PTU-070 ★ SOLUBLE PLANTAIN FIBRE BLOCKS EPITHELIAL ADHESION AND M-CELL TRANSLOCATION OF INTESTINAL PATHOGENS

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Introduction Dietary fibres may have prebiotic effects mediated by promotion of probiotic bacteria. This study explores the possibility that they may also improve health by inhibiting epithelial adhesion and translocation by pathogenic bacteria. We have focussed on soluble non-starch polysaccharide (NSP) from plantain bananas (*Musa* spp) since previous studies had shown that this is particularly effective at blocking *Escherichia coli* epithelial adherence.

Methods The ability of plantain NSP to inhibit epithelial cell adhesion and invasion of various bacterial pathogens, their translocation through microfold (M)-cell monolayers (generated by co-culture of Caco2-cl1 cells and Raji B cells) and human Peyer's patches mounted in Ussing chambers has been assessed.

Results Plantain NSP showed dose-related inhibition of epithelial adhesion and M-cell translocation by a range of gut pathogens. Plantain NSP at 5 mg/ml, a concentration readily achievable in the human gut lumen, inhibited adhesion to Caco2 cells of *Clostridium difficile* (67.6±12.3%, p<0.001 ANOVA), *Salmonella typhimurium* (85.0±8.2%, p<0.01), *Shigella sonnei* (46.6±29.3%, p<0.01) and ETEC (56.1±23.67%, p<0.05) but did not inhibit EPEC adhesion. Plantain NSP (5 mg/ml) also inhibited invasion of Caco2 cells by *Salmonella* (80.2±9.7%) and *Shigella* (46.7±13.4%; both p<0.01). Blockade of adherence and invasion to $Caco_2$ cells by plantain NSP was also confirmed by Giemsa stain and light microscopy. Plantain NSP, at 5 mg/ml, also inhibited translocation of *Salmonella* and *Shigella* across M-cells by 46% and 73% respectively (both P<0.01). Similarly, blockade of *Salmonella* translocation across follicle-associated epithelium (FAE) of human ileal Peyer's patches was observed with 5 mg/ml plantain NSP (p<0.01; N=3).

Conclusion Soluble plant fibre from plantain bananas inhibits invasion and adhesion of pathogenic bacteria to Caco2 cells, and their translocation across M-cells of the FAE. This represents a novel mechanism by which soluble dietary fibres could promote intestinal health and prevent infective diarrhoea.

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Keywords clostridium difficile, dietary fibre, intestinal epithelium, m cell, Peyer's patches, salmonella, shigella.