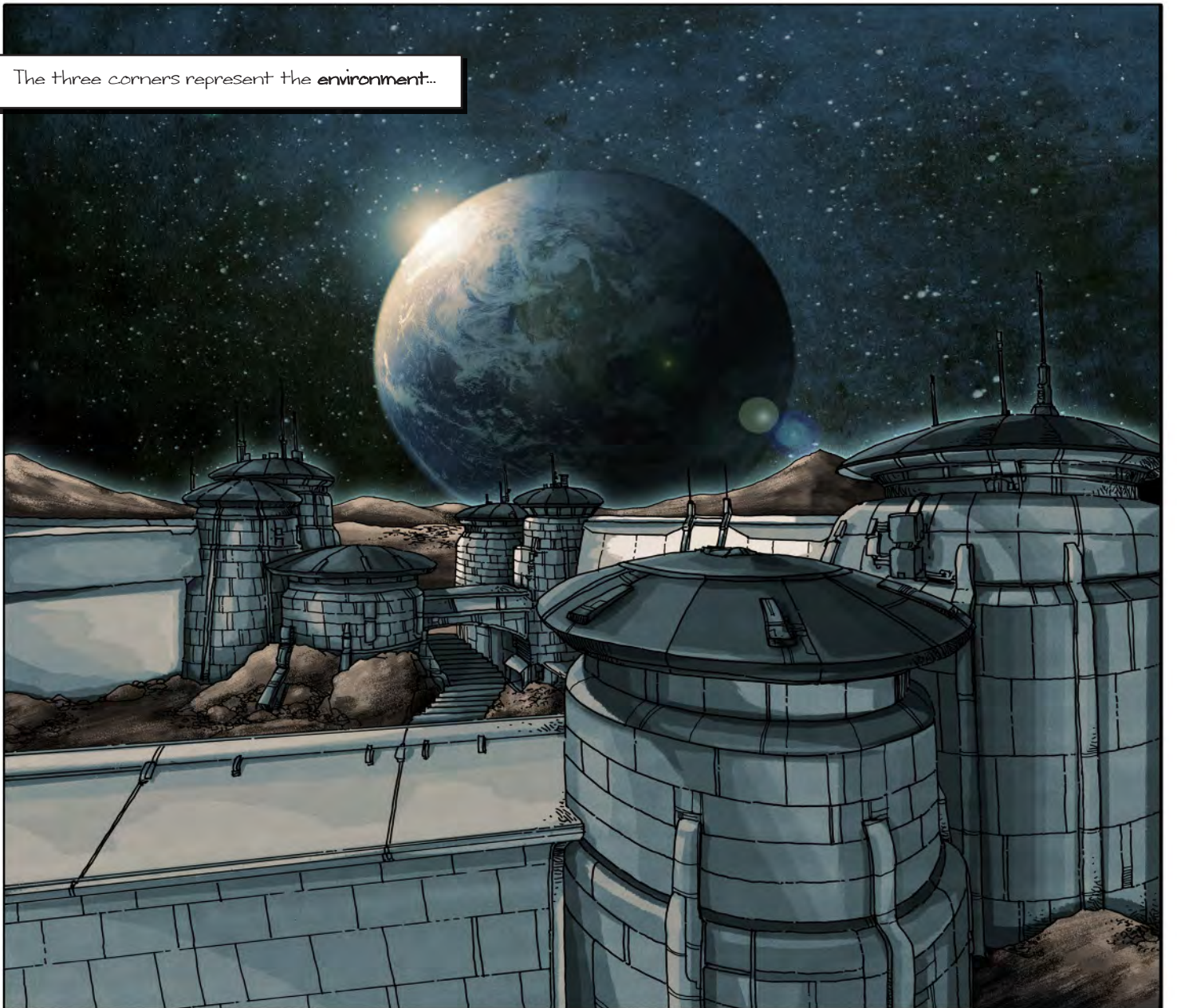
ASK A SCIENTIST

How Do People Become Infected With Germs?



