

Inhibitory activity of *Bifidobacterium longum* HY8001 against Vero Cytotoxin of *Escherichia coli* O157:H7

S.H. Kim¹, S.J. Yang¹, H.C. Koo¹, W.K. Bae¹, J.Y. Kim¹, J.H. Park¹, Y.J. Baek², and Y.H. Park^{1*}

¹Coll. Vet. Med. & Sch. Agri. Biotech., Seoul Nat'l. Univ., Suwon, Gyunggi, 441-744,
and ²R & D Center, KOREA Yakult Milk Products Co., Youngin, Gyunggi, 449-900

Vero cytotoxin (VT)-producing *Escherichia coli* (VTEC), such as *E. coli* O157:H7, are emerging foodborne pathogens worldwide. VTs are associated with hemorrhagic colitis (HE) and hemolytic uremic syndrome (HUS) in human. Attachment of the B subunit of VTs to its receptor, globotriaosylceramide (Gb3) at gut epithelium is the primary step and, consequently, the A subunit of VTs inhibits protein synthesis in the target cell. Proinflammatory cytokines, such as TNF- α and IL-1 β , upregulate Gb3 expression, increase the sensitivity to VTs, and enhance VT action in developing disease. Currently, there is a growing interest in probiotics with increasing occurrence of antibiotic resistant bacteria. Especially, much work on bifidobacteria among probiotics, regarded as microorganisms targeted for technological and therapeutic applications, has been performing. In Korea, neutralizing effect of culture supernatant of *B. longum* HY8001, Korean isolate, against the VTs from *E. coli* O157:H7 was found. Therefore, this study was focused on the raveling of inhibitory effect of *B. longum* HY8001 against VTs, through the interference B subunit of VTs and Gb3 interaction. Mice were inoculated intragastrically with *B. longum* HY8001 culture supernatant before and after challenge with *E. coli* O157:H7. Control mice were inoculated intragastrically only with *E. coli* O157:H7. Cytokine, TNF- α and IL-1 β , levels in sera and expression of their mRNA were decreased and expression of Gb3 in renal tubular epithelial cells was reduced in mice treated with *B. longum* HY8001 culture supernatant. In competitive ELISA, culture supernatant of *B. longum* HY8001 primarily binds VTs to interfere the VTs with Gb3 interaction. These results suggest that soluble substance(s) in *B. longum* HY8001 culture supernatant may have inhibitory activity on the expression of Gb3 or VT-Gb3 interaction, or both. Further study should be done to elucidate the property of soluble substances in *B. longum* HY8001 culture supernatant.