

MEDICAL BREAKTHROUGHS **RESEARCH SUMMARY**

TOPIC: SUPERBUGS: ANTIBIOTIC RESISTANCE A GROWING PROBLEM DURING THE PANDEMIC
REPORT: MB #4780

BACKGROUND: When germs like bacteria and fungi develop the ability to beat the drugs designed to kill them, that is known as antibiotic resistance. There are some infections caused by antibiotic-resistant germs; however, they are difficult and sometimes impossible to treat. In most cases, antibiotic-resistant infections require long hospital stays, additional follow-up doctor visits, and costly alternatives. Antibiotic resistance does not mean the body is becoming resistant to antibiotics, it is that bacteria have become resistant to the antibiotics designed to kill them. Antibiotic resistance can affect anyone at any stage of life. At least 2.8 million people in the U.S each year are infected with antibiotic-resistant bacteria or fungi, and more than 35,000 people die from it.

(Source: <https://www.cdc.gov/drugresistance/about.html>)

SUPERBUGS AND SECONDARY INFECTIONS: The hidden threat from antibiotic resistance, or bacteria that are not killed by standard antibiotics, is an even larger threat that is lurking behind the current COVID outbreak. The superbugs that cause these infections thrive in hospitals and medical facilities, and are putting all patients, whether they have a minor illness or major surgery, at risk. Studies have found that 1 in 7 patients hospitalized with COVID have acquired a dangerous secondary bacterial infection, and 50% of patients who have died had such infections. The patients at greatest risk from superbugs are the ones who are already more vulnerable to illness from viral lung infections like influenza, severe acute respiratory syndrome (SARS), and COVID. According to the Centers for Disease Control and Prevention, the 2009 influenza pandemic, for example, claimed nearly 300,000 lives around the world. And, between 29% and 55% of those deaths were actually caused by secondary bacterial pneumonia.

(Source: <https://www.statnews.com/2020/03/23/antibiotic-resistance-hidden-threat-lurking-behind-covid-19/>)

NEW NANO STRATEGY: Researchers at Rice University's Brown School of Engineering have developed a strategy for "trapping and zapping" antibiotic resistant genes. The team used molecular-imprinted graphitic carbon nitride nanosheets to absorb and degrade these genetic remnants in sewage system wastewater before they have the chance to invade and infect other bacteria. "This study addresses a growing concern, the emergence of multidrug resistant bacteria known as superbugs," said Pedro Alvarez, director of the Nanosystems Engineering Research Center for Nanotechnology-Enabled Water Treatment (NEWTEC) Center. "They are projected to cause 10 million annual deaths by 2050." Their strategy is to use molecularly imprinted coatings that enhance selectivity and minimize interference by background organic compounds. Molecular imprinting is like making a lock that attracts a key. For this project, graphitic carbon nitride molecules are the lock, or photocatalyst, customized to absorb and then destroy NDM1, which is known to resist multiple drugs.

(Source: <https://news.rice.edu/2020/03/12/new-nano-strategy-fights-superbugs-2/>)

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If this story or any other Ivanhoe story has impacted your life or prompted you or someone you know to seek or change treatments, please let us know by contacting Marjorie Bekaert Thomas at mthomas@ivanhoe.com