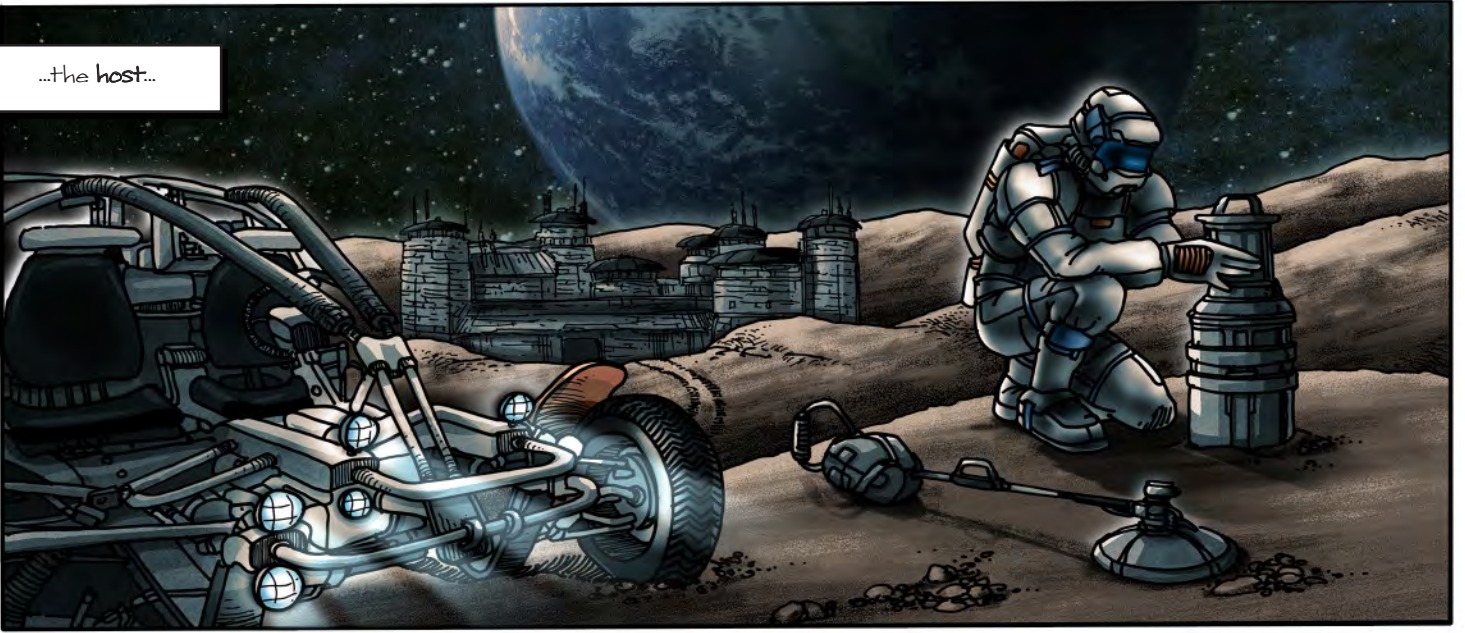


One way to think about how living things get sick is to imagine a triangle.

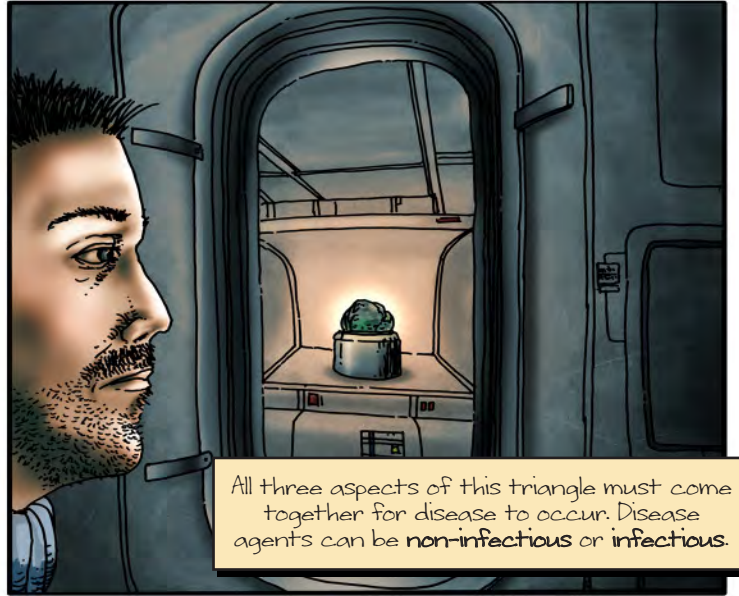


The three corners represent the **environment**..

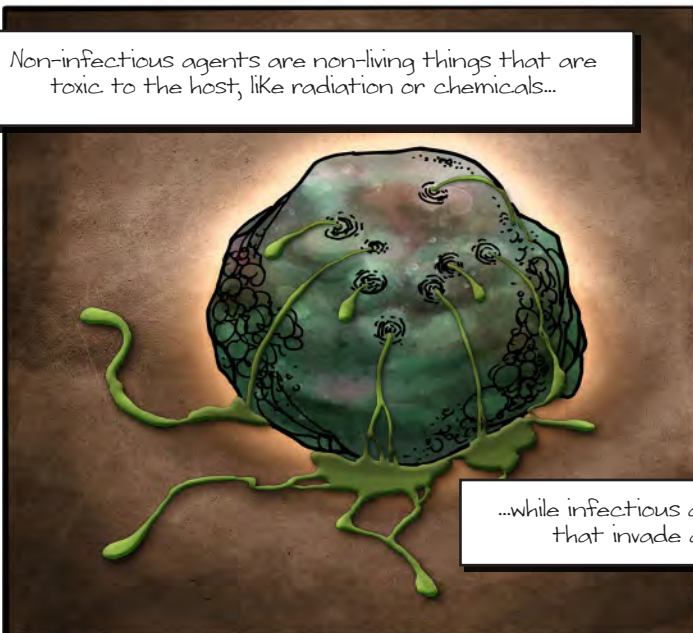
...the host...



