

# Infections caused by Escherichia coli

Escherichia coli (EC) is a gram-negative bacterium that is a common commensal of the large and small intestine. E. coli causes:

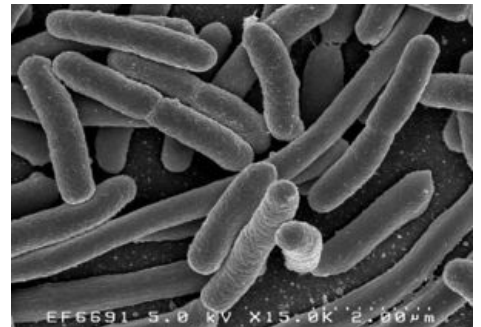
- **specific diarrheal diseases** - mainly in infants, but also in adults
- **non-specific intestinal** (mostly exogenous infection) **and extraintestinal diseases** (mostly endogenous infection)

Type of E. coli

- according to body, capsular and flagellar antigen
- human E.coli can infect animals, but animal E.coli cannot infect humans

## Occurrence

This bacterium is found in the vast majority of warm-blooded animals. It is part of the **physiological microflora** of the large intestine and the distal part of the ileum. A person is colonized almost immediately after birth, most often by alimentary route or transmission from an already inhabited individual. E. coli is unable to exist outside the host for a long time. Therefore, its finding (eg in drinking water) indicates contamination with feces.



Escherichia coli in an electron microscope.

## Intestinal infection of E. coli

- infection in children are caused by E. coli , which get attached to the small intestine -for that, they need **colonization factors** (CFA) on the plasmid , which enables them to adhere to the mucosa
- they are divided according to the produced toxin:
  - ETEC - **enterotoxigenic** strains (9-12 hours incubation)
  - EIEC - **enteroinvasive** (10-18 hours incubation)
  - EPEC - **enteropathogenic** (incubation 9-12 hours)
  - EHEC - **enterohemorrhagic** (3-8 days)
  - EAEC / EAggEC - **enteroaggregative**

### ETEC

- diarrhea in the tropics, there are different names for the disease (cholera-like disease, diarrhea of travelers , etc.)
  - **weaned child syndrome** - in children with nutrient deficiency under poor hygienic conditions - after weaning from the breast the child has diarrhea
- caused by thermolabile or thermostable enterotoxin , production in the small intestine
- does not occur in the moderate (atmosphere)zone

### EPEC

- they cause neonatal and infant diarrhea
- pathogenesis is not fully explained, there is around 14 serotypes
- severe diarrhea and vomiting - rapid dehydration
- source of infection - adult carriers

### EIEC

- rather older children and adults, the course resembles a bacillary dysentery ("collisenteria")
- nausea and vomiting, fever , abdominal pain, stool quickly turns watery with mucus and blood
- tenesmus (urge on the stool)
- toxin allows them to penetrate intestinal epithelial cells (like shigels )

### EHEC

Strains carrying the body antigen **O157** are referred to as **EHEC (enterohemorrhagic E. coli )** , sometimes also as STEC (shiga-like toxigenic), or VTEC (verotoxigenic).<sup>[1]</sup>

Penetration into the body is similar to other strains. The microbes then adhere to the brush border of the enterocytes . **Verotoxin** (shiga-like toxin) then enters into the bloodstream through the disrupted epithelium , leading to damaged erythrocytes and platelet aggregation and the subsequent formation of hyaline thrombus. Together with the released substances from damaged epithelium (especially endothelin), thrombi thus contribute to the **failure of blood flow** through the kidneys and the so-called **hemolytic-uremic syndrome** develops .

Disruption of the intestinal mucosa is associated with leakage of fluids and blood into the intestine. This leads to **severe bloody diarrhea** that mimics shigellosis .

#### Therapy

- lighter forms - rehydration, hungry diet;
- more severe forms - hospitalization, parenteral treatment of homeostasis ;
- ATBs are not commonly used, optionally aminoglycosides ;
- otherwise adsorption ( Smecta® ), charcoal and disinfection ( Endiaron® ).

## Extraintestinal E. coli infections

- mostly unusual serotypes, often resistant to ATB
- mostly endogenous when immunity is weakened
- E. coli is one of the most common causes of urinary tract infections
- in young children - sepsis , meningitis , in the elderly - urinary tract and bile duct infections

## Links

#### related articles

- Diarrheal diseases
- Escherichia coli

**Reference** HORACEK, Jiri, et al. Basics of medical microbiology. 1st edition. Karolinum, 2000. ISBN 80-246-0006-4 . **Source** BENEŠ, Jiří. Study materials [online]. [feeling. 2010]. < <http://jirben.wz.cz> >. References

1. [1]HORÁČEK, Jiří, et al. Základy lékařské mikrobiologie. 1. vydání. Karolinum, 2000. ISBN 80-246-0006-4.