Scientists Discover a Superbug With Undetectable Antibiotic Resistance

Antibiotic-resistant bacteria, particularly those included in the *Enterobacteriaceae* family like E.coli and salmonella, is one of the most urgent crises facing the healthcare industry. Figures predict 10 million deaths a year will occur worldwide by 2050 if nothing changes, and that doesn't even take into account the long-term health issues those who survive will face. Currently, those who contract this kind of infection face a mortality rate of 40 to 50 percent. If that's not enough to send a frisson of worry down the back of your neck, researchers at Emory University in Atlanta have discovered a strain of *Enterobacteriaceae* (CRE) where current diagnostic tests are unable to detect it's resistance to medicine's last line of defense. According to the study,

> *The data are worrisome, especially since the colistin heteroresistance was not detected by current diagnostic tests. As these isolates were carbapenem resistant, clinicians might turn to colistin as a last-line therapy for infections caused by such strains, not knowing that they in fact harbor a resistant subpopulation of cells, potentially leading to treatment failure."*

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Bacteria Evolution

The strain is called *Klebsiella pneumoniae* (CRKP), and it's resistant to almost all available antibiotics, including carbapenems, a commonly used treatment for multidrug-resistant

bacteria. Prior to this study, scientists thought it was still susceptible to colistin, the antibiotics of last resort, at a dose of 0.5 ml or less. A closer look at that bacteria has revealed that 1 in 1,000 CRKP cells can survive a dosage four times that (2 ml). Those cells are genetically identical to the antibiotic- susceptible bacteria, and scientists identified a protein in the cell's membrane that signaled another protein inside the bacteria to turn resistance on and off. This communication system enables the bacteria to hide in plain sight, and our current health system has no way to counter it.

A New System

This is not the first and will not be the last study to reach the conclusion that something in the healthcare system is fundamentally flawed. Sick? Take antibiotics. Still not better? Here are stronger ones! Scientists have confirmed that current diagnostic tests can't even properly determine how to treat these pathogens, and yet clinicians keep throwing the same pharmaceuticals at them. And even those practices are in serious danger, as the World Health Organization has confirmed recently that the world is running out of antibiotics.

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So much of our modern lifestyle is designed to be easy and convenient and it can be hard to see what the actual cost of it is. The bill has arrived for the antibiotics. Are we prepared to pay it?

Sources:

- *Deadly superbug just got scarier—it can mysteriously thwart last-resort drug* – Ars Technica
- *Carbapenem-Resistant Klebsiella pneumoniae Exhibiting Clinically Undetected Colistin Heteroresistance Leads to Treatment Failure in a Murine Model of Infection* –

American Society for Microbiology

- *WHO Says the World Will Run Out of Antibiotics Able to Treat Bacteria Superbugs* – Organic Lifestyle Magazine