

# Thwarting bacteria's defenses as a way to fight infection

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To combat the growth of antibiotic resistance, researchers in Mark Brynildsen's lab are searching for precise treatments that kill bacterial pathogens by weakening their defenses against the body's immune system. Credit: David Kelly Crow

To combat the growth of antibiotic resistance, Mark Brynildsen searches for precise treatments that kill pathogens by weakening their defenses against the body's immune system.

"We study how bacteria defend themselves against the stresses imposed by the [immune system](#), in order to identify ways to sabotage some of those defenses," said Brynildsen, an associate professor of chemical and biological engineering.

For instance, some [immune cells](#) deploy nitric oxide, a highly [reactive molecule](#) that helps kill bacteria by damaging their proteins and DNA. But many bacteria, including food-borne pathogens such as E. coli and salmonella, make enzymes that can detoxify nitric oxide before it causes much harm. In addition to probing the genetic mechanisms that allow bacteria to survive [nitric oxide](#), Brynildsen's lab is working with Princeton's Small Molecule Screening Center to search for compounds that might interfere with the bacteria's defenses.

"This defense system is important for a pathogen to cause an infection, so that suggests that if you can drug that defense system you can actually get a treatment that's not an antibiotic," in the sense that it does not directly kill bacteria or stop their growth, said Brynildsen, whose work in this area is funded in part by Princeton's Helen Shipley Hunt Fund. "It works in conjunction with your immune system." And because of its specificity, "if it gets out of your body it's not going to cause drug resistance development in water or sewage or agricultural settings."

Provided by Princeton University

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