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Antibiotics Modified with Nitric Oxide: An innovative approach to combat antimicrobial resistance

The dual-action antibiotic-NO heightens the efficacy of the proposed treatment, while slowing the development of antibiotic resistance. By modifying antibiotics to release nitric oxide, we are synthesizing a dual-action, broad-spectrum antimicrobial solution that can revolutionize the field of antibiotics, reducing the effect of antimicrobial resistance.

The Problem: Antimicrobial Resistance

DEADLY INFECTIONS
 These 5 pathogens were responsible for almost 80% of the 1.27 million deaths attributed directly to antimicrobial resistance in 2019.

Antimicrobial resistance (AMR) occurs when germs, such as fungi and bacteria, **mutate** and develop the ability to defeat the drugs and treatments designed to kill them, posing a dangerous threat to global health and economy, calling for **innovative solutions**.

In 2019, 4.95 million people died from an illness in which AMR played a role. AMR was the direct result of 1.27 million of those deaths.¹

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 Murray, C. L. J. et al. *Lancet* [https://doi.org/10.1016/S0140-6736\(21\)02724-0](https://doi.org/10.1016/S0140-6736(21)02724-0) (2022).

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 1. Murray, C. L. J. et al. *Lancet* [https://doi.org/10.1016/S0140-6736\(21\)02724-0](https://doi.org/10.1016/S0140-6736(21)02724-0) (2022).

Infection Sources

Hospital acquired infections and medical devices are common places for biofilm growth, leading to the development of antimicrobial resistance.

Catheter-associated UTIs affect 449,334 patients per year in the US.¹

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 1. Klevens R.M., et al. *Public Health Rep* 122: 160–166.

Nitric Oxide (NO) to the Rescue

Nitric Oxide: Broad spectrum antibacterial agent naturally produced in the body with ability to disperse biofilms

Vision for Hemocompatible & Antibacterial Surface

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The Solution: Antibiotics Modified with Nitric Oxide

Antibiotics - Cannot penetrate the biofilm alone, reducing the effectiveness	Antibiotics + NO - NO can break up the biofilm , exposing the bacteria to the surroundings, increasing the susceptibility to conventional antibiotics
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By conjugating a NO-donor to antibiotics, a dual-action biocidal innovative solution is formed

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