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To Exist, It Must Resist

As a society, we take antibiotics too often. The antibiotic azithromycin, a derivative of erythromycin, is prescribed in the form of Zithromax. In an age where antibiotics are the magical cure, there is the opportunity for resistance development. Enterobacter aerogenes, a gram negative pathogen, is excellent at becoming resistant to drugs. I hypothesized that E. aerogenes would develop measurable resistance when exposed to azithromycin over five generations. First, I determined what the maximum concentration of azithromycin to the Enterobacter aerogenes that would still allow growth. I began to grow Generation One. By growing the bacteria in tube cultures, then later plating them out; I was able to distinguish between growth and non-growth. Each generation, I exposed the Enterobacter aerogenes to an increased amount of antibiotic, possible to raise the maximum concentration that would allow growth. At the end of the fifth generation, the highest concentration of the azithromycin that allowed growth was 180 µg/mL. This showed that it took more antibiotic to kill the organism (the first concentration that inhibited growth was 120 µg/mL). Over five generations, the Enterobacter aerogenes made a measurable resistance to the azithromycin. The bacteria grew to the rim of an antibiotic disc from Generation five, different than the large zone of the original organism. This project has substantial applications. If you were infected with E. aerogenes, received azithromycin, and received an inadequate dose, the bacteria could easily become resistant to azithromycin. My hypothesis was correct.