BACTERIA

You can't see 'em; you can't hear 'em; you can't taste 'em. But, oh boy, can they make you smelly or sick!

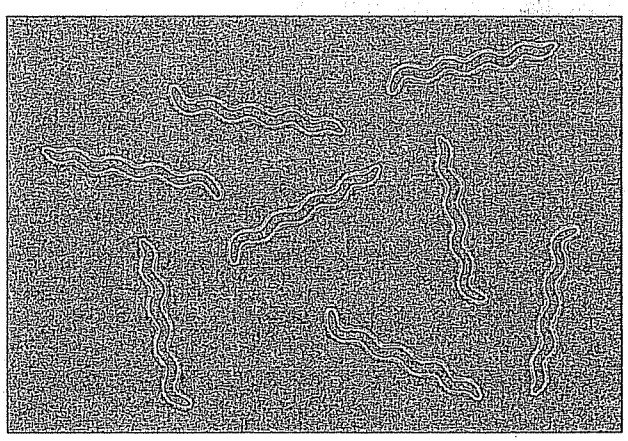
THE GOOD, THE BAD, AND THE STINKY

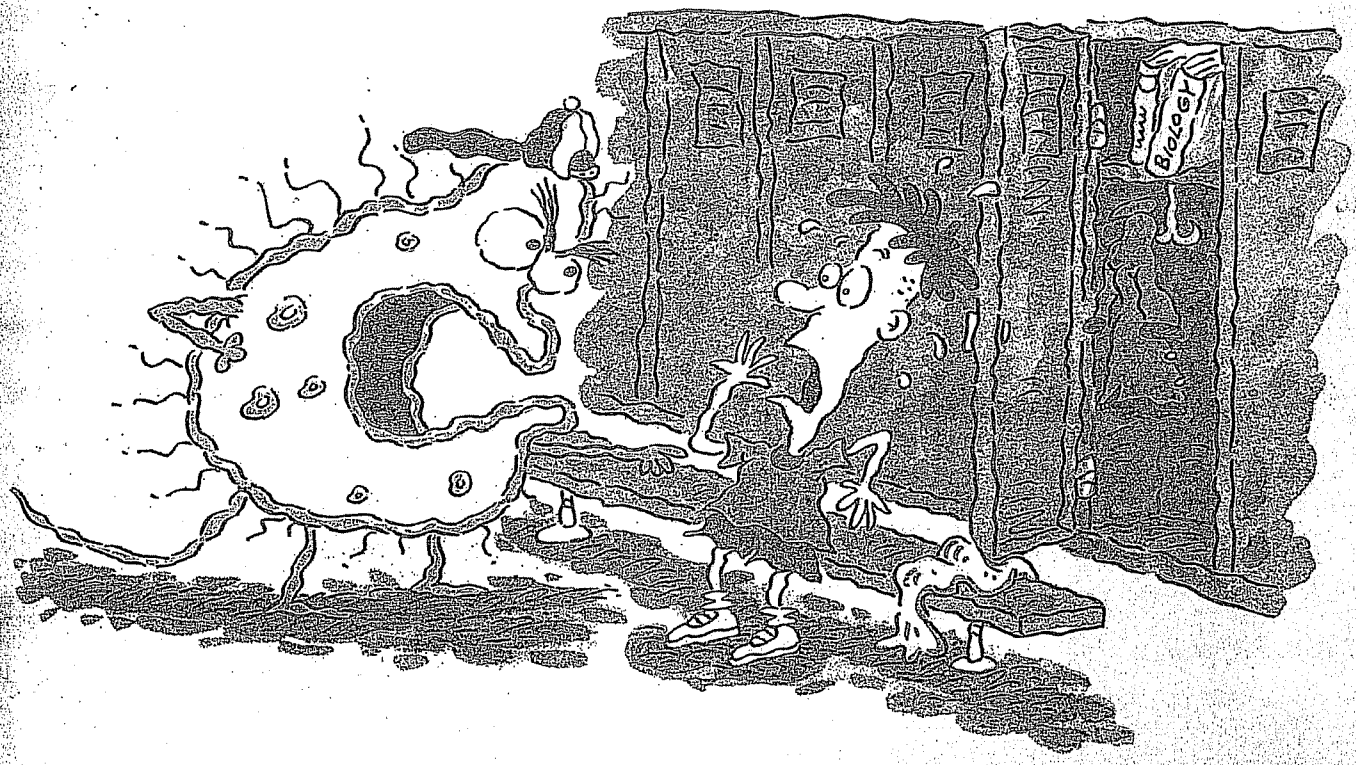
Bacteria are tiny living things (known as microorganisms) that cover the entire earth. They live in the dirt and deep in the sea. They float through the air and thrive in the bodies of every living thing. They are *not* plants, *not* animals, *not* fungi. Instead they belong to a group of living things called MONERA *(moan-air-ah).*

