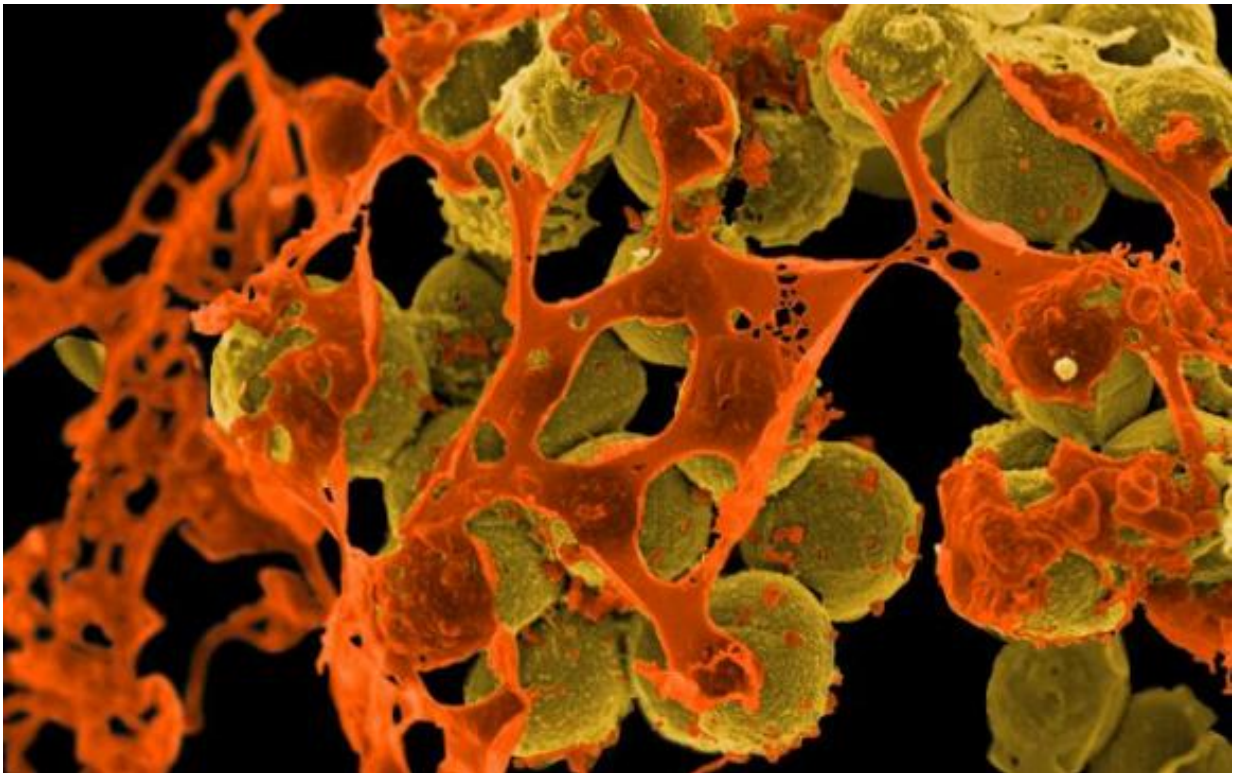


Scientists make breakthrough in fight against antibiotic resistance

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Methicillin-resistant *Staphylococcus aureus*. Credit: NIH/NIAID

Scientists have developed a pioneering new treatment to prevent bacterial skin infections, which could be used in the battle against 'superbugs', such as MRSA.

The new treatment, developed by researchers at the University of Sheffield in collaboration with AGE UK, is a new way to prevent [skin wounds](#), such as bed-sores and ulcers, becoming infected.

This new treatment has been proven to work on antibiotic-resistant bacteria, such as MRSA, which is currently one of the biggest threats to global healthcare and medicine.

Bacterial [skin infections](#) are a major problem for the elderly and people with [chronic health conditions](#), such as diabetes. Infected wounds heal more slowly, causing pain and distress for the patient, and are a significant cost to the NHS in the UK.

To launch an infection, bacteria attach tightly to skin cells and have learned to hijack 'sticky patches' on human cells to achieve this. Using proteins called tetraspanins, from [human cells](#), the Sheffield scientists have made these patches much less sticky, allowing bacteria to be harmlessly washed away.

The research has shown that these proteins prevent bacterial infections in a model of [human skin](#), which the scientists say give a clear indication that this treatment is both safe and effective.

This treatment was trialled on a model of 3D tissue engineered skin (TEskin) developed by engineers at the University.

The engineered skin, pioneered by Professor Sheila MacNeil from the University's Department of Materials Science and Engineering, can model infected wounds in human skin and mimics the tissue structure of normal adult skin. It can be used to analyse the penetration of peptides and bacteria.

Dr Pete Monk from the University's Department of Infection, Immunity

and Cardiovascular Science, who led the study, said: "This development is a huge breakthrough in the fight against antibiotic-resistance.

"Skin infections, such as bed-sores and ulcers, can be incredibly troubling for patients who may already be dealing with debilitating conditions. They are also a significant problem for modern healthcare.

"We hope that this new therapy can be used to help relieve the burden of [skin](#) infections on both patients and health services while also providing a new insight into how we might defeat the threat of antimicrobial drug resistance.

"The therapy could be administered to patients using a gel or cream and could work well as a dressing. We're hoping it can reach clinical trials stage in the next three to five years."

Unlike conventional antibiotics, the tetraspanin proteins do not directly kill bacteria and so do not encourage the evolution of resistance.

Now, with substantial research funding from the Humane Research Trust, Sheffield scientists are developing the proteins for new anti-bacterial dressings that will help keep wounds sterile and so promote more rapid healing.

This development further cements the University's position at the forefront of world-class research into infectious diseases. Sheffield scientists are developing radical solutions to global problems of disease and antimicrobial resistance as part of projects including Florey and Imagine. These are signature research projects addressing some of the world's biggest biomedical problems.

More information: Jennifer K. Ventress et al. Peptides from Tetraspanin CD9 Are Potent Inhibitors of Staphylococcus Aureus

Adherence to Keratinocytes, *PLOS ONE* (2016). [DOI: 10.1371/journal.pone.0160387](https://doi.org/10.1371/journal.pone.0160387)

Provided by University of Sheffield

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