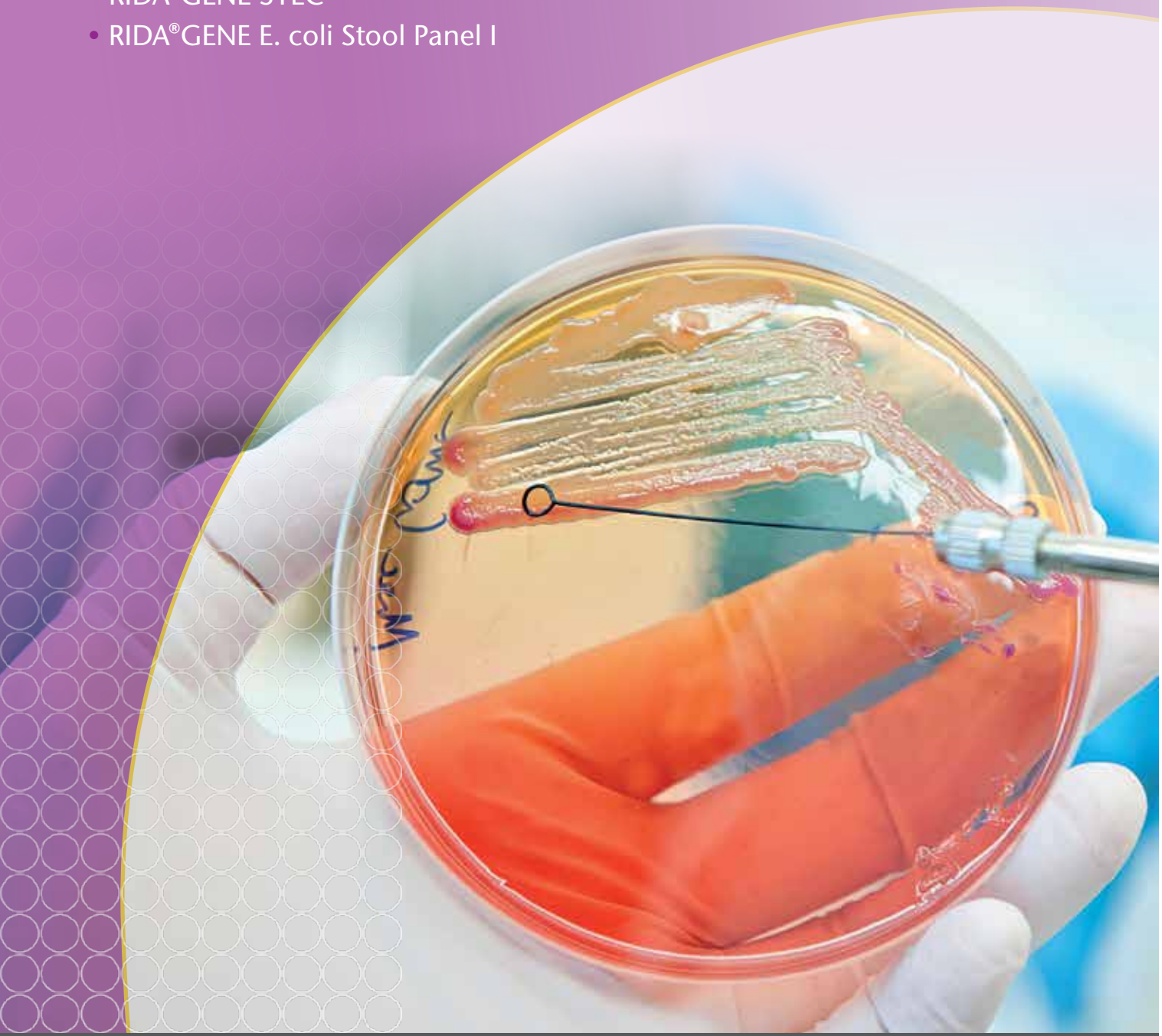
Pathogenic *E. coli* diagnostics

Rapid and reliable detection by real-time PCR

- RIDA®GENE EHEC/EPEC
- RIDA®GENE EAEC
- RIDA®GENE ETEC/EIEC
- RIDA®GENE STEC
- RIDA®GENE E. coli Stool Panel I



Pathogenic *E. coli* – the cause of life threatening diseases

Escherichia coli (E. coli) are part of the normal intestinal flora of humans and many farm animals and are generally non pathogenic. Some *E. coli* strains are pathogenic to humans through the acquisition of certain virulence factors (e.g. genes for toxins).

The six known intestinal pathogenic *E. coli*: enterohemorrhagic *E. coli* (EHEC), enteropathogenic *E. coli* (EPEC), enterotoxic *E. coli* (ETEC), enteroinvasive *E. coli* (EIEC), EAEC enteroaggregative *E. coli* und diffusely adherent *E. coli* (DAEC) can be differentiated by the virulence factors.[1]

Enterohemorrhagic *E. coli* (EHEC) are currently the most important intestinal pathogenic *E. coli*. EHEC are a subgroup of the Shiga toxin or verotoxin producing *E. coli* (STEC or VTEC) and are capable to produce two cytotoxins, verotoxin 1 and 2. Another important diagnostic virulence factor for EHEC is the eae gene (*E. coli* attaching and effacing gene) encoding for intimin. By the detection of the ipaH gene, (invasion plasmid antigen H) EHEC/STEC can be differentiated from *Shigella*/EIEC.
Severe disease such as haemorrhagic colitis occurs in approx. 10 to 20 % of cases of infection. With 5 - 10 % of infections, particularly in babies and small children as well as old patients or patients with weakened immune systems, this may also lead to a hemolytic uremic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP) as a life-threatening post-infectious complication. With HUS and TTP, mortality is particularly high among infants (approx. 10 - 15 %).