Most bacteria are so small that if you put 10,000 of them in a row, they would measure only about an inch. (And getting your hands on 10,000 bacteria is a snap. One bacterium can divide into a million bacteria in half a day!) Of course, there always has to be an exception to every rule. A monster bacteria has just been discovered lurking in the reeking, sulfurous muck of the ocean bottom near the coast of Namibia in Africa. These are big guys, big enough that you can see them without using a microscope. Each is about the size of the period at the end of this sentence. That may not seem huge, but in the bacteria world, that's a King Kong of a germ.

What do bacteria love to do most of all? Munch! They munch on the oil in our skin and the partially digested dinner in our guts. They'll invade the flesh of a dead cow and the grease in your kitchen drain. They'll even take on a half-mile-wide oil spill!

Most bacteria are totally cool little microbes (another name for microorganisms). Some turn raw sewage into chemicals that help plants grow. Then there are the ones that specialize in devouring grease, eating pond scum, or lapping up those huge oil spills. Good bacteria such as these are actually sold by laboratories around the world. Other good bacteria help break down animal hides so they can be turned into shoes, handbags, briefcases, and those cool motorcycle jackets. Other ones are used to make vaccines, medicines, yogurt, and even tea!





Then there are the "geeky" bacteria, like the ones that create a stink in our armpits. They're not exactly harmful, but they sure are annoying. (See BODY ODOR, page 21, and FOUL FEET, page 63, for more on those icky geeks.)

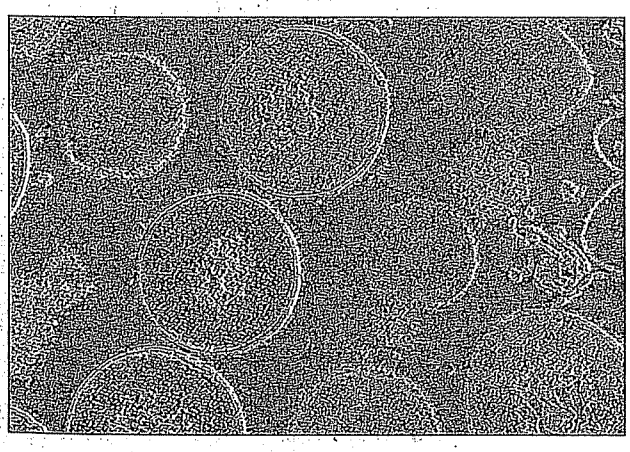
Finally, there are "bully" bacteria that can make us sick by causing food poisoning, strep throat, pneumonia, diarrhea, and other big-time problems.

