New antimicrobial coating could be key in fight against hospital-acquired infections

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Scientists at the University of Birmingham have created an antimicrobial coating for steel surfaces which has proven to rapidly kill bacteria that cause some of the most common hospital-acquired infections.

Developed by researchers at the University of Birmingham, patented by University of Birmingham Enterprise, and to be commercialized by a new company NitroPep, the coating—also called NitroPep—has been heralded as a new tool in the fight against the spread of infection.

Working with the Royal Centre for Defence Medicine and the Royal Navy, the researchers conducted a clinical trial which saw NitroPep coated on steel surfaces—including door handles, an operating theater and part of a communal toilet—on board a Royal Fleet Auxiliary ship.

Both the surfaces coated in NitroPep, and 'control' surfaces that were not treated with the coating, were subject to standard daily cleaning regimes while the ship was at sea for an 11 month period.

The surfaces were swabbed on a weekly basis and the results were then analyzed in the laboratory at the University of Birmingham.

The results showed that the coating was effective against five different bacteria that are responsible for hospital-acquired infections—*Staphylococcus aureus*, *Staphylococcus epidermidis*, *Enterococcus*, *Pseudomonas aeruginosa* and *Escherichia coli*.

The research also showed that the coating killed bacteria within 45 minutes—far more rapidly than currently commercially available technologies which do not have a significant effect on bacteria until up to 24 hours.

Published in *Materials Science and Engineering C: Materials for Biological Applications*, the research was carried out by scientists at the University of Birmingham's Institute of Microbiology and Infection and School of Chemistry; the Royal Centre for Defence Medicine; the University of Nottingham; and Queen Elizabeth Hospital Birmingham which is part of University Hospitals Birmingham NHS Foundation

Trust.

Dr. Felicity de Cogan, Royal Academy of Engineering Enterprise Fellow at the University of Birmingham and Chief Scientific Officer at NitroPep, said: "One of the biggest public health issues across the world continues to be the spread of infection and contamination from bacterial, viral and insect-borne diseases.

"Despite increased sterilization and education campaigns, hospital acquired infections have not been eradicated and the accumulation of bacteria on frequently touched surfaces is key in the transmission of infection.

"Therefore, our priority must be to research, develop and implement safe and effective prevention techniques and technologies.

"Our successful clinical study shows that our non-toxic coating could be used on regularly handled steel surfaces, such as toilet flush handles, bed rails and metal medical equipment, across healthcare, education and other industrial and leisure settings helping to create safer and healthier environments."

Graeme Forster, Managing Director of NitroPep, said: "There is a clear and urgent need to prevent the transmission and spread of infection in the built environment, not just in the UK but globally.

"NitroPep is a novel, cost effective, and cutting-edge technology for bonding antimicrobial actives onto various surfaces which we believe is the future solution to a global problem."

More information: Lily Riordan et al. Directly bonding antimicrobial peptide mimics to steel and the real world applications of these materials, *Materials Science and Engineering: C* (2019). DOI:

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