

The Antimicrobial Heroes Gallery

Amy (*Amycolatopsis mediterranei*)

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Claim to fame: producer of Rifamycin B – a precursor of Rifampicin – and a game changer in tuberculosis therapy

Microbes play a significant role in improving human health by producing life-saving chemicals. One such extraordinary microbe is *Amycolatopsis mediterranei*, which we will fondly refer to as "Amy" in this portrait. Amy emerged as a hero by producing **Rifamycin B**, that paved the way for the development of an antibiotic **Rifampicin**. It is the wonder drug that not only revolutionized the treatment of tuberculosis (TB) but also laid the foundation for a multi-billion dollar industry that produces and markets this antibiotic.

The problem of tuberculosis. Tuberculosis, caused by the bacterium *Mycobacterium tuberculosis*, remains one of the deadliest diseases known to humanity, currently claiming over **1.6 million lives** each year. Before **1968**, there was no effective cure for TB, and doctors could only rely on

A learner-centric microbiology education framework

dietary changes and environmental treatments. Everything changed when scientists discovered Amy in 1957 in the pine forests of St. Raphael, France.

Amy's changing name. When first isolated from soil, this bacterium was named *Nocardia mediterranei*. It was later named as *Streptomyces mediterranei* and finally as *Amycolatopsis mediterranei*, a name it holds today. The final renaming occurred because this microbe lacks mycolic acid in its cell wall, a distinguishing feature of the genus *Amycolatopsis*. This renaming highlights the microbe's unique properties and its importance in microbial research over the years.

Amy's training by clever microbial technologists. Originally, Amy produced only a small quantity of Rifamycin B, approximately 5 milligrams per liter. However, decades of scientific progress have significantly enhanced its production capabilities. Today, industrial strains of this microorganism can yield up to 24 grams per liter of Rifamycin B.

The global health importance of high yielding Amy. This remarkable advancement made Rifampicin accessible to impoverished patients who would otherwise have been unable to afford it, ultimately saving millions of lives. Even today, Rifampicin remains a cornerstone in the treatment of tuberculosis.

Rifampicin is a wonder drug.

The emergence of resistance to Rifampicin and the search for new variants. Rifampicin was so effective that scientists once hoped tuberculosis could be eliminated entirely. However, in recent years, TB bacteria have developed resistance to rifampicin, leading to a global health crisis.

Despite this, rifampicin and Amy continue to be crucial allies in the fight against TB. Scientists are now working with Amy to modify the biosynthetic gene cluster to develop new rifamycin derivatives that can combat drug-resistant TB strains. With the latest advancements in this area, Amy is poised to become a powerhouse for producing new Rifamycin analogs—not only to treat rifampicin-resistant TB but also as a model system for the development of new drugs, showcasing its potential in drug discovery.

Thanks to Amy, there is still hope. This tiny microbe continues to help scientists develop better treatments for TB, ensuring it remains a hero in humanity's ongoing fight against this deadly disease (<https://pubs.acs.org/doi/abs/10.1021/acs.jnatprod.3c00686>)