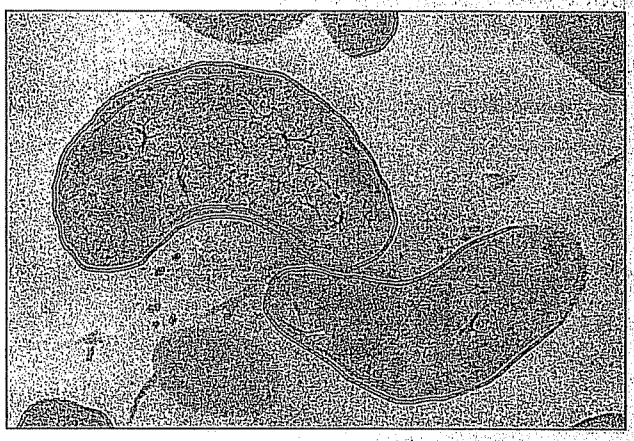
Bacteria come in different shapes, just like the bullies at school. There are tall, skinny ones, round, pudgy ones, spiral ones, and curvy ones. And just like the school bullies, they can make your life miserable. Read "Bacteria—Up Close and Personal" to find out their names.

WHERE THE BAD GUYS HIDE

One of the main ways that bully bacteria are spread is through bad hygiene. Translation? Not washing your hands after you go to the bathroom. Remember that half of what your

Back to back bacteria! The squiggly ones at far left are spirochetes just waiting to give someone Lyme disease. The round ones in the middle are cocci that cause pneumonia, and the cheese-doodle-shaped ones below are vibrios, which can give you cholera.



