GenoType® EHEC

Based on DNA•STRIP® Technology

- simple
- safe
- fast
- easy to combine
- can be automated

CE-labelling

Quality management certified to ISO 9001/13485

Escherichia coli belongs to the group of enterobacteria and is usually apathogenic. However, there also exist *E. coli* strains with pathogenic properties in humans and animals. Of the six known enteropathogenic strains, the enterohaemorrhagic *E. coli* (EHEC) is one of the most important causative agents of enteritis in Germany alongside salmonellas and *Campylobacter*. On the basis of their surface antigens, the EHEC are divided into different serovars, the most important and most common being *E. coli* serotype O157:H7.
EHEC produce cytotoxins which are similar or almost identical to those of dysentery pathogens (shigellas) and are therefore called shiga toxins (synonyms: shiga-like toxins or verotoxins). Within the shiga toxin family a distinction can be made between shiga toxin 1 (Stx1) and different variations of shiga toxin 2 (Stx2).

Virulence Factor	Localisation	Mechanism	Place of Effect
shiga toxins (*stx1*, *stx2*)	lambdoid prophage, chromosomal integrated	inhibition of protein biosynthesis, apoptosis	epithelial and endothelial cells
intimin (*eae*); type III secretion system	chromosomal on pathogenicity island	adherence, secretion	intestinal epithelium
invasion plasmid antigen H (*ipaH*)	plasmid and chromosomal integrated	inflammatory modulation	nucleus

Table 1: Virulence factors of EHEC and their effects (modified according to *Karch, H. et al.* 2000)

Clinical symptoms of EHEC infections range from mild diarrhea through hemorrhagic colitis (HC) to post-infectious syndromes such as hemolytic uremic syndrome (HUS) and thrombotic thrombocytopenic purpura (TTP). The latter may lead to life-threatening complications particularly in infants and the elderly.
Due to the high infectivity of EHEC (infection dose: 10-100 pathogens) an early examination of diarrhea is mandatory in the case of hospitalized children, outbreaks in nursing homes and other shared facilities. Patients are treated symptomatically; an antibacterial treatment actually is even contraindicated as it prolongs the excretion of bacteria and stimulates the production of toxins.
In cultivation, EHEC do not differ phenotypically from apathogenic *E. coli*, thus making their microbiological identification extremely difficult. Even when using special culture media or performing a serological examination only some types can be detected since EHEC do not rep-

resent a uniform serofermentative group. The foremost diagnostic criterion in detecting an EHEC infection therefore must be the shiga toxin produced by the bacteria. This identification, however requires the use of molecular biological diagnostic procedures.

On the basis of primary culture the **GenoType® EHEC** allows

- the differentiation of *E. coli* and *Shigella ssp.*,
- the distinction between EHEC on the one hand and shigellas and EIEC (enteroinvasive *E. coli*) on the other hand by means of the detection of the gene of a shigella-specific virulence factor (*ipaH*),
- the detection of the diagnostically relevant shiga toxin genes (*stx 1* and *stx 2*) and the intimin-gene (*eae*).

Contrary to conventional detection methods this information can be obtained in a certain, fast and reliable manner in one single procedure.

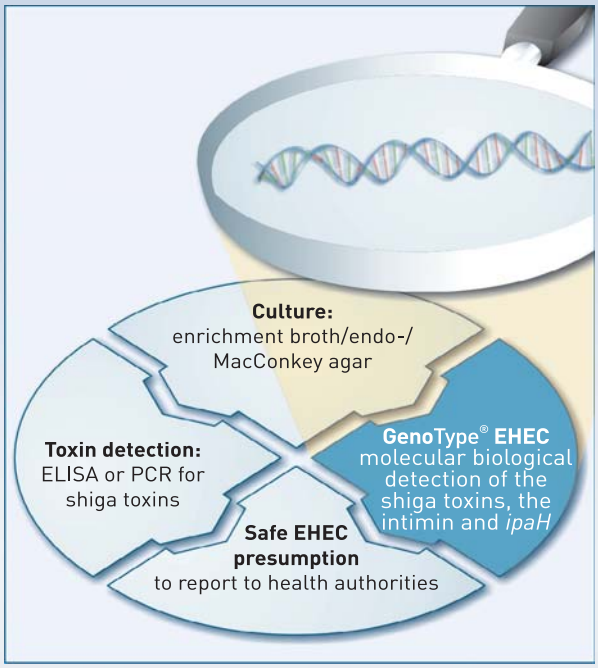

Fig. 1: Diagnostic procedures for the detection of an EHEC infection

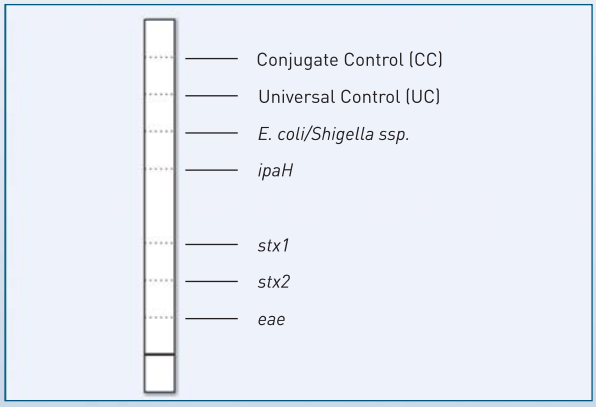

Fig. 2: Reaction zones of the **GenoType® EHEC**

Your cost-effective entry into molecular genetic diagnostics

By simply combining **GenoType® EHEC** with other assays of the **GenoType®** series and thanks to minimized technical requirements even small laboratories benefit from efficient and modern diagnostics. All **DNA•STRIP® Technology**-based assays can easily be incorporated into your routine diagnostics, both in a manual and automated manner. In addition to **GenoType® EHEC**, our microbiological product series offers a number of further tests. For technical information, please refer to the brochure "**DNA•STRIP® Technology**".

EHEC Fact Sheet

- EHEC is among the most important enteritis pathogens in Germany
- Virulence factors are shiga toxins (*stx* genes), intimin (*eae* gene) and others
- Reservoir: ruminants
- Transmission via food, drinking and bathing water but also from person to person

Clinic:

- Incubation period Ø 1-3 days, up to 8 days possible, infection dose 10-100 pathogens
- Symptoms: range from aqueos bloody diarrhea to hemorrhagic colitis
- Possible complications: hemolytic uremic syndrome (HUS) and thrombotic-thrombocytopenic purpura (TTP)
- Usually only the symptoms are treated; antibacterial treatment is contraindicated

Diagnostics:

- Culture, toxin detection, molecular biological detection

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