how best to fight the weapons we have created to destroy them. As Dr. Richard Wenzel of the University of Iowa commented in *Newsweek*, "They're so much older than we are . . . and wiser."

If this were the end of it, it would be bad enough, but our intervention into the microbial sphere has created even more responses from bacteria than we thought possible.

Bacteria that have the ability to resist antibiotics are now known to emit unique pheromones to attract bacteria to themselves in order to exchange resistant information. It is almost as if they put up a sign that says "bacterial resistance information here." More, the seminal discoveries of genetic researcher Barbara McClintock are also at work. Bacteria, like corn, also possess "jumping genes," or transposons, that are able to jump from bacterium to bacterium independently of plasmid exchange. These transposons also have the ability to "teach" antibiotic resistance. Furthermore, bacteria also have diseases: bacterial viruses (called bacteriophages). These viruses, as they infect other bacteria, pass on the information for resistance. Finally, bacteria release free-roving pieces of their DNA, which carry resistance information. Other bacteria that encounter it ingest it, thereby learning how to survive antibiotics. Yet, even with all this, there is still more that they do.

In ways no researcher understands, bacteria learn resistance to multiple antibiotics *from encountering only one antibiotic.* Medical researchers have placed bacteria into solutions containing *only* tetracycline in such a way that the bacteria are not killed; they live in a tetracycline-heavy environment. In short order the bacteria develop resistance to tetracycline, but they also develop resistance to other antibiotics that they have never encountered. And being isolated, they have never come into contact with resistance information from other bacteria. Levy comments that "it's almost as if bacteria strategically anticipate the confrontation of other drugs when they resist one."

This uncanny ability of bacteria to develop immunity, their ever more rapid manner of learning it, and the almost supernatural appearance of resistance in bacteria that haven't had exposure to specific antibiotics leads Levy to remark that "one begins to see bacteria, not as individual species, but as a vast array of interacting constituents of an integrated microbial world." Or, as former FDA commissioner Donald Kennedy remarked, "The evidence indicates that enteric microorganisms