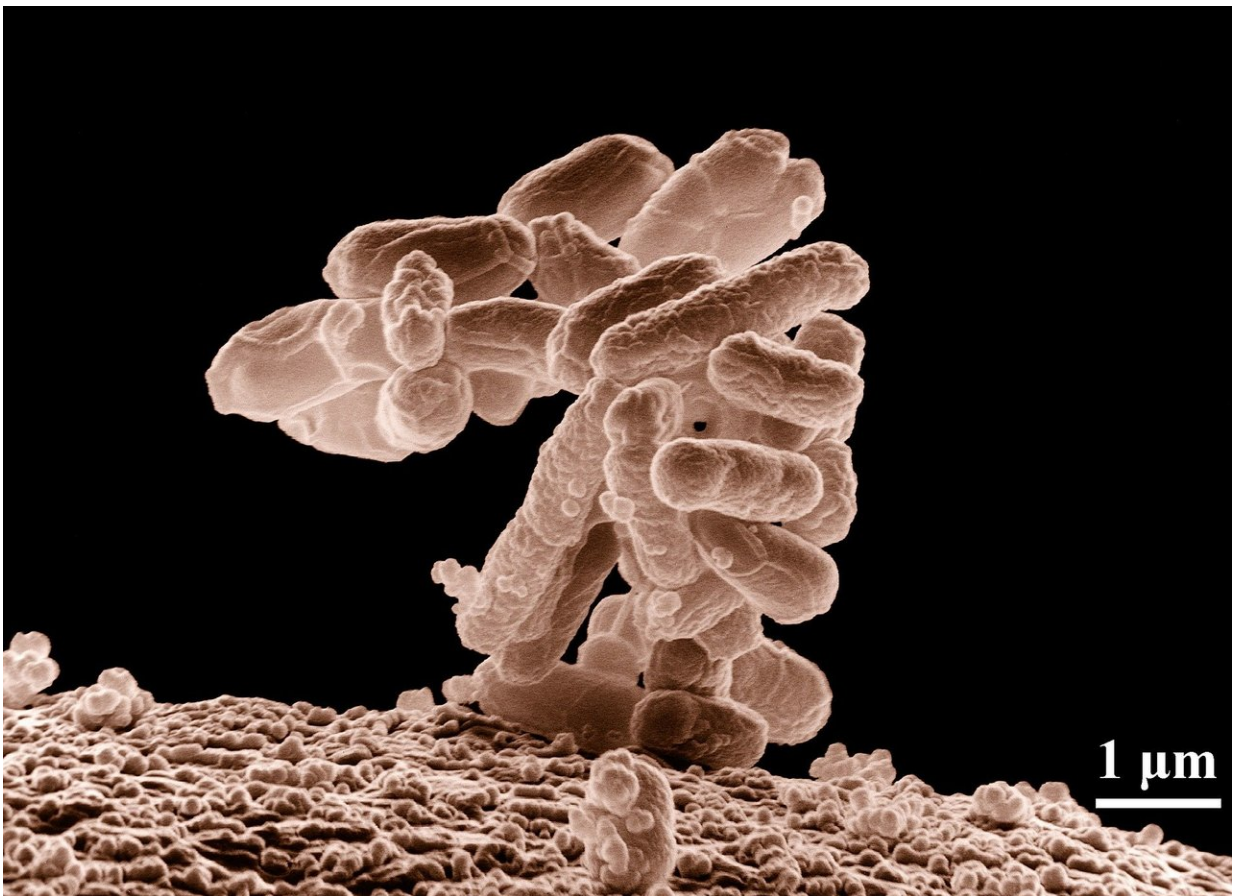


Scientists discover how superbugs hide from their host

May 2 2019



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New research led by the University of Sheffield has discovered how a hospital superbug evades the immune system to cause infection – paving

the way for new treatments.

The study, led by the University of Sheffield's Department of Molecular Biology and Biotechnology, investigated how *Enterococcus faecalis* (*E. faecalis*), bacteria commonly found in the digestive tracts of humans, cause life-threatening infections.

While *E. faecalis* is harmless in healthy carriers, it is also an opportunistic pathogen that frequently causes hospital-acquired infections such as heart valve infections, [urinary tract infections](#) and bacteraemia – the presence of bacteria in the blood. Scientists currently do not fully understand how this happens.

Treatment of *E. faecalis* infection is difficult as it is highly resistant to several key components of the immune system and resistant to multiple antibiotics.

Now, new research led by Dr. Stéphane Mesnage from the University of Sheffield's Department of Molecular Biology and Biotechnology, has discovered a mechanism used by *E. faecalis* to hide from the immune system of the host.

The study revealed that the bacteria changes a component of its [cell surface](#) in order to evade the immune system, enabling the spread of infection. The findings could pave the way for novel treatments for infections caused by *E. faecalis*.

Dr. Stéphane Mesnage, Senior Lecturer in Molecular Biology and Biotechnology, said: "E. faecalis is an opportunistic pathogen. It is naturally resistant to a wide range of antibiotics including synthetic penicillin derivatives and is acquiring resistance to the last resort antibiotic vancomycin. Following an antibiotic treatment, *E. faecalis* can out-compete other microorganisms to cause an infection.

"Our study shows that this organism modifies its polysaccharide surface, which is essential for causing an infection. Bacteria whose polysaccharides are unmodified are quickly recognised and engulfed by the cells of our immune system, whereas by modifying the polysaccharide, *E. faecalis* can evade the host immune cells and spread [infection](#)."

Dr. Mesnage added: "Hospital-acquired infections caused by bacteria resistant to last resort [antibiotics](#) are on the rise. Our work suggests that targeting the mechanism that modifies the surface polysaccharides could be a novel strategy for developing new treatments to fight *E. faecalis* infections."

The research, "Decoration of the enterococcal [polysaccharide](#) antigen EPA is essential for virulence, cell surface charge and interaction with effectors of the innate [immune system](#)," is published in the journal *PLoS Pathogens*.

More information: Robert E Smith et al. Decoration of the enterococcal polysaccharide antigen EPA is essential for virulence, cell surface charge and resistance to innate immunity, *PLoS Pathogens* (2018). [DOI: 10.1101/479022](https://doi.org/10.1101/479022)

Provided by University of Sheffield

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