

Lower antibiotic resistance in intestinal bacteria with forgotten antibiotic

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Escherichia coli. Credit: Rocky Mountain Laboratories, NIAID, NIH

A forgotten antibiotic, temocillin, led to lower selection of resistant bacteria than the standard treatment for febrile urinary tract infection, in a study published in *The Lancet Infectious Diseases*. Thus, temocillin may

be useful in treating severe urinary tract infections that give rise to fever, and contribute to a reduced spread of resistant bacteria in hospitals.

The bacterial species *Escherichia coli* (*E. coli*) constitutes a large fraction of the normal bacterial flora in the intestine. But if *E. coli* gets into the wrong places in the body, such as the blood or [urinary tract](#), it can cause serious illness. *E. coli* is the most common cause of urinary tract infections. These can often be treated with antibiotics in tablet form, but some patients become so ill that they must be admitted to hospital and treated with [intravenous antibiotics](#).

"It has long been standard procedure to use the antibiotic cefotaxime for such intravenous [treatment](#). But as time has passed, an increasing fraction of bacteria have become less susceptible to this antibiotic, both in Sweden and the rest of the world, and this has made it necessary to seek an alternative," says Håkan Hanberger, professor at Linköping University and consultant in infectious diseases at Linköping University Hospital. He has been principal investigator and medically responsible for the study.

The study now published is the result of the Public Health Agency of Sweden being requested by the Swedish government to study how already existing antibiotics can be used in the best way. The researchers have investigated temocillin, a member of the penicillin group of antibiotics that has been known for several decades. It is used in some other European countries, but is not marketed in Sweden. Temocillin acts specifically against *E. coli* and other intestinal bacteria that can cause urinary tract infections. It is positive that temocillin does not have a broad effect against many different bacteria, since it reduces the risk that the treatment will act against the normal intestinal bacterial flora. This led the researchers to investigate whether temocillin gives less resistance among intestinal bacteria than treatment with the standard antibiotic, cefotaxime.

They studied 152 patients with urinary tract [infection](#) that gave rise to fever, also known as pyelonephritis, that required intravenous [antibiotics](#).

"We saw clearly that the intestinal flora was less affected in the group treated with temocillin. The main reason for this is that temocillin gives less selection of resistant intestinal bacteria," says Charlotta Edlund, professor of microbiology and specialist investigator at the Public Health Agency of Sweden.

The clinical effect of temocillin was as good as the [standard treatment](#) with cefotaxime, and the undesired effects were equivalent. The fact that temocillin is less aggressive against the bacterial flora in the intestine suggests that starting to use this forgotten antibiotic for urinary tract infections will have advantages for both patients and society.

"The consequence will be that we see less selection of resistant [intestinal bacteria](#) in hospitals, which may contribute to reducing hospital-related infections from these [bacteria](#)," says Håkan Hanberger.

More information: The clinical and microbiological efficacy of temocillin versus cefotaxime in adults with febrile urinary tract infection, and its effects on the intestinal microbiota: a randomised multicentre clinical trial in Sweden, *The Lancet Infectious Diseases* (2021). [DOI: 10.1016/S1473-3099\(21\)00407-2](https://doi.org/10.1016/S1473-3099(21)00407-2)

Provided by Linköping University

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