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The Achilles' heel of antibiotic-resistant bacteria

PLOS

New research reveals that antibiotic resistant bacteria may have an Achilles' heel, a time window when the bacteria are sensitive to antibiotic treatment. Duke University researchers Hannah Meredith, Allison Lopatkin, Deverick Anderson, and Lingchong You identify a new metric that may guide the regimen design for existing antibiotics.

In a study publishing this week in *PLOS Computational Biology*, the authors use modeling to guide the design of effective antibiotic protocols for moderately resistant bacteria. The researcher's new approach may help reintroduce antibiotics that might be disregarded out of concern for treatment failure for certain bacterial pathogens.

The authors find that, after a dose of antibiotics, a population of moderately resistant bacteria will be sensitive to further treatment before reaching a resistant state. Regardless of the dose concentration or duration, if subsequent doses of antibiotic are delivered while the population is "sensitive," the population declines for each additional dose. However, if subsequent doses of antibiotic are delivered after the "sensitive" period had passed, the population will recover despite the antibiotic treatment. Once this Achilles' heel has been identified for a given bacteria-antibiotic pair, a dosing regimen can be selected that will ensure the population will be reduced.

Ultimately, the authors intend to establish a standardized database that would guide the optimization of antibiotic prescriptions such that patient outcomes would improve while extending the shelf life of antibiotics.

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