René Dubos: unearthing antibiotics

In 1939, René Dubos discovered gramicidin—the first clinically tested antibiotic agent. This discovery helped revive the stalled interest in penicillin and launched the era of antibiotics.

The notion that microbes can inhibit other microbes dates back to the late 1800s, when Louis Pasteur showed that anthrax cultures were robbed of their virulence when exposed to aerobic microbes. Dubos based his early experiments on this principle of “antibiosis” and “the supremely simple working hypothesis that soil as a self-purifying environment could supply an agent to destroy disease-causing bacteria” (1). The S III enzyme, which worked by lytic streptococci, pneumococci, and hemolytic streptococci, identified in 1931 as the causative agent of septicemia—a disease that afflicted mice when exposed to aerobic microbes. Dubos based his early experiments on this principle of “antibiosis” and “the supremely simple working hypothesis that soil as a self-purifying environment could supply an agent to destroy disease-causing bacteria” (1). The S III enzyme, which worked by stripping the bacteria of their sugary coats and rendering them vulnerable to attack by phagocytic cells, protected mice against fatal bacterial infections, the compound was toxic when administered intravenously and thus could not be used to treat systemic infections. Topical gramicidin, however, proved highly effective and was used during World War II to treat wounds and ulcers. Indeed, gramicidin is still an ingredient in some modern-day topical antibiotics.

Although ultimately of limited practical use, gramicidin was the first natural antibiotic discovered through a deliberate, systematic search for antibacterial compounds. And without it, penicillin might have been left to languish. Howard Florey (Oxford University) credited Dubos for reviving his research on penicillin, which was shelved for nearly a decade after its uncelebrated discovery by Fleming in 1929 (10).

REFERENCES