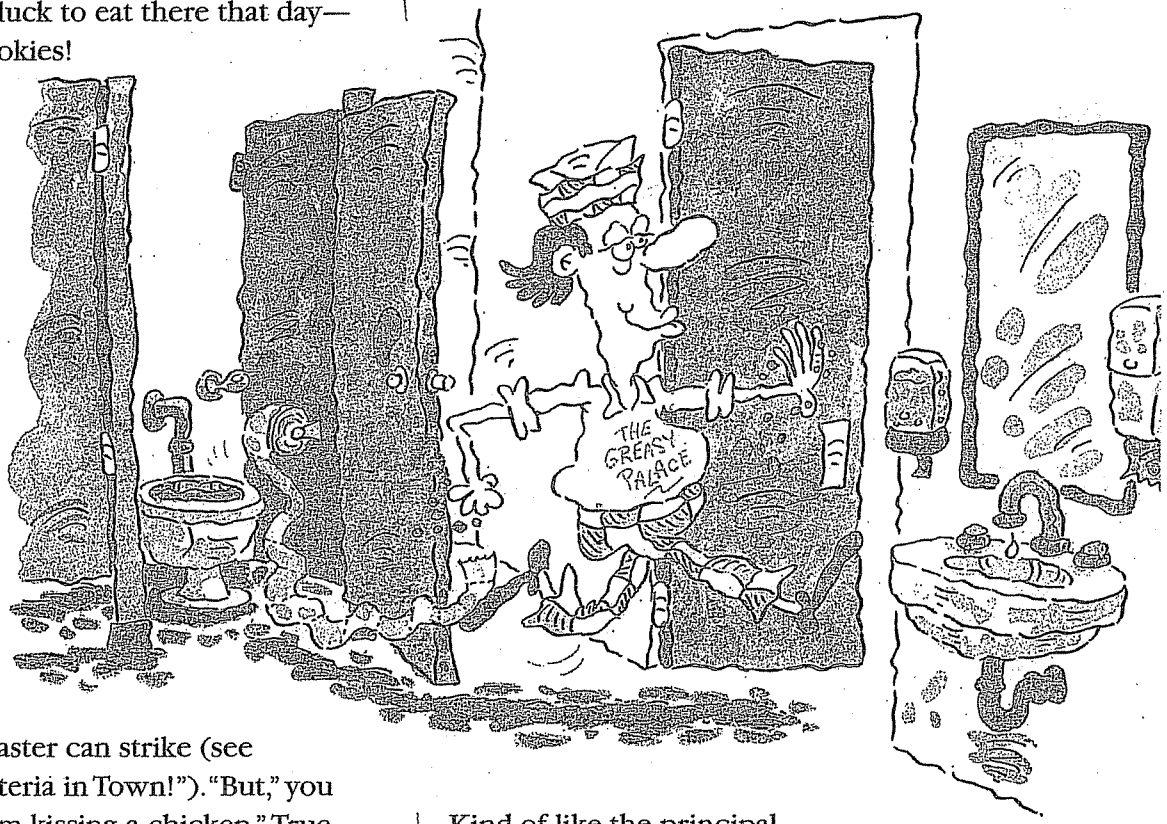


body's getting rid of when you poop is bacteria. Some of it is harmless, but some is not. (See POOP, page 121.) As you wipe, bacteria can leap onto your hands. Once on your hands, the bacteria start to reproduce like crazy. If a person who works at the local burger joint doesn't wash, those bacteria creep into everything he handles—the burgers and fries and milk shakes. And before you can say "I think I'm gonna hurl," you—and anyone else who had the bad luck to eat there that day—will be tossing cookies!

Other times, sickness starts when bacteria that live aboard one animal make the move to another. A perfectly healthy chicken's guts are crawling with salmonella bacteria that help the chicken digest all that chicken feed. But when that same bacteria gets into our intestines, disaster can strike (see "The Baddest Bacteria in Town!"). "But," you say, "it's not like I'm kissing a chicken." True, but chances are you're eating one! Undercooked chicken can give you salmonella. Even eating the uncooked egg that has been beaten into brownie batter can make you pretty sick, so don't lick that spoon!

Some nonliving things, such as air conditioners, can hide bacteria cities. Certain types of these microbes adore the warm wetness that's created by air conditioner motors. And the air blowing from them propels millions of bacteria into the air—*and* the lungs of whoever happens to be in the room! Before you know what's hit you, you'll be shaking with chills and flushed with a fever from Legionnaires' disease (see the box for more grisly details).

Fortunately, other living creatures, namely FUNGI *(fun-guy)*, can beat the bully bacteria up. That's basically what that nasty pink stuff is that your doctor gives you for ear infections or strep throat—a mess of bigger, meaner critters.



Kind of like the principal and the dean of students on the warpath. These ANTIBIOTICS (that's what the pink stuff is called) destroy bacteria. And, boy, are we grateful to them. Their only downside: they wipe out the good bacteria (those that break down food) along with the bad. That's why lots of us end up with the trots when we take antibiotics. But fear not! The good-guy bacteria will be back! And you can even help bring them back faster by eating yogurt that contains active acidophilus cultures (See POOP, page 121, for more on the trots.)

The Baddest Bacteria in Town!

They're deadly, dangerous, and downright disgusting. Here are some of the meanest microbes and how to avoid them.

1. CAMPYLOBACTER *(camp-peh-low-back-ter)*

Got a bad case of the runs? This critter could be the cause. It invades the intestines through poorly cooked food, then excretes a toxin that destroys the mucus lining of the gut.

2. CLOSTRIDIUM TETANI *(klah-stri-dee-yum tet-in-eye)*

All of you have had to get a tetanus *(tet-nus)* shot from time to time. That's to protect you from this nasty bacterium. Down in the dirt, just about everywhere in the world, there are sleeping spores of clostridium. Infection begins when the spores creep into an injury or wound. The spores germinate, just like a seed that grows into a plant, except the spores release active bacteria. These bacteria multiply and produce a neurotoxin that makes muscles go into severe spasms. Your muscles can rip and your bones snap from the power of these contractions, and some very little bacteria can leave you very dead. Suddenly that tetanus shot doesn't seem quite so bad, does it?

3. E. COLI *(Ee coe-lie)*

Chances are you've heard of this little creep. It's most often found hiding out in cattle doo-doo, and each year over 20,000 Americans end up sick as dogs from eating food tainted with it. At its least, it can give you the nastiest case of diarrhea you've ever had; at its worst, this bug can destroy every organ in your body, turning your heart and liver to mush. How can you avoid this deadly bug? Cook your hamburgers really well. No pink meat for you! Wash forks and knives that have touched raw meat before using them again. And always wash your hands after you shape those hamburger patties!