...and the cause of the disease,
the Agent.



All three aspects of this triangle must come together for disease to occur. Disease agents can be **non-infectious** or **infectious**.



Non-infectious agents are non-living things that are toxic to the host, like radiation or chemicals...

...while infectious agents are **organisms** that invade a host to survive.

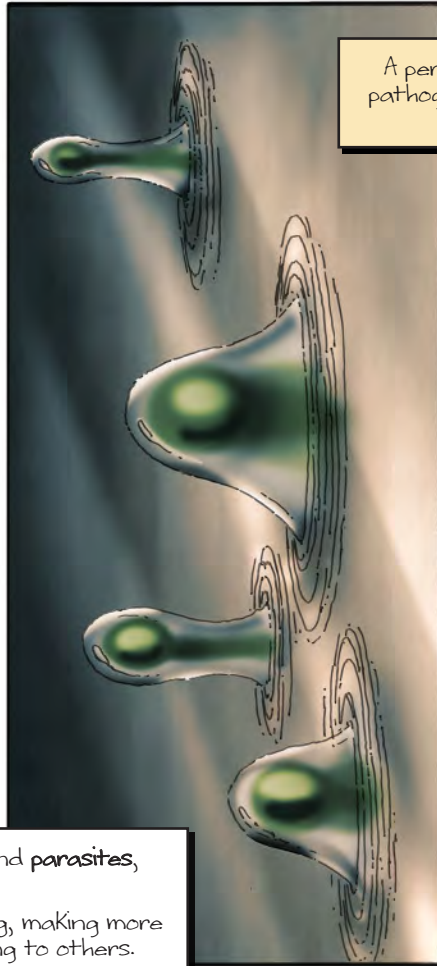


Only infectious agents can spread, or **transmit**, between hosts.

Infectious disease agents, otherwise known as pathogens, must infect a host in order to grow, or replicate.



A person can become infected with a pathogen when in the same environment as the agent...



Human pathogens, like viruses, bacteria, and parasites, evolved to infect people. Their survival is dependent on quickly invading, making more of themselves, and efficiently transmitting to others.



...and don't have enough protection in the form of physical barriers or pre-existing immunity.

If a pathogen gets past a host's defenses, it will attempt to infect the host and begin replicating itself.



The subsequent battle between the germs and the body's immune system will cause the symptoms of illness.



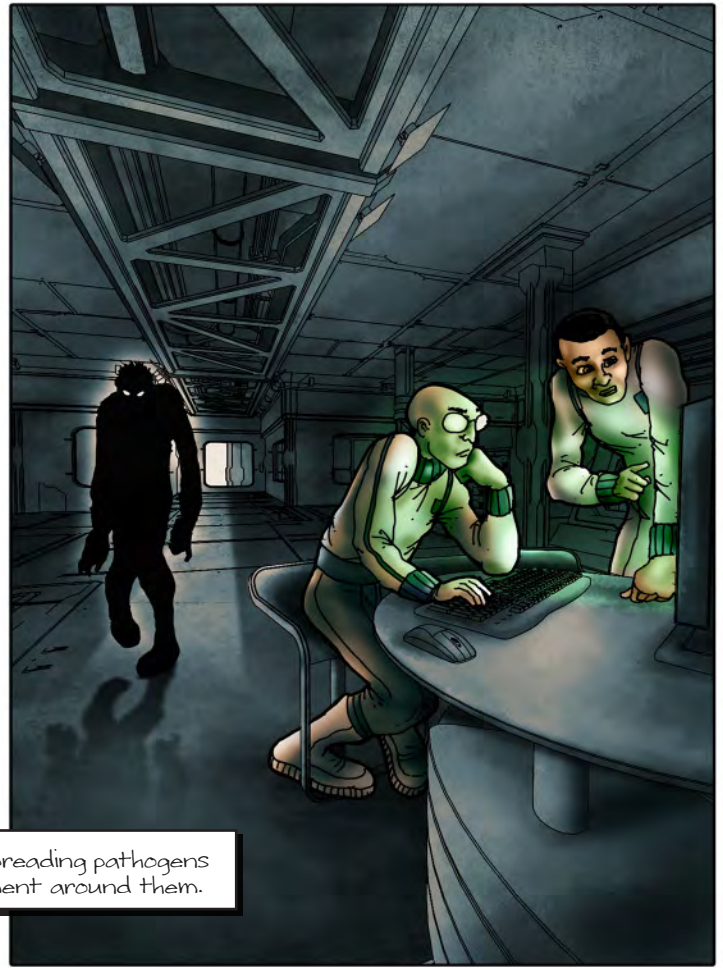
Many cells will be destroyed as germs kill them through replicating and as collateral damage from the activated immune cells.

