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# How Does Antibiotic Resistance Spread in Tuberculosis?

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How does Antibiotic Resistance Spread in Tuberculosis?  
Julie Allison Spencer  
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The ancient bacterial disease of tuberculosis (TB) is curable with antibiotics, but according to the World Health Organization, in 2016 over 10 million people became infected with the disease. 600,000 of these cases were resistant to antibiotics, yet the worldwide treatment success rate for drug resistant TB is only 54%. Furthermore, strains exist now that are resistant to all known antibiotics. In the current environment of global travel, this poses a risk for emergent epidemics of drug resistant TB. In this study, I asked: after an antibiotic resistant strain has evolved in someone's lungs, how does it spread? It is well known that a strain may be transmitted when an infected person coughs, and then another person inhales the aerosol droplets containing the bacterium that causes the disease. However, resistance may also spread by the movement of DNA directly from cell to cell. One way this happens is when the tiny viruses that attack bacteria carry genes back and forth between bacterial cells. I analyzed 67 whole genomes, and found evidence of recently acquired genes in 30 different places in the DNA. Many of the genes involved have functions related to antibiotic resistance or evasion of the human immune system. These results may open the way for the development of new treatments for tuberculosis.