Enteropathogenic *E. coli* (EPEC) cause diarrhea, particularly in infants younger than 2 years of age. The virulence factor for EPEC is the eae gene.[2]

Enteroaggregative *E. coli* (EAEC) are the second most common cause of travellers' diarrhea after ETEC among travellers to developing countries, such as Mexico, India and Jamaica. They are defined as *E. coli* that do not secrete heat-labile or heat-stable enterotoxins.[3] Important virulence genes for EAEC detection by PCR are the aatA gene (anti-aggregation protein transporter gene, referred to as CVD432 or EAEC probe) and the aggR gene (master regulator of the EAEC plasmid virulence genes).[2] EAEC is the cause of acute and chronic (> 14 days) diarrhea among children, adults and HIV-infected persons, in both developing and industrialized countries.[3]

Enterotoxigenic *E. coli* (ETEC) are the most common cause of traveller's diarrhea that affects persons travelling to developing countries.
30 - 60 % of all traveller's diarrhea cases are caused by ETEC.
ETEC has two important diagnostic virulence factors. They are capable to produce heat stable (ST) and/or heat labile (LT) enterotoxins.

Enteroinvasive *E. coli* (EIEC) are responsible for Shigellose-like disease in developing countries and among travellers to these less developed regions. EIEC strains are biochemically and genetically related to *Shigella* spp. The pathogenic features of EIEC and *Shigella* spp. are based on plasmid-mediated capability to invade the colonic epithelium for destruction.[2] By the detection of the ipaH gene (invasion plasmid antigen H gene) EIEC/*Shigella* spp. can be differentiated from ETEC.

[1] *Kaper JM, et al.* PATHOGENIC ESCHERICHIA COLI. Nature Reviews Microbiology 2004; 2:123-140.
[2] *Nataro JP and Kaper JM.* Diarrheagenic Escherichia coli. Clinical Microbiology Reviews 1998; 11(1):132-201.
[3] *Huang DB et al.* A review of an emerging enteric pathogen: Enteroaggretative Escherichia coli. J Med Microbiol 2006, 55:1303-1311.

RIDA®GENE EHEC/EPEC Art. No. PG2205

- Real-time multiplex PCR
- Differentiation of EHEC, STEC and EIEC/*Shigella* spp. (stx1/2, eae, ipaH)

RIDA®GENE EAEC Art. No. PG2215

- Real-time PCR
- Detection of specific virulence factor genes aatA/AggR

RIDA®GENE ETEC/EIEC Art. No. PG2225

- Real-time multiplex PCR
- Differentiation of ETEC and EIEC/*Shigella* spp. (LT, ST, ipaH)

RIDA®GENE STEC Art. No. PG2255

- Real-time PCR
- Differentiation of virulence factor genes stx1 and stx2

RIDA®GENE E.coli Stool Panel I Art. No. PG2285

- Real-time multiplex PCR
- Differentiation of STEC, EHEC and EPEC (eae)

RIDA®GENE real-time PCR for *E. coli* diagnostics – detection overview

	RIDA®GENE EHEC/EPEC	RIDA®GENE EAEC	RIDA®GENE ETEC/EIEC	RIDA®GENE STEC	RIDA®GENE E. coli Stool Panel I
Detection	STEC (stx1/stx2)	EAEC (aatA/aggR)	ETEC (LT)	STEC (stx2)	STEC (stx2)
	EIEC/*Shigella* spp. (ipaH)		EIEC/*Shigella* spp. (ipaH)		STEC (stx1)
	EPEC (eae)		ETEC (ST)	STEC (stx1)	EPEC (eae)
Thermal profile	• DNA profile				
Time to result	~ 60 - 90 min*				
Controls	• Positive control • Negative control • Internal control DNA				

* Dependent on the instrument used.

Ordering information

Product	Description	Tests	Matrix	Art. No.
RIDA®GENE	**Real-time PCR**			
RIDA®GENE EHEC/EPEC	Real-time multiplex PCR for the direct qualitative detection and differentiation of EHEC, STEC, EPEC and EIEC/*Shigella* spp. in human stool samples and cultures	100	Stool/ cultures	PG2205
RIDA®GENE EAEC	Real-time PCR for the direct qualitative detection of enteroaggregative *E. coli* (EAEC) in human stool samples and cultures	100	Stool/ cultures	PG2215
RIDA®GENE ETEC/EIEC	Real-time multiplex PCR for the direct qualitative detection and differentiation of ETEC and EIEC/*Shigella* spp. in human stool samples and cultures	100	Stool/ cultures	PG2225
RIDA®GENE STEC	Real-time multiplex PCR for the direct qualitative detection and differentiation of shiga-toxin genes (stx1 and stx2) of shiga-toxin producing *E. coli* (STEC) in human stool samples and cultures	100	Stool/ cultures	PG2255
RIDA®GENE E. coli Stool Panel I	Real-time multiplex PCR for the direct qualitative detection and differentiation of shiga-toxin genes (stx1 and stx2) of shiga-toxin producing *E. coli* (STEC) and EPEC in human stool samples and cultures	100	Stool/ cultures	PG2285

For detailed information on *E.coli* follow us

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