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HEp-2 cell adherence patterns of porcine *Escherichia coli* carrying a gene encoding adhesin involved in diffuse adherence (AIDA)

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Introduction

Escherichia coli strains associated with diarrhea have been divided into the following six major categories on the basis of pathogenic mechanisms: enterotoxigenic *E. coli* (ETEC), enteroinvasive *E. coli* (EIEC), enteropathogenic *E. coli* (EPEC), enterohemorrhagic *E. coli* (EHEC), enteroaggregative *E. coli* (EAggEC) and diffusely adherent *E. coli* (DAEC).[15,18] EPEC, EAggEC, and DAEC strains were classified by their ability to produce distinct patterns of adherence to cultured epithelial cells in vitro: localized (LA), aggregative (AA), and diffuse (DA) adherence. The objective of this study was to investigate the relationship of the adherence patterns with AIDA-positive *E. coli* isolated from diarrheic pigs.

Materials and Methods.

A total of 58 AIDA-positive *E. coli* were used for adherence pattern of HEp-2 cell assay. Twenty-two isolates were from unweaned pigs and 36 isolates were from weaned pigs. The patterns of adherence of the AIDA-positive *E. coli* strain were examined by Center for Vaccine Development. HEp-2 cell assay was performed in triplicate. Positive control *E. coli* strain included in each HEp-2 cell assay.

Results

Of the 22 isolates from preweaned pigs, LA to HEp-2 cells was found with 6 isolates and DA to HEp-2 cells was found with 4 isolates. One isolate showed a combination of the LA and AA patterns, respectively and 3 isolates showed a combination of the DA and AA patterns, respectively. Four isolates adherenced aggregatively to HEp-2 cells. Four isolates were nonadherent.

Of the 36 isolates from postweaned pigs, LA to HEp-2 cells was found with 8 isolates and DA to HEp-2 cells was found with 9 isolates. Two isolates showed a combination of the LA and AA patterns, respectively and 1 isolate showed a combination of the DA and AA patterns, respectively. Eleven isolates adherenced aggregatively to HEp-2 cells.

Discussion

This in vitro study demonstrates that AIDA-positive *E. coli* isolated from diarrheic pigs display the three distinct phenotypic patterns on HEp-2 cells. There was no association between AIDA-positive *E. coli* and adherence patterns. The apparent combination of three patterns (LA, DA, and AA) was seen in the isolates from diarrheic pigs, indicating that the two corresponding genetic loci also coexist. Some *E. coli* strain simultaneously exhibited the LA (or DA) and AA phenotypes has also been identified in patients with chronic diarrhea

Recently, epidemiological studies suggested that the prevalence of AIDA-positive *E. coli* in diarrheic pigs was 7.5% and may represent an important virulence determinant in the pathogenesis of enteric colibacillosis in pigs. The AIDA gene is also identified in porcine ETEC strains isolated from pigs with weaned diarrhea or edema disease. Since a high percentage of the AIDA-positive *E. coli* strain showed three distinct adherence to HEp-2 cells in the present study, the epidemiologic significance and relative importance of AIDA-positive porcine E. coli as a diarrheal pathogens is needed to established.

References

1. **Ha, S.-K., Choi, C., Chae, C.,** J. Vet. Diagn. Invest. 2003 **15**, 378-381.