# ALBERT SCHATZ—ACTUAL DISCOVERER OF STREPTOMYCIN

## (1920–2005)

Photograph: Special Collections and University Archives, Rutgers University

Albert Schatz at age 23 in the laboratory

Most of our readers are probably familiar with the contributions of Dr Albert Schatz to fluoride research. In the 1960s, he drew attention to peculiar, non-monotonic "paradoxical" dose-response effects of fluoride, especially at low concentrations.[1] Along these lines, he also contributed extensively to the study of demineralization by chelation in biological systems.[2] Later, he uncovered serious shortcomings relating to delayed appearance of dental caries in official reports claiming significant reduction in actual rates of tooth decay by water fluoridation.[3,4] More recently, he documented how low-level fluoridation and low-level radiation have been scientifically misrepresented.[5] However, there is another, very important part of his scientific career for which, until late in his life, he was denied fair and proper credit—namely, his *primary role* in the discovery of the tubercle bacillus antibiotic streptomycin in 1943.[6]

Born in Norwich, Connecticut on February 2, 1920, Albert Schatz grew up in Passaic, New Jersey where his family moved to in 1923. During his youth he also lived and worked on his grandparents' remote farm in Bozrah, Conn., without central heating, electricity, running water, or telephone. In 1938, with the help of his father's World War I bonus check and a scholarship, he was able to enroll in the College of Agriculture at Rutgers State University of New Jersey, where he received a Bachelor of Science degree with the highest class ranking in Soil Science in May 1942. Upon graduation, he immediately embarked on a PhD program in Soil Microbiology at Rutgers under the direction of the eminent Professor Selman A Waksman.

Five months later, World War II interrupted his graduate studies; Schatz was drafted and assigned as a bacteriologist in the Medical Detachment of the Air Force. Stationed in army hospitals in Florida, he often witnessed the painful, death-dealing ravages of severe bacterial infections, including advanced stages of tuberculosis, that were unresponsive to existing antibiotics. At that time there were no effective treatments for many such infections. During off-duty hours, he isolated and tested various molds and actinomycetes and sent cultures of some of them to Prof Waksman for further testing.

Owing to recurrence of a back problem while in the service, Schatz was honorably discharged from the military on June 15, l943 and returned to Rutgers, where Prof Waksman allowed him to continue the search he had started in Florida for an antibiotic that would be active against Gram-negative bacteria and also for a Gram-positive one that would be active against the tubercle bacillus. Assigned in late June to a basement laboratory to help prevent infecting anyone with the virulent tubercle bacillus (formally known as *Mycobacterium tuberculosis*), he was testing against, Schatz energetically plunged into the tedious effort. Working practically around the clock, often sleeping in the laboratory, he was able by mid-October to isolate a new antibiotic from two active strains of *Actinomyces griseus* that was highly potent *in vitro* against both Gram-negative and Gram-positive bacteria. This new antibiotic, which he named "streptomycin", was also very effective against *M. tuberculosis*. During this time, he regularly reported his findings to Prof Waksman, but Waksman never visited him in the basement laboratory.

Schatz wrote up two reports[7,8] on his discovery of streptomycin that appeared in 1944 and later a third report[9] in 1945—with the unusual distinction in Waksman's research group of being the lead author on all three of them. Continuing to work very hard, he also scaled up the isolation procedure and provided samples for highly successful clinical testing at the Mayo Clinic in Rochester, Minnesota. At that time, Waksman repeatedly referred to Schatz as "the most brilliant student I have ever had" and initially gave him full credit for the key role he played in the discovery of streptomycin. Gradually, however, as additional resources and personnel were dedicated to isolating larger quantities of streptomycin, Waksman began giving the impression, especially to reporters and the media, that he was primarily responsible for the discovery of streptomycin and that Schatz had only done what was expected of any new graduate student assistant.

In 1946, at Waksman's request, Schatz signed over his royalty rights as "co-discoverer of streptomycin" on the patent to the Rutgers Research and Endowment Foundation, only to find out later there was another, prior agreement with the foundation giving Waksman 20% of all streptromycin royalties. Realizing how he had been misled, Schatz saw fit to bring suit against Waksman and Rutgers in March 1950 and won with an out-of-court settlement. But the final blow came two years later when, to Schatz's dismay, Waksman was named the sole recipient of the 1952 Nobel Prize in Physiology or Medicine "for his discovery of the antibiotic streptomycin, the first antibiotic effective against tuberculosis."

In the wake of all this, Schatz was ostracized from obtaining a promising tenure-track appointment at a major research university because he had sued his former research director. Over the years, however, he held various academic and laboratory positions as a microbiologist and was awarded numerous medals and five honorary degrees for his wide-ranging research achievements, especially for his contributions to humanity and his role in the discovery of streptomycin. Beginning in 1962, he held teaching-research professorships at the University of Chile in Santiago, at Washington University in St. Louis, and ultimately at Tem-

ple University in Philadelphia, where he retired in 1981 and turned his attention to various aspects of alternative health care.

Fortunately, Schatz lived to see recognition from his alma mater. On April 28, 1994, Rutgers bestowed on him its highest honor, the Rutgers University Award—commonly known as the Rutgers Medal—for his pivotal role in the discovery of streptomycin 50 years earlier.[10] Although tuberculosis gradually became resistant to it, streptomycin in combination with isoniazid and para-aminosalicylic acid has, nevertheless, saved millions of lives around the world. I recall with pleasure my visit with Al and his wife in St. Louis in the late 1960s and his appearance at the University of Kansas for the 25th Annual Edward C Franklin Memorial Lecture, April 5, 1973, where he spoke on "Paradoxical Concentration Effects in Biological Systems."

On January 17, 2005, Albert Schatz died from pancreatic cancer just two weeks before his 85th birthday. He is survived by his wife of 59 years, the former Vivian Rosenfeld, also a microbiologist, whom he met at Rutgers; his sister Elaine; his two daughters Linda and Diane; and four grandchildren.

Albert W. Burgstahler, PhD, Editor

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