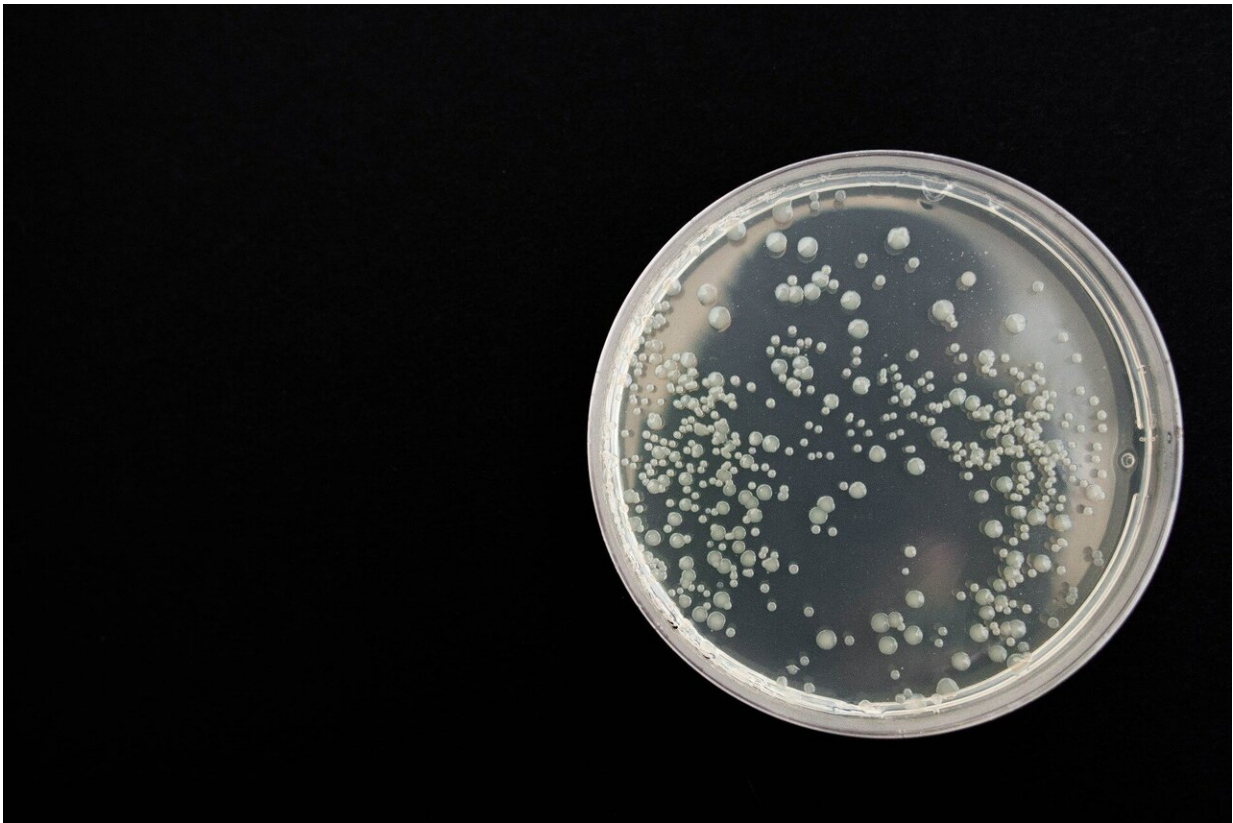


# New findings may reduce the risk of infection for patients with urinary catheters

July 22 2022

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Patients who have indwelling urinary catheters often suffer from urinary tract infections, which can be difficult to treat. Now, researchers at Karolinska Institutet have discovered that the synthetic peptide CD4-PP

has a good bactericidal effect against urinary tract bacteria, even those resistant to antibiotics. The study, published in the journal *Cellular and Molecular Life Sciences*, offers new possible treatment methods.

Patients, who are treated with indwelling catheters through the urethra, often have bacterial colonization in their urine after a period of time. These bacteria can cause infections that are sometimes difficult to treat and can even be life-threatening.

"Increased [antibiotic resistance](#) further reduces the chances of successful treatment, therefore alternatives to traditional antibiotic treatment are an important aspect," says John Kerr White, researcher at the Department of Microbiology, Tumor and Cell Biology, Solna, Karolinska Institutet, and shared first author.

A possible alternative treatment focuses on the use of [antimicrobial peptides](#), which are naturally found in the body. They have among other things, antibacterial qualities, but the disadvantage is their relatively short lifespan. In recent years, antimicrobial peptides have been synthetically developed to improve their stability and efficacy against bacteria, while being harmless to the body's own cells.

## **Synthetic peptide kills bacteria**

Annelie Brauner's research group has studied a specific synthetic antimicrobial peptide, CD4-PP, which was developed by professor Ulf Göransson's research group, Uppsala University. In the study, the researchers examined what effect CD4-PP had on the most common bacterial strains that cause [urinary tract infections](#), such as *E. coli*, *K. pneumoniae* and *P. aeruginosa*.

"The study shows that CD4-PP has good bactericidal effect against these urinary tract bacteria as well as being effective against [antibiotic-](#)

[resistant bacteria](#), which can be very difficult to treat," says Annelie Brauner, professor of Clinical microbiology, at the Department of Microbiology, Tumor and Cell Biology, Solna, Karolinska Institutet, and the study's senior author.

CD4-PP was also shown to be active against biofilm, a kind of mucus blanket that bacteria form, which increases their resistance to the body's immune system as well as to different antibiotics. CD4-PP was found to prevent the formation of new biofilm and also dissolved existing biofilm. The beneficial effect was further enhanced by the fact that CD4-PP also activated the immune system to protect cells against infection.

## Reduced bacteria on the catheter

Preventing [bacteria](#) from attaching to the catheter itself is an important part of reducing the risk of infections.

"When we applied CD4-PP together with a saline fluid on [urinary catheters](#), we found that the adhesion of E. coli to the catheters decreased. Since bacterial adhesion is the first step of the infection process, this effect is important in preventing urinary tract infections. We now plan to further develop and refine how CD4-PP can be applied when using catheters. We will also be investigating how CD4-PP reacts to other types of bacterial strains, such as those that cause infections in wounds," says Annelie Brauner.

**More information:** John Kerr White et al, A stable cyclized antimicrobial peptide derived from LL-37 with host immunomodulatory effects and activity against uropathogens, *Cellular and Molecular Life Sciences* (2022). [DOI: 10.1007/s00018-022-04440-w](https://doi.org/10.1007/s00018-022-04440-w)

Provided by Karolinska Institutet

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