

# Citrobacter

**Citrobacter** is a genus of gram-negative coliform bacteria from the family *Enterobacteriaceae*, which is a relatively common opportunistic pathogen in humans. The most common species are *Citrobacter freundii* and *Citrobacter koseri* (referred to in the older literature as *Citrobacter diversus*).

## cultivation

Sensitivity and culture are similar to other enterobacteria. In Endo's soil, some strains are very similar to *E. coli*, while other strains are salmonella.

## Biochemical properties

Representatives of the genus *Citrobacter* may form hydrogen sulfide, biochemically similar to salmonella. The genus is, of course, lactose positive, so it should not form bright colonies with a black center, for example on soil such as XLD ( *xylose lysine deoxycholate* ). Occasionally, strains that produce lactose may be delayed or not at all. In any case, they remain positive for the ONPG test (ortho-nitrophenyl- $\beta$ -galactoside). When diagnosing the genus *Citrobacter*, it is important to keep in mind that antigens may cross-react with salmonella and similarly may STEC ( *Shiga toxin producing E.coli* ) strains.

## Pathogenicity

*Citrobacter* is an opportunistic pathogen in the gut. Its pathogenicity is also presented in the urinary tract and other infections include bacteremia, endocarditis, meningitis (even in newborns) and brain abscesses. In exceptional cases, it causes osteomyelitis in children. These complications are often caused primarily by intra-abdominal infections caused by non-infectious processes, such as gallstones or tumors in the abdominal cavity.

## Virulence

Virulence factors include the aerobactin iron recovery system. In the case of brain infections, there is an increased ability to penetrate the blood-brain barrier.

## Diagnostics

The diagnosis of the genus *Citrobacter* is based mainly on biochemistry. The ONPG test can be used to distinguish *Citrobacter* (delayed lactose fermentation) from *Salmonella*. An alternative method of resolution is the PYR-test (*Citrobacter* - positive, *salmonella* - negative).

## Transmission

Transmission is usually faecal-oral and parenteral infections are exclusively endogenous.

## Therapy

*Citrobacter* is primarily resistant to cephalosporins I and II. generation. Co-amoxicillin, cephalosporins III, has been shown to be effective. generations are also effective, but must only be used in serious cases. And even in the case of *Citrobacter*, strains producing broad-spectrum beta-lactamase are increasing, especially low-virulent strains, which can transfer their genes encoding resistance to virulent strains of other enterobacteria.

## Links

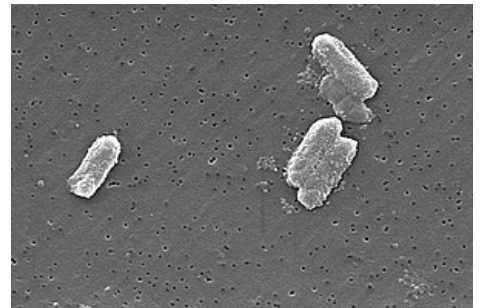
### Source

- VOTAVA, Miroslav, et al. *Medical microbiology special*. 1st edition. Brno: Neptun, 2003. 495 pp. ISBN 80-902896-6-5.

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### References

- VOTAVA, Miroslav, et al. *Medical microbiology special*. 1st edition. Brno: Neptun, 2003. 495 pp. ISBN 80-



Citrobacter Freundii

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