Escherichia coli Isolates from Broiler Chicken Meat, Broiler Chickens, Pork, and Pigs Share Phylogroups and Antimicrobial Resistance with Community-Dwelling Humans and Patients with Urinary Tract Infection

Escherichia coli is the most common cause of urinary tract infection (UTI). Phylogroup B2 and D isolates are associated with UTI. It has been proposed that E. coli causing UTI could have an animal origin. The objective of this study was to investigate the phylogroups and antimicrobial resistance, and their possible associations in E. coli isolates from patients with UTI, community-dwelling humans, broiler chicken meat, broiler chickens, pork, and pigs in Denmark. A total of 964 geographically and temporally matched E. coli isolates from UTI patients (n = 102), community-dwelling humans (n = 109), Danish (n = 197) and imported broiler chicken meat (n = 86), Danish broiler chickens (n = 138), Danish (n = 177) and imported pork (n = 10), and Danish pigs (n = 145) were tested for phylogroups (A, B1, B2, D, and nontypeable [NT] isolates) and antimicrobial susceptibility. Phylogroup A, B1, B2, D, and NT isolates were detected among all groups of isolates except for imported pork isolates. Antimicrobial resistance to three (for B2 isolates) or five antimicrobial agents (for A, B1, D, and NT isolates) was shared among isolates regardless of origin. Using cluster analysis to investigate antimicrobial resistance data, we found that UTI isolates always grouped with isolates from meat and/or animals. We detected B2 and D isolates, that are associated to UTI, among isolates from broiler chicken meat, broiler chickens, pork, and pigs. Although B2 isolates were found in low prevalences in animals and meat, these sources could still pose a risk for acquiring uropathogenic E. coli. Further, E. coli from animals and meat were very similar to UTI isolates with respect to their antimicrobial resistance phenotype. Thus, our study provides support for the hypothesis that a food animal and meat reservoir might exist for UTI-causing E. coli.

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