

Inside the Body

Looking Inside the Body

Written by Todd Mercer

READING TIP

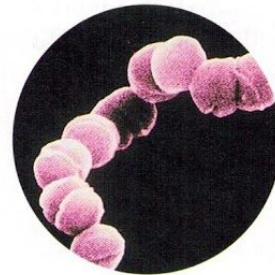
Read graphic information

Much of the information we learn comes from “reading” graphics. Look carefully at each of the photographs in this selection. Jot down notes about what you learned from each photograph before you read the text.

Close-up Views of the Human Body

Can you tell what these pictures are? They’re all views of types of tiny germs that can live in people’s bodies. The first picture is a tiny germ called a *virus*. Viruses cause infections like chicken pox. The second picture is a larger germ called a *bacterium*. Bacteria cause infections such as strep throat. The largest germ shown is a *parasite*. This one causes a sickness called Lyme disease.

Not all germs are bad. In fact, you host many germs in your body.



Did You Know?

- ▶ There are a million germs in your mouth!
- ▶ There are about 100 germs in your stomach. (That's because stomach acid kills many germs.)

Meet Dr. Anne Matlow

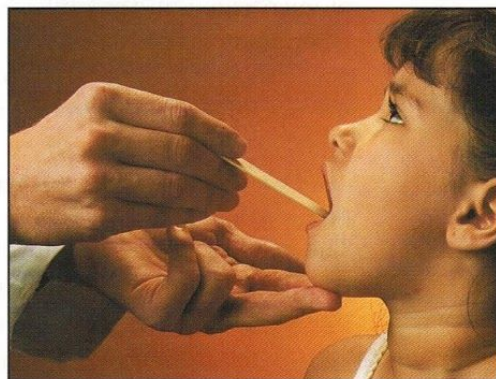
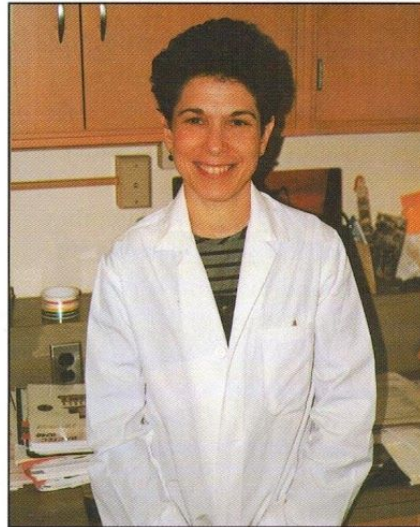
One person who's very interested in tiny hidden worlds within the human body is Dr. Anne Matlow. She's Director of Infection Control at the Hospital for Sick Children. Dr. Matlow is a medical doctor and a *microbiologist* ("micro" means small and "biologist" is a scientist who studies life). She is one of the physicians responsible for all the germ samples tested in the hospital's microbiology laboratory.

How does her work affect young patients? Here's just one example. If a child comes to the hospital's Emergency Department with a very sore throat, the examining doctor will probably ask for a *throat swab*, a sample of the germs at the back of the child's throat.

LEARNING GOALS

You will

- find out how doctors learn about the inside of the human body
- gather information from pictures



How Does a Medical Microbiologist Tell What's Wrong?

Germs are much smaller than what anyone could see with the human eye—even with the aid of a magnifying glass. When microbiologists or technologists at Dr. Matlow's laboratory receive a sample such as a throat swab, they prepare *plates* so they can look at the sample under a microscope.

To make a plate, they put the germ sample in a round dish and leave it to grow overnight.

The microbiologists can often identify the germ by closely observing how it grows.



Microscope plates, prepared for study under a microscope.

Many Kinds of Microscopes

There are four different types of microscopes in Dr. Matlow's laboratory. "Which ones we use," she explains, "depends on the type of germ we're trying to find."

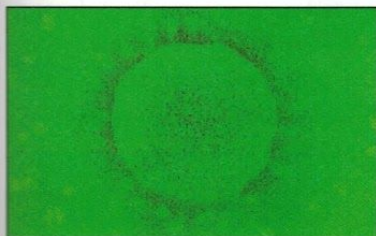
"We have a light microscope to see an individual bacterium. The microscope can magnify the bacteria from 10 to 1000 times bigger than it really is."



Light Microscope

“The stereomicroscope allows us to look at groups, or *colonies*, of bacteria. This lets us see more detail.”

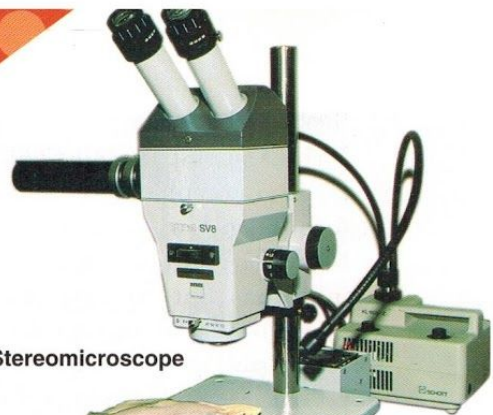
“We also have fluorescent microscopes in the lab. If we’re looking for the germs that cause whooping cough, we add a fluorescent chemical to the germ sample. This chemical will only react with the whooping cough germ. If we see a glowing apple-green coloured reaction when we look at the plate through a fluorescent microscope, we know the patient has the whooping cough germ.”



