

31. Kam KM, Yip CW, Cheung TL, Tang HS, Leung OC, Chan MY. Stepwise decrease in moxifloxacin susceptibility amongst clinical isolates of multidrug-resistant *Mycobacterium tuberculosis*: correlation with ofloxacin susceptibility. *Microb Drug Resist*. 2006;12:7–11. <http://dx.doi.org/10.1089/mdr.2006.12.7>
32. World Health Organization. The use of delamanid in the treatment of multidrug-resistant tuberculosis in children and adolescents: interim policy guidance. Geneva: The Organization; 2016.
33. Achar J, Hewison C, Cavalheiro AP, Skrahina A, Cajazeiro J, Nargiza P, et al. Off-label use of bedaquiline in children and adolescents with multidrug-resistant tuberculosis. *Emerg Infect Dis*. 2017;23:1711–3. <http://dx.doi.org/10.3201/eid2310.170303>
34. Gandhi NR, Moll A, Sturm AW, Pawinski R, Govender T, Lalloo U, et al. Extensively drug-resistant tuberculosis as a cause of death in patients co-infected with tuberculosis and HIV in a rural area of South Africa. *Lancet*. 2006;368:1575–80. [http://dx.doi.org/10.1016/S0140-6736\(06\)69573-1](http://dx.doi.org/10.1016/S0140-6736(06)69573-1)
35. Gandhi NR, Andrews JR, Brust JC, Montreuil R, Weissman D, Heo M, et al. Risk factors for mortality among MDR- and XDR-TB patients in a high HIV prevalence setting. *Int J Tuberc Lung Dis*. 2012;16:90–7. <http://dx.doi.org/10.5588/ijtld.11.0153>
36. Dheda K, Shean K, Zumla A, Badri M, Streicher EM, Page-Shipp L, et al. Early treatment outcomes and HIV status of patients with extensively drug-resistant tuberculosis in South Africa: a retrospective cohort study. *Lancet*. 2010;375:1798–807. [http://dx.doi.org/10.1016/S0140-6736\(10\)60492-8](http://dx.doi.org/10.1016/S0140-6736(10)60492-8)
37. Pietersen E, Ignatius E, Streicher EM, Mastrapa B, Padanilam X, Pooran A, et al. Long-term outcomes of patients with extensively drug-resistant tuberculosis in South Africa: a cohort study. *Lancet*. 2014;383:1230–9. [http://dx.doi.org/10.1016/S0140-6736\(13\)62675-6](http://dx.doi.org/10.1016/S0140-6736(13)62675-6)
38. Chiang SS, Khan FA, Milstein MB, Tolman AW, Benedetti A, Starke JR, et al. Treatment outcomes of childhood tuberculosis meningitis: a systematic review and meta-analysis. *Lancet Infect Dis*. 2014;14:947–57. [http://dx.doi.org/10.1016/S1473-3099\(14\)70852-7](http://dx.doi.org/10.1016/S1473-3099(14)70852-7)
39. Zhang X, Falagas ME, Vardakas KZ, Wang R, Qin R, Wang J, et al. Systematic review and meta-analysis of the efficacy and safety of therapy with linezolid containing regimens in the treatment of multidrug-resistant and extensively drug-resistant tuberculosis. *J Thorac Dis*. 2015;7:603–15.
40. Ahuja SD, Ashkin D, Avendano M, Banerjee R, Bauer M, Bayona JN, et al.; Collaborative Group for Meta-Analysis of Individual Patient Data in MDR-TB. Multidrug resistant pulmonary tuberculosis treatment regimens and patient outcomes: an individual patient data meta-analysis of 9,153 patients. *PLoS Med*. 2012;9:e1001300. <http://dx.doi.org/10.1371/journal.pmed.1001300>
41. Falzon D, Gandhi N, Migliori GB, Sotgiu G, Cox HS, Holtz TH, et al.; Collaborative Group for Meta-Analysis of Individual Patient Data in MDR-TB. Resistance to fluoroquinolones and second-line injectable drugs: impact on multidrug-resistant TB outcomes. *Eur Respir J*. 2013;42:156–68. <http://dx.doi.org/10.1183/09031936.00134712>
42. Migliori GB, Sotgiu G, Gandhi NR, Falzon D, DeRiemer K, Centis R, et al.; “The Collaborative Group for Meta-Analysis of Individual Patient Data in MDR-TB”. Drug resistance beyond extensively drug-resistant tuberculosis: individual patient data meta-analysis. *Eur Respir J*. 2013;42:169–79. <http://dx.doi.org/10.1183/09031936.00136312>

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etymologia

Streptomycin [strep"to-mi'sin]

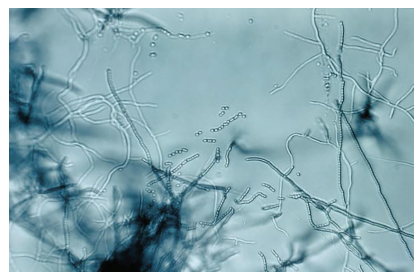
Ronnie Henry

In the late 1930s, Selman Waksman, a soil microbiologist working at the New Jersey Agricultural Station of Rutgers University, began a large-scale program to screen soil bacteria for antimicrobial activity. By 1943, Albert Schatz, a PhD student working in Waksman's laboratory, had isolated streptomycin from *Streptomyces griseus* (from the Greek *strepto-* ["twisted"] + *mykēs* ["fungus"] and the Latin *griseus*, "gray").

In 1944, Willam H. Feldman and H. Corwin Hinshaw at the Mayo Clinic showed its efficacy against *Mycobacterium tuberculosis*. Waksman was awarded a Nobel Prize in 1952 for his discovery of streptomycin, although much of the credit for the discovery has since been ascribed to Schatz. Schatz later successfully sued to be legally recognized as a co-discoverer of streptomycin.

Sources

1. Comroe JH Jr. Pay dirt: the story of streptomycin. Part I. From Waksman to Waksman. *Am Rev Respir Dis*. 1978;117:773–81.
2. Wainwright M. Streptomycin: discovery and resultant controversy. *Hist Philos Life Sci*. 1991;13:97–124.



Slide culture of a *Streptomyces* sp. bacteria, which produces the antibiotic streptomycin. Note the branching filamentous hyphae, abundant aerial mycelia, and long chains of small spores. Image: CDC/Dr. David Berd

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