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An Outbreak of Diarrhea Caused by Escherichia coli Serogroup O169:HNM Harboring a Coding Gene for Enteroaggregative E. coli Heat-Stable Enterotoxin 1 (astA) in Fukui Prefecture

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In Japan, the first outbreak of gastroenteritis caused by a strain of Escherichia coli having a coding gene for enteroaggregative E. coli heat-stable enterotoxin 1 (astA) occurred in Osaka Prefecture in 1996 (1). Outbreaks of diarrhea due to the same strain have since been reported in Hiroshima city and Ota Prefecture (2,3). The strain was also implicated in a food-poisoning outbreak that occurred in a school dormitory in Fukui Prefecture on 19 to 22 August 2004, in which 69 of 95 exposed individuals (82 students and 13 teaching staffs) were symptomatic. Lunches that were served on 19 or 20 August were the only food stuffs ingested in common by all these patients, although no portions of the lunches remained for examination. The clinical symptoms recorded were as follows: explosive diarrhea (68 people), abdominal pain (55), fever (17), headache (12), and nausea (10).

Stool samples were collected from 15 students and 1 teaching staff of 69 patients and 3 food-handlers (1 of those food handlers was clinically symptomatic) during 23-24 August, and were examined for bacteriological inspection. E. coli O169:HNM were isolated from all samples. A PCR-based assay for genes encoding astA, aggR, eae, LT, ST, invE, and stx (4-6) revealed that all 19 strains were positive for astA and negative for aggR, eae, LT, ST, invE, and stx, as previously described (data not shown). When 13 of the 19 strains were tested for their sensitivity to tetracyclin (TC), fosfomycin (FOM), ampicillin (ABPC), streptomycin (SM), ciprofloxacin (CPFX), kanamycin (KM), cefotaxime (CTX), chloramphenicol (CP), sulfamethoxazole-trimethoprim (ST), gentamycin (GM), nalidixic acid (NA), and sulfisoxazole (Su) by using Sensi Disc (Becton Dickinson Microbiology Systems, Cockeysville, Md., USA), all were resistant to TC, and intermediately resistant to FOM and ABPC (data not shown).

These 13 isolates were also examined by pulsed-field gel electrophoresis (PFGE) using a Gene Path Typing System (Program No. 22; Nippon Bio Rad, Tokyo, Japan). The PFGE patterns of XbaI- (Nippon Bio Rad) or BlnI- (Roche Diagnostics, Mannheim, Germany) digested chromosomal DNAs were identical among all the isolates examined (Fig. 1). The plasmid profiles were also identical among these isolates (data not shown). As referring, 1,730 strains of O-serotyped E. coli isolates from sporadic diarrhea cases at 2 hospitals in Fukui from 1997 to 2004, only 3 strains were found to be E. coli O169:HNM, and 2 of these were positive for astA.

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