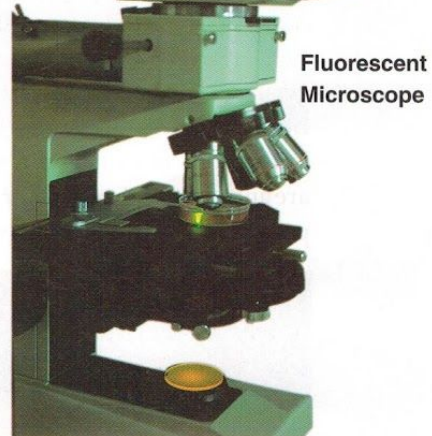
A virus, as seen through a fluorescent microscope.



A microorganism, as seen through an electron microscope.



Stereomicroscope



Fluorescent Microscope

“We might use an electron microscope to look at very tiny *viruses*, like the germ that causes chicken pox. Viruses are about 100 times smaller than bacteria. So we need more powerful microscopes to see them.”

Controlling Germs

The major responsibility of medical microbiologists and technologists at the hospital laboratory is to diagnose infections. But they also have a second very important responsibility: they help physicians by determining the most effective medicines to use to treat infections or manage the infection-causing germs.

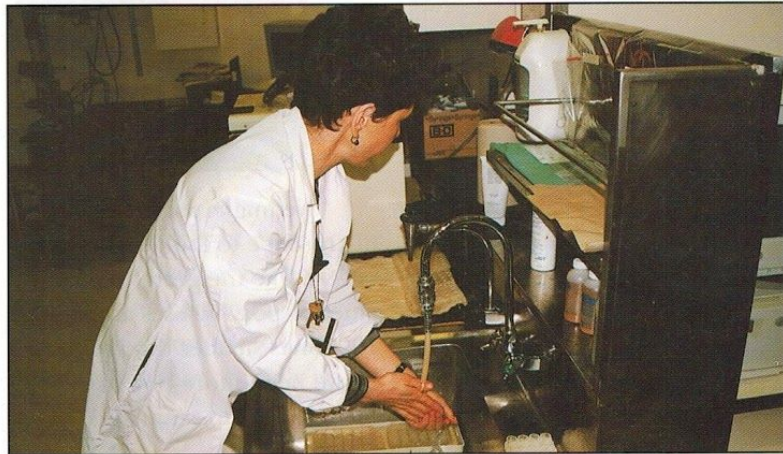
Usually we live in harmony with the germs in our body. (Remember those million germs living in your mouth.) But sometimes our germs grow out of control or harmful germs are introduced from other people, creatures, or the

environment. And these often cause serious infections.

Maybe that's a good reason to listen when a parent or guardian says, "Wash your hands." You don't want to be responsible for passing germs you can't see to someone else.

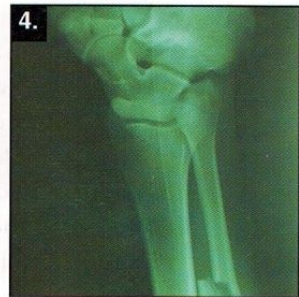
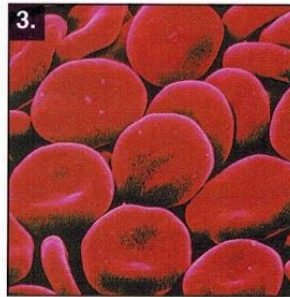
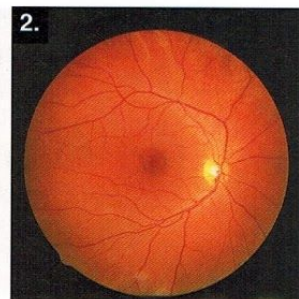
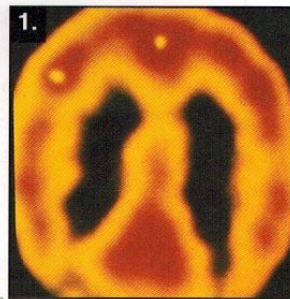
Unfortunately infections do strike. And when they do, Dr. Matlow finds the most satisfying part of her work is "being able to diagnose and have an impact on the treatment of infections in children."

Maybe it's because of her experience as a medical doctor, but even when she's looking at the tiniest germ under a microscope, she's able to connect it to a person.



