UW-Madison: D-Day invasion was bolstered by UW-Madison penicillin project

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MADISON – Seventy-three years ago Tuesday, on June 6, 1944, the D-Day invasion of Normandy was bolstered by millions of doses of a precious new substance: penicillin.

On the other side of the Atlantic, researchers at the University of Wisconsin-Madison and other institutions had spent the last three years pursuing advances in penicillin production. Though discovered 16 years prior, the world's first natural antibiotic was expensive and difficult to wring from the mold that makes it. By discovering new strains, isolating more productive mutants, and improving growing methods, UW-Madison biologists helped supply Allied troops with enough penicillin to treat life-threatening infections.

More than 50 UW-Madison scientists participated in the government-organized program. Descendants of the penicillium mold developed at UW-Madison are still used to produce penicillin around the world today.

In 1941, two British scientists, Howard Florey and Norman Heatley, came to the United States to enlist government and university researchers in increasing penicillin production. Florey's team had demonstrated that penicillin could safely treat bacterial infections in animals and humans, but they could barely extract

enough of the antibiotic to treat a single patient. In Ken Raper, a bacteriologist at the USDA's Northern Research Regional Laboratory (NRRL) in Peoria, Illinois, Florey found an able partner.

Raper, who later joined the faculty at UW-Madison after collaborating with his future colleagues throughout the war, was already an experienced mold biologist. His lab at the NRRL had been perfecting fermentation techniques to extract valuable natural compounds from microbes, an expertise well suited to increasing penicillin production. Raper's experience collecting many different strains of fungi and the social amoebae dictyostelids helped him recognize that better strains of penicillium mold might be found in nature. At the time, only Alexander Fleming's original mold was known to produce the antibiotic.

In a nationwide search for more productive strains, the best was found growing on a moldy cantaloupe in a Peoria grocery store – strain NRRL-1951. Unlike Fleming's mold, which only grew on the surface of liquid cultures, NRRL-1951 grew well when mixed throughout the culture. This submerged growth allowed much higher concentrations of the mold, and penicillin, to be produced.

Raper sent NRRL-1951 to collaborators around the country. Researchers at Cold Spring Harbor in New York irradiated the strain with X-rays and sent the resulting mutants to the University of Minnesota, where scientists screened them and forwarded promising candidates on to Wisconsin.

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