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BOOKS

## Separating Friend From Foe Among the Body's Invaders

By ABIGAIL ZUGER, M.D.

Even metaphorical wars can have flesh-and-blood casualties, and [hospitals](#) around the country are now tending to the victims of one of our fiercest. It is not so much that we are “losing” this particular war; simple notions of victory and defeat dropped away some time ago. Rather, locked in a spiral of costly and controversial escalations, we may have lost sight of who the enemy actually is.

**Good Germs, Bad Germs**  
*Health and Survival in a Bacterial World. By Jessica Snyder Sachs.*  
Hill & Wang. 290 Pages. \$25

Sound familiar? This is a posting from the front lines of the global war on germs. Given the news-media storm over infections caused by the drug-resistant staphylococcus called MRSA, Jessica Snyder Sachs's capable overview could hardly be more timely even if it did not call to mind a variety of other recent headlines.

For one thing, the armies of bacteria that sneak into our bodies the moment we are born must be the primal illegal immigrants, uninvited but necessary guests. Most are industrious and friendly, minding their own business in tight-knit, long-lived communities, doing the grunt biochemical work we depend on to stay alive. A few miscreants, though, will kill us if we let them stay.

How do we separate friend from foe? Wouldn't it be safer just to nuke them all? In the course of a century, scientists have run through many of the same slogans politicians have. The pioneering immunologist Elie Metchnikoff, winner of a 1908 [Nobel Prize](#), thought the only good germ was a dead one: he “viewed bacteria as the worst sort of parasites,” Ms. Sachs reminds us. “He blamed the ‘putrefaction’ of bacteria inside the human bowel for senility, [atherosclerosis](#) and an altogether shortened life span.” It was only a matter of time, Metchnikoff predicted, before “surgeons would routinely remove the entire human colon simply to rid us of the ‘chronic poisoning from its abundant intestinal flora.’”

While Metchnikoff's theories represented an extreme position that some of his contemporaries disputed, our untrammelled use of [antibiotics](#) has, in effect, put them to the test.

The results speak for themselves. It turns out that the indiscriminate killing of harmless microbes damages the body in complex ways we are only beginning to understand.

Meanwhile, the bad germs are pretty much unstoppable. A few have proved susceptible to vaccines, but under attack the rest simply become hardened and infinitely resourceful, forcing a continuous escalation of weaponry.

In dozens of interviews with scientists and patients, Ms. Sachs, a veteran science journalist, has done yeoman's work tracing out all the complexities of our current unhappy relationship with the microbial world.

We host more bacteria than we ever realized: new DNA technology has found hundreds of previously unrecognized species in the traditional stomping grounds of mouth and intestine, and traces of bacteria even in tissues previously thought to be sterile. Further, our indwelling organisms apparently communicate constantly with one another, both within individual colonies and also among species. Powerful antibiotics introduced into this complex environment cause mayhem, much like a series of bombs tossed into a market square.

When the peaceful activities of a normal microbial population are disrupted, malevolent bacteria may take full advantage of the opportunity to strike. The intestinal infection *C. difficile* [colitis](#), now rampaging through hospitals around the world, is one such complication of antibiotic use.

In addition, many scientists now subscribe to the theory that the creation of an unnaturally microbe-free environment is at least partly responsible for the modern explosion of allergic and autoimmune diseases. Without routine early exposure to a wide array of microbes, the immune system may become jumpy and frightened, overreacting violently to harmless substances like pollen, peanuts or even the body's own cells.

Finally, there is the problem of antibiotic resistance. Microbes exposed to antibiotics evolve dozens of biochemical tricks to inactivate or evade them, and then can pass the tricks around on fragments of DNA.

Drug-resistant tuberculosis and staph infections are treated like breaking news, but in fact these problems have been with us for decades. [Eleanor Roosevelt](#) died of drug-resistant [TB](#) in 1962, while a 1958 outbreak of fatal drug-resistant staph infections unfolded quite similarly to the one we face today.

What is new is the emerging consensus that the way to combat antibiotic resistance may not be bigger, better, stronger antibiotics but, rather, no antibiotics at all. Instead, other molecular weapons with the ability to disable bad germs without bothering good ones are the key, although for the most part these molecules remain on the drawing board.

In the meantime we are left with the bizarre contradictions of the modern drugstore, with antibiotic capsules in the pharmacy, antibacterial hand wipes by the cashier, dairy products touting their "good" bacteria in the food aisle, and capsules of even better

bacteria over by the [vitamins](#), right next to the industrial-strength colonic purges that Dr. Metchnikoff himself would endorse.

Ms. Sachs gives the last word to Joshua Lederberg, the Nobel-winning molecular biologist: “It would broaden our horizons if we started thinking of a human as more than a single organism. It is a superorganism that includes much more than our human cells.”

In other words, perhaps we should stop trying to live within an inviolate fortress. The melting pot may prove as happy an image for the body human as it is for the body politic.

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