Other Doctors Who Have Close-up Views of the Human Body

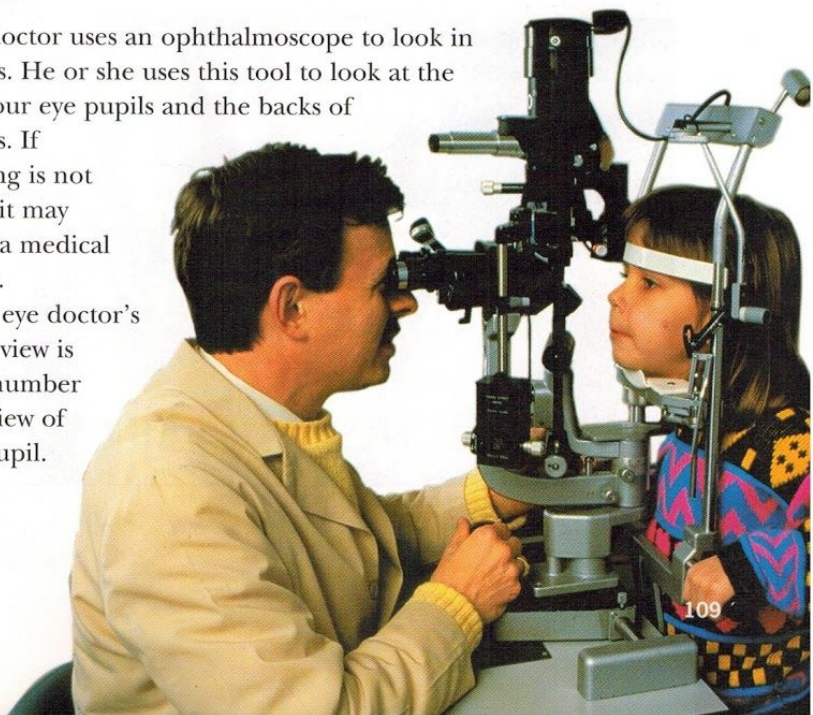
Where are these views from? To find the answers, read the information below.



Eye Doctor

An eye doctor uses an ophthalmoscope to look in your eyes. He or she uses this tool to look at the size of your eye pupils and the backs of your eyes. If something is not normal, it may indicate a medical problem.

The eye doctor's close-up view is picture number two—a view of an eye pupil.



Radiologist

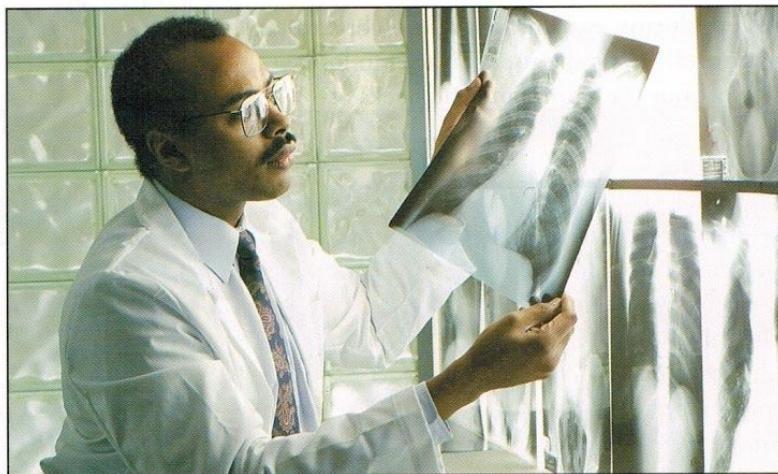
A radiologist is a doctor who interprets X-rays and other pictures taken of the inside of our bodies. For example, a radiologist would determine if you have a broken bone by “reading” your X-ray.

To make an X-ray of a broken leg, a special tube creates a beam that passes through your leg. Bone is much denser, or more compact, than skin and muscle. These differences in density are captured on the X-ray film. So, when the film is developed, the bone appears white, and soft

tissues, like skin and muscle, are dark grey or black. The broken part of the bone is grey.

Radiologists use other tools such as ultrasound machines and CT scanners to take pictures of the insides of our bodies. Ultrasound machines use special waves to create pictures and CT scanners use computer technology to take X-ray pictures offering many different views of our insides.

The radiologist’s close-up views are pictures number one and four—a view of a brain captured by a CT scanner and an X-ray of a broken leg.



A radiologist examines some chest X-rays.



Blood Doctor

A blood doctor, or *hematologist*, often uses a light microscope to check if there is anything in our blood that could indicate diseases. He or she examines parts of the blood called *cells*. There are three main types of blood cells: red cells, white cells, and platelets. If the red

cells are small, it may mean a person is not getting enough iron in his or her diet. If there are a lot of disease-fighting white blood cells, this might mean the person has an infection in his or her body.

The blood doctor's close-up view is picture number three—a view of blood cells.

AFTER YOU READ

Compare text and graphics

Look back at the notes you made about each photograph. Beside each note, add the information you learned from reading the text. Were you a careful viewer and able to gather as much information as possible from the photographs? Did the text confirm what you learned from the photographs?