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Escherichia coli

Escherichia coli is a Gram-negative, rod-shaped bacteria of the family Enterobacteriaceae. Most *E. coli* are abundant in the gut of humans and animals and reside as commensals without pathology (Lim et al 2010). Some variants however can be highly pathogenic by the nature of their acquired virulence factors; others can cause disease in a susceptible host at extra-intestinal locations. Acquisition may be through contact with contaminated water, food or the environment, but may simply be autoinoculation or haematogenous spread from colonised areas.

Members can be serotyped based on O (somatic), H (flagellar) and K (surface/capsular) antigens allowing more rapid identification of specific pathogenic strains (for example O157:H7) and for easy epidemiological tracing. Those that commonly cause gastroenteritis may also be defined by their pathogenic mechanism (eg. Enteroinvasive *E. coli* (EIEC), Enteroaggregative *E. coli* (EAEC), and Adherent invasive *E. coli* (AIEC) are found in humans only whereas Enterotoxigenic *E. coli* (ETEC), Enteropathogenic *E. coli* (EPEC), and Enterohaemorrhagic *E. coli* (EHEC) are also found in animal hosts (Lim et al (2010).

Common infections caused by *E. coli* include urinary tract infections, gastroenteritis (particularly those with specific virulence factors such as toxins), sepsis/bacteraemia and neonatal sepsis/meningitis (>5 days after birth); less commonly *E. coli* may also cause wound and abscess infections, post-operative, joint infections and aspiration pneumonia.

Escherichia coli is predominantly identified using culture methods, often using selective media on average over 2 days. However, molecular methods such as PCR may be useful to detect *E. coli* in normally sterile sites such as CSF and blood where *E. coli* is suspected. *Escherichia coli* is the most common cause of bloodstream infections in England and can cause a mortality rate of 16%, with infections increasing in the UK and internationally (Vihta et al 2018). This level of mortality could increase with a greater level of antibiotic resistance (Vihta et al 2018). A swift rapid response may then be useful to identify infections in the blood stream and in CSF.

Micropathology Ltd uses semi-nested PCR end-point assay for qualitative detection of in *E. coli* (and closely related *Shigella sp.*).

References:

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urinary tract infections, and antibiotic susceptibilities in Oxfordshire, UK, 1998-2016: a study of electronic health records. *Lancet Infect Dis.* 2018 Oct;18(10):1138-1149.