

DIFFERENT PLASMIDS CODING FOR HEAT STABLE ENTEROTOXINS IN PORCINE ESCHERICHIA COLI STRAINS OF O-GROUP 149
 ANDERS FRANKLIN*1, ROLAND MÖLLBY2,3 AND OLOF SÖDERLIND1
 NATIONAL VETERINARY INSTITUTE, S-750 07 UPPSALA1
 DEPARTMENT OF BACTERIOLOGY, KAROLINSKA INSTITUTET, S-104 01 STOCKHOLM2
 DEPARTMENT OF BACTERIOLOGY, NATIONAL BACTERIOLOGICAL LABORATORY, S-105 21 STOCKHOLM3, SWEDEN

The aims of the present study were to investigate whether the different heat stable enterotoxin (ST) patterns, exhibited by enterotoxigenic porcine *E. coli* strains, might be explained by the presence of different genetic determinants coding for ST production. Accordingly, attempts were made to transfer the presumptive plasmids encoding for ST production into *E. coli* K12 strains, the tests for expression of the ST genes in *E. coli* K12 being performed by means of the infant mouse model and the pig intestinal loop assay.

Four *E. coli* strains of O-group 149 were used as donor strains, all of which produced heat-labile enterotoxin (LT) and ST as assayed in six weeks old pigs (STp). Two strains were ST+ as assayed in infant mice (STm). As recipient strain for plasmids from the donor strains an *E. coli* K12 rec A strain was used. ST production in *E. coli* K12 transconjugants was determined by the infant mouse model (Gianella, 1976) and by the pig intestinal loop assay using heat-inactivated culture supernatants (Olsson and Söderlind, 1980). LT production was assayed in the adrenal cell test (Söderlind and Möllby, 1978). The plasmid content of some wild type and transconjugant strains was analysed on agarose gels (Meyers et al. 1976).

STm+ transconjugant clones were obtained at a high frequency by selection for raffinose fermentation ability (Raf) and resistance to sulpha and streptomycin. The STm-encoding determinants most often resided on a 55 Mdal plasmid encoding for colicin B which acted as transfer factor for the plasmids encoding for raffinose fermentation and antibiotic resistance (Franklin, Söderlind and Möllby, 1981). The STm determinants were transferred independently of the LT plasmid. The LT+ transconjugants were all STp+ regardless of whether they were STm+ or STm-. The STp encoding determinants seemed to reside exclusively on a 60 Mdal LT plasmid. The STp toxin caused fluid accumulation only in ligated pig intestines but not in infant mice, while the STm toxin was active in infant mice and in ligated intestinal loops of one week old pigs but not in six weeks old pigs.

Conclusions:

Two distinct ST toxins have been identified in porcine *E. coli* strains of O-group 149. These toxins were encoded for by two genetically independent determinants residing on different plasmids.

This work was supported by grants from the Swedish Council for Forestry and Agricultural Research.

Selected references: Franklin, A., Söderlind, O., and Möllby, R; *Med. Microbiol. Immunol.* 1981, 170:63; Gianella, R.A.; *Infect. Immun.* 1976, 14, 95-99; Meyers, J.A., Sanchez, D., Elwell, L.P., and Falkow, S.; *J. Bact.* 1976, 127, 1529-1537; Olsson, E., and Söderlind, O.; *J. Clin. Microbiol.* 1980, 11, 6-15; So, M., and McCarthy, B.J.; *Proc. Natl. Acad. Sci. USA*, 1980, 77, 4011-4015; Söderlind, O., and Möllby, R.; *Zentralbl. Veterinärmed. Reihe B* 1978, 25, 719-728.