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Escherichia coli strains isolated from patients with Crohn's disease and ulcerative colitis

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Abstract: Crohn's disease (CD) and ulcerative colitis (UC) represent inflammatory bowel diseases (IBD) in which different opportunistic bacteria, and among them *Escherichia coli* strains, have been isolated. It cannot be excluded that *E. coli* plays a role in the pathogenesis of IBD. However, mechanisms that *E. coli* perhaps uses are still not well defined. In presented work we studied an incidence of selected virulence genes (*ipaH*, *iucC*, *α-hly*, *afa*, *aer*, *cnf1*, *sfa*, *pap*, *stx1*, *stx2*, *eae*, *ehly*) coding for the expression of respective virulence factors in 69, 47 and 44 *E. coli* strains isolated from 31, 36 and 36 biopsy specimens of 6, 6, and 6 individuals suffering from CD, ulcerative colitis and belonging to control group of patients with non-IBD, respectively. In a proportion of strains isolated from biopsy specimens of IBD patients we found a significantly higher capacity to invade and survive in Caco-2 cell line compared to *E. coli* biopsy specimen isolates from non-IBD patients, but we did not find *ipaH* gene, known to code for the *E. coli* invasion characteristic, in any of these isolates. We found different combinations of genes in a proportion of *E. coli* strains isolated from CD and UC.

Key words: *Escherichia coli*, Crohn's disease, ulcerative colitis, invasion, adherence, virulence genes.

Abbreviations: CD, Crohn's disease; IBD, inflammatory bowel diseases; UC, ulcerative colitis.

Introduction

Crohn's disease (CD) can be characterized as an inflammation in the small intestine, sometimes it may affect the entire digestive tract. CD usually occurs in the lower part of the small intestine, called the ileum (40%), but it can affect any part of the digestive tract, from the mouth to the anus.

Ulcerative colitis (UC) is a disease that causes inflammation and ulcers in the lining of the large intestine. The inflammation usually occurs in the rectum (95%) and lower part of the colon, but it may affect the entire colon. UC rarely affects the small intestine except for the terminal ileum.

Due to the fact that the aetiology of inflammatory bowel disease (IBD) is still not well recognized and seems to be multifactorial, some studies have recently also indicated that intestinal luminal bacteria could play a role in pathogenesis of both CD and UC (Sartor, 1997). Some bacterial pathogens have been suggested as aetiological agents in CD, such as *Mycobacterium paratuberculosis* and *Listeria monocytogenes* (Bulois et al. 1999).

The involvement of intestinal bacteria in the pathogenesis of IBD is also supported by finding of Boudeau et al. (2001) who showed that enterovirulent *Escherichia coli* not contained in physiologic large bowel intestinal flora are dominant bacteria in CD, UC and even in colorectal carcinoma. *Escherichia coli* is one of the most important facultative anaerobe of the human colonic flora playing very important role in promoting the stability of the intestinal microbial flora and maintaining the normal physiology of intestines. By acquisition of well-known virulence factors, such as fimbrial and non-fimbrial adhesins, production of enterotoxins and cytotoxins, invasion into tissues, *E. coli* strains become pathogenic and consequently are involved in intestinal diseases (Siegfried & Kmetova, 1997; Bogyiova et al., 2001; Masseret et al., 2001; Kmetova et al., 2004).

Some authors showed that *E. coli* isolated from patients with IBD are qualitatively different compared

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