



The Healing Power of Chemistry: How Your Body Is Its Own Bodyguard

Have you ever noticed how you get a tear in your eye when a speck of dust gets in it? Or have you ever suddenly sneezed when you stepped outside? These are just two parts of your body's amazing defense systems that work every day to protect you. But there are even more cool things to learn about how your body takes care of itself!

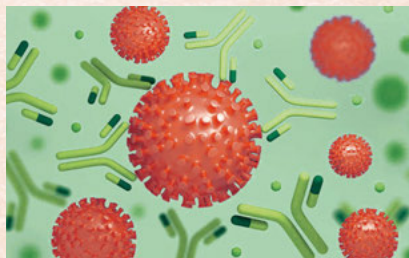
There are **germs** everywhere, and your skin is the biggest protection against them, as well as injuries (read more on page 11). For your body to take care of you, it uses three types of **immunity**: the kind your body knows how to do on its own, the kind your body learns as it fights with germs, and the kind that you received from your mom before birth (or perhaps through blood transfusions for certain diseases). All of these are necessary to keep you healthy.

Immunity your body knows

Almost everyone is born with one or more kinds of innate immunity or defenses against things that could hurt us. Examples of these defenses include our skin; tears (to get rid of dust/bugs/germs); mucus (like snot to trap germs/dust, which we sneeze and cough up, or swallow and excrete); saliva (to break down **pathogens**, or disease-causing germs); and stomach **acid** (to kill foreign particles that we've swallowed). When you get a fever, it's your body's way of fighting the **infection**, because by raising our body's temperature, we make it difficult for pathogens to multiply. More examples include the way that blood clots work to stop bleeding, and how scabs form over wounds as they heal. These are all ways your body works naturally to protect you!

Immunity your body learns

Adaptive immunity is when your body learns to fight a certain germ ... and "remembers" it for later! When you first get infected with a germ, your body makes Y-shaped proteins called **antibodies** to fight back. These tiny proteins recognize the germ that caused the disease, so that the next time this germ attacks you, you'll be able to fight it off without becoming sick. **Vaccines** work in a similar way, by mildly infecting you so that your body can identify and fight off the same infections later. This is like a "Wanted" sign that helps people identify a certain suspect. A vaccination (or previous infection) helps warn your immune system when an old enemy returns!



Immunity from others

Passive immunity is immunity to infection from antibodies that were *not* produced in your body. This protects you only for a short term (not for life). For example, antibodies passing on to a baby from the mother will go away a few months after birth as the baby develops their own immunity.

About the cover:

About 5 weeks after breaking his arm, the little mole is at the doctor's office to see how he's healing. On the computer screen, you can see an X-ray of the healing bone called the *radius*. The bone was held in place by a soft fiberglass cast. Notice how a little bump (called a *callus*) has formed as the bone has healed.

On the doctor's shelves, you can find:

- *milk of magnesia*: a liquid medication (activity on page 9) for heartburn, upset stomach, and constipation
- *hydrogen peroxide*: a chemical disinfectant commonly used for cleaning wounds
- *bandages*: used to cover cuts and speed up the body's ability to heal wounds (find out more about bandages on page 4, and how to make your own on page 5)
- *pain relief medication (analgesics)*: treat pains from injuries, twisted ankles, and headaches
- all the cool "Doctor" books: *Dr. Grey*, *Dr. Who*, *Dr. Sleep*, *Dr. Strange*, and *Dr. Dolittle*

On the counter, you can also find:

- *otoscope*: used to check ears for signs of hearing loss, earaches, and infections, or to find out if an ear canal needs cleaning
- *sphygmomanometer* (or blood pressure cuff): used to measure how well a heart is pumping blood throughout the body
- *digital thermometer*: tells whether you have fever as your body is busy fighting germs (read more on page 3)
- older editions of *Celebrating Chemistry*: did you notice our recent algae edition?

Given the incredible things our body does for us, it deserves the same love and attention from us. Promise yourself to eat nutritious food with lots of whole grains, fruits, and vegetables. Maintain good hygiene by washing hands and brushing your teeth regularly, getting enough sleep, showering daily, etc. Enjoy learning about "The Healing Power of Chemistry"!