New two-in-one powder aerosol to upgrade fight against deadly superbugs in lungs

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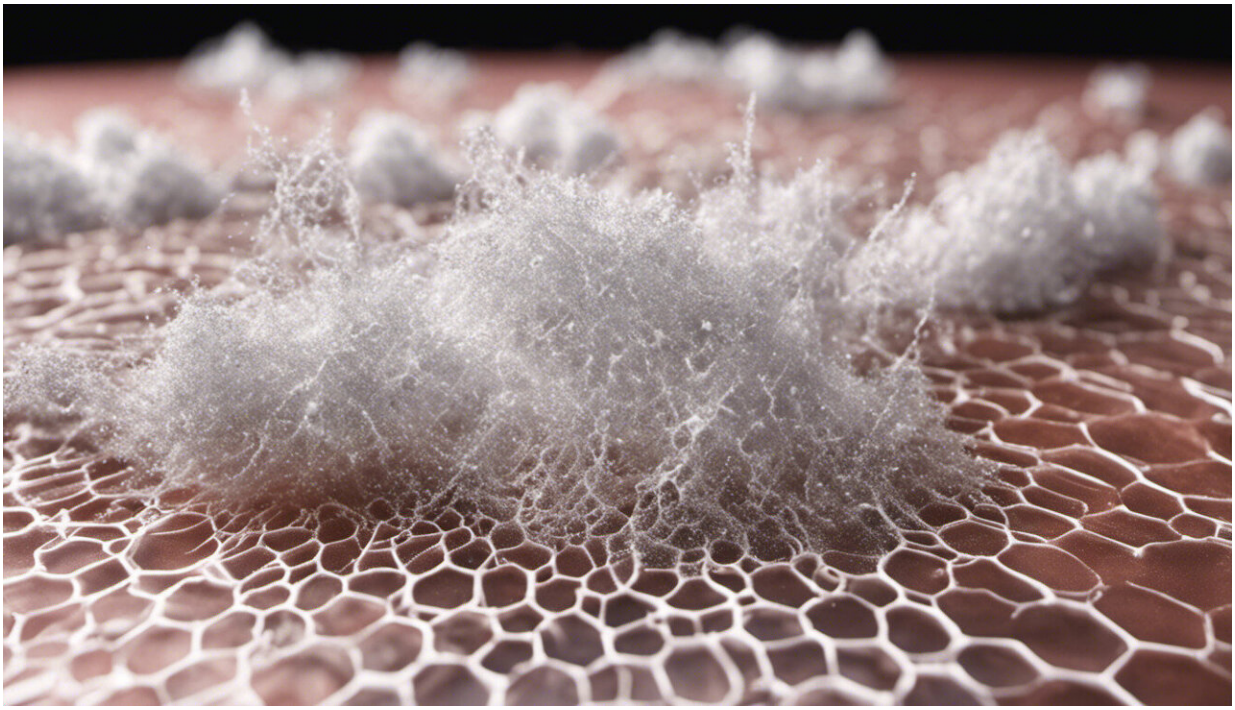

Credit: AI-generated image (disclaimer)

Purdue University researchers have developed a new approach to treating the fourth-leading cause of death worldwide – lower respiratory infections.

Lung infections, often caused by multi-drug-resistant bacteria, are

deadly because the 'superbugs' are resistant to all available antibiotics. Even worse, traditional systemic administrations of those antibiotics cannot reach the lung surface to kill the bacteria, and giving a person high doses can produce dangerous and sometimes deadly stress on the kidneys or liver.

Now, Purdue researchers have invented a drug formulation that uses two synergistic antibiotics – colistin and ciprofloxacin – in one single particle that is shown to reach the infection sites in the deep lung area with the capability to kill multi-drug-resistant superbugs.

"We are providing a promising option to fight the global crisis of antimicrobial resistance," said Qi (Tony) Zhou, an assistant professor in Purdue's College of Pharmacy, who leads the research team. "It has been a worldwide challenge to incorporate two antibiotics with different chemical properties into a single particle. Our novel formulation allows for a much more effective killing of drug-resistant bacteria in the deep lungs as two synergistic antibiotics can be simultaneously delivered to the same infection site."

Zhou said the technology is designed to save tens of thousands of lives from a variety of deadly lung infections, including people with cystic fibrosis and ventilator-assisted pneumonia.

The Purdue innovation is a dry powder inhaler formulation, which is proving to be more effective and easier to use than conventional inhalation products delivered through nebulizers in most hospitals. Zhou said the Purdue formulation allows for more than 60 percent of drugs to be delivered to the lungs as compared with only 10 percent for a jet nebulizer, along with improved chemical stability. Such an approach can be readily applied to many antibiotic compounds, including those for tuberculosis.

Provided by Purdue University