Some microbes, known as “pathogens,” can make you sick. Luckily, your body has several ways to fight these microbes before they can cause disease or infection. Your skin and the moist linings of your nose, eyes and mouth are the first lines of defense. They keep potential invaders outside the body. Mucus in the respiratory and digestive passages traps some microbes. Coughing and sneezing help to eliminate microbes. Crying and urination both flush microbes out of the body. In addition, tears and saliva have germ-killing proteins. In the stomach, strong acids destroy many pathogens.

And if bacteria or viruses get past these defenses, your body has a built-in system—the immune system—to find and kill the invaders. A healthy immune system is able to tell the difference between the body’s own cells and foreign substances. Anything that the body identifies as “foreign” will cause the immune system to spring into action. Materials that trigger an immune system response are called “antigens.” An antigen can be a microbe, like a bacterium, part of a microbe, or other molecule.

The billion-cell army of the immune system is always on guard. The soldiers of the immune system are several dozen different kinds of white blood cells, each with a special job. Some cells attack any foreign particle from outside the body. For example, some “eating” cells gobble up invaders or infected cells in the bloodstream. Other white blood cells target and destroy specific invaders. Some white blood cells make products, called antibodies, that tag invaders so that they can be destroyed. The immune system “remembers” invaders, so it is better prepared to defend against them in the future.

Vaccines use the body’s immune system to protect against diseases, such as polio, measles and tetanus. Vaccines contain dead or weakened microbes, which are recognized as invaders and attacked by the immune system. Because the immune system remembers information about the weakened microbe in the vaccine, it is able to fight off future infections—even if a new invader is a stronger version of the one contained in the vaccine. Vaccines are effective only against microbes that don’t change (mutate) very much. Microbes that change constantly, such as viruses that cause colds, don’t match the immune system’s memories of previous infections, so they are able to cause illness.

Sometimes, the immune system itself becomes damaged or weakened. This is what happens when HIV, the virus that causes AIDS, infects the body. HIV attacks a certain kind of white blood cell, called a “T cell,” and weakens the body’s ability to defend itself.

In other cases, the immune system makes a mistake and attacks the body’s own cells or tissues. This kind of response causes diseases like arthritis and Type 1 diabetes. These illnesses are called “autoimmune disorders.” Sometimes, the immune system reacts to a seemingly harmless foreign substance, like tree pollen. The result is called an allergy. Hay fever, which is a reaction to several different kinds of pollen, actually is an allergy, rather than an infection, like a cold.
ACROSS
1. The immune ______ can be triggered by fragments of organisms or by entire organisms.
4. There are about this many cells in the immune system.
6. The body has many ways to tell invaders, "Keep ______!"
7. The linings of your nose and mouth are not dry or completely wet; they are ______.
11. You have a lot of these in your nose to trap germs.
12. This immune system cell is destroyed by HIV.
13. This childhood illness, which causes a red, blotchy rash, can be prevented with a vaccine in most cases.
15. Some immune system cells ______ up invaders as if the invaders were chocolate candy.
17. The Type 1 form of this disease is caused when the body's own immune system makes a mistake.
21. An ______ helps to tag and destroy invaders before they are able to spread throughout the body.
22. There are many kinds of this defender cell (three words).
24. An ______ is something that triggers an immune response.
26. This structure is in the center of many cells.
27. The immune system attacks ______ that enter the body from outside.
28. This happens when the immune system reacts to a seemingly harmless substance.

DOWN
2. Also called microorganism.
3. Some microbes enter the body when an insect ______ a person.
5. Once you are vaccinated against a disease, you probably will ______ get it.
7. Microbe-tapping slime in the nose is called ______.
8. This liquid, found in the mouth, has germ-killing properties.
9. It is difficult to create vaccines for microbes that mutate or ______ easily.
10. This kind of microbe does not have a defined nucleus.
14. After it has fought a certain invader once, the immune system can ______ that invader the next time it enters the body.
15. A ______ is a useful tool for observing microbes.
18. When a harmful microbe invades and starts reproducing in the body, it causes an ______.
19. From somewhere else; not belonging to the body.
20. Disease-causing agents are called ______.
22. An HIV infection reduces or ______ the body's ability to defend against disease.
23. Ah-choo! When you ______, it helps to get germs out of your body.
25. This is a kind of fever that you can't catch.