4. LEGIONELLA *(lee-jon-el-ah)*

Remember Legionnaires' disease from page 8? Back in the 1970s, a bunch of guys who belonged to an organization called the American Legion went to a convention in Philadelphia. While they were there, a lot of them got really sick with a serious lung infection that came to be known as Legionnaires' disease. The culprit was the hotel's air-conditioning, which was sending airborne bacteria hurtling through the hotel! Scientists named this strain of bacteria after those unlucky folks who got sick.

5. SALMONELLA *(sal-muh-nell-uh)*

Chickens and eggs, when not cooked enough, harbor this dandy disease-bringer. Even fruit and ice cream can hide this varmint. Got food poisoning? Chances are, if you're puking your guts out, the culprit was salmonella.

6. SHIGELLA *(shi-gell-ah)*

This breed of bacteria attacks the lining of the small intestines. Cramps, gas, and the "squirts" are the result. And how does the bacteria get there? Contaminated food, fly-infested homes, and bad sanitation. Shigella is especially common in developing countries and refugee camps.

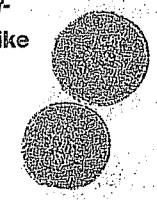
BACTERIA BREAKDOWN

When bacteria eat, they break complex substances, like your half-digested dinner, into smaller, simpler things. Imagine a huge Lego tower. It's made of a thousand little tiny blocks, all snapped together. But the bacteria only want to play with three or four blocks, three rows from the bottom. So they start to unsnap the whole building! When they are done, the tower doesn't look like a tower anymore. It looks like a mess.

Bacteria—Up Close and Personal

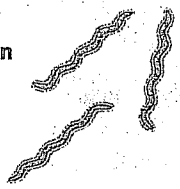
Bacteria are tiny but that doesn't mean they all look alike. Here are their four basic shapes.

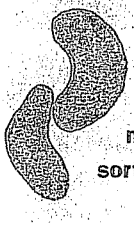
COCCI *(cock-eye)* **As round as marbles, not nearly as much fun. They like to gang up and cause strep throat, pneumonia, and boils (a nasty skin infection).**



BACILLI *(ba-sill-eye)* **Rod-shaped, and an occasional big-time troublemaker. Bacteria from this group cause the lung disease tuberculosis.**

SPIROCHETES *(spy-ra-keets)* **Look like a kind of curly pasta. They don't taste like it, though. Some of these bullies are responsible for Lyme disease, which is spread by tick bites and is a real nuisance in the northeastern part of the United States.**





VIBRIOS *(vib-ree-ohs)* **Curvy and sometimes creepy. They look like miniature commas and can cause all sorts of tummy troubles.**

Some bacteria breathe in oxygen just like we do. Some breathe in hydrogen sulfide and exhale sulfur. And where there's sulfur, there's *stinkiness!*

All living things rot . . . sometimes quickly, sometimes very, v-e-r-y slowly. Rotting is, believe it or not, a part of growing—of living. Without rotting, the corpses of everything that has died since life on earth began would be piled up all over the place! Bacteria help makes that rotting happen. Let's say that a caterpillar gets squooshed on the street. A goner, right? No heartbeat. No breathing. But the bacteria living on the caterpillar are still chugging along. They invade the tissue and alter the chemical makeup of that caterpillar, breaking it down into smaller and smaller bits until it disappears and is reabsorbed into the earth.

So let's have a round of applause for those hard-working bacteria. If it weren't for them, you'd be stepping on a mile-high mound of dead bodies on your way to school every day!

BAD BREATH

Just woke up and wondering what that awful stench is? Well, it's probably coming from your mouth. Whether you call it horse breath, moose breath, or just plain morning mouth, to find out more about it see HALITOSIS on page 78.

BARF

What's green and brown and red all over? Barf! Want to know more about that stinky, goopy, altogether nasty stuff? Turn to VOMIT on page 187 to find out what's up with tossed cookies (and why they sure don't smell like chocolate chips!).