That's just how one person gets infected, but how does disease spread?

Well, if sick people go around sneezing and coughing without covering their mouth or frequently washing their hands...



...they are actually spreading pathogens all over the environment around them.



Pathogens often take advantage of the symptoms of illness to transmit to other people.



Mucus, diarrhea, and skin rashes are all prime ways newly replicated pathogens choose to leave a person's body.

One person can infect many more people.



This is how infectious disease outbreaks can begin.

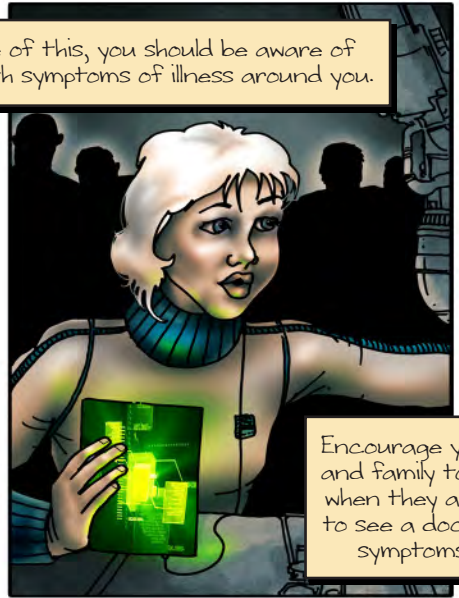
Now, what if YOU come along to the environment as an unsuspecting host?



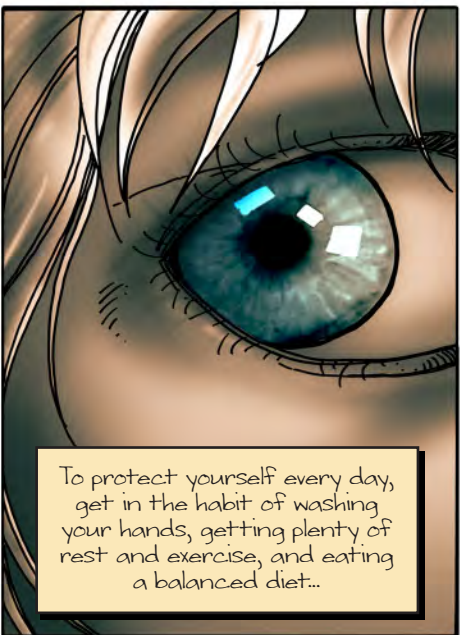
Because of this, you should be aware of others with symptoms of illness around you.



If you are in a contaminated environment and don't take the proper precautions, you can get sick, too!



Encourage your friends and family to stay home when they are sick and to see a doctor if their symptoms persist.



To protect yourself every day, get in the habit of washing your hands, getting plenty of rest and exercise, and eating a balanced diet...

... and avoiding close contact with contagious, acutely ill people whenever possible.



If you want to study how germs work, how pathogens spread from person to person, and how to make new drugs to fight disease, you could work at the CDC as a microbiologist!

WORD	DEFINITION
agent	the cause of a disease
bacteria	a member of a large group of single cellular microorganisms that have cell walls but lack organelles and an organized nucleus, including some that can cause disease
environment	the surroundings or conditions in which a person or organism exists
host	a person or organism on or in which another organism lives
immunity	the ability of an organism to resist a particular infection or toxin by the action of specific antibodies or sensitized white blood cells
infectious	the ability of a living organism to transmit to people or other organisms through the environment
mucus	a slimy substance secreted by mucous membranes and glands for lubrication and protection from infection
non-infectious agent	non-living things that are toxic to the host but are not transmitted through the environment, like radiation or chemicals
organism	an individual life form
parasite	an organism that lives in or on another organism (its host) and benefits by deriving nutrients at the host's expense
pathogen	a bacterium, virus, or other microorganism that can cause disease in humans, animals, or plants
replicate	make an exact copy of; reproduce
transmit	the ability to pass on from one place or person to another
virus	an infective agent that typically consists of a nucleic acid molecule in a protein coat, is too small to be seen by light microscopy, and is able to multiply only within the living cells of a host

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**U.S. Department of
Health and Human Services**
Centers for Disease
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