Novel Campylobacter-Like Organism Resembling Helicobacter fennelliae Isolated from a Boy with Gastroenteritis and from Dogs

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We isolated a Campylobacter-like organism resembling Helicobacter fennelliae from a 5 ½-year-old boy with gastroenteritis. Similar strains had been found previously in fecal specimens from healthy and diarrheic dogs. These isolates could be differentiated from H. fennelliae by a lack of catalase and arylsulfatase activities. This group of organisms seems to be homogeneous by a nonradioactive dot blot DNA hybridization assay.

Campylobacter jejuni and C. coli are recognized as leading causes of bacterial gastroenteritis worldwide (2). Several new species of campylobacters causing infectious gastroenteritis and other human diseases have been described only recently (7). Following the introduction of nonselective (6) culture procedures for the isolation of campylobacters, we isolated an unusual Campylobacter-like organism from a boy with gastroenteritis. It resembled Helicobacter fennelliae in cultural behavior and by key phenotypic tests, but it gave an atypical negative reaction for catalase. Similar organisms had been found previously in our laboratory in fecal specimens from dogs. Here we present evidence that these strains may represent a new group within the Campylobacter-Helicobacter phylogenetic complex.

Fecal specimens from 198 pediatric patients hospitalized for infectious gastroenteritis were analyzed for enteric pathogens. For the isolation of Campylobacter-like organisms, fecal specimens were plated onto a commercially available selective medium (Campylosel; BioMérieux, Geneva, Switzerland) containing, in a Columbia agar base, 5% sheep blood, 32 mg of cefoperazone per liter, 10 mg of vancomycin per liter, and 3 mg of amphotericin B per liter. The plates were incubated for up to 96 h at 37°C in an atmosphere containing 6% oxygen, 7% carbon dioxide, and 7% hydrogen which was provided by evacuating the chambers of an incubator and filling them with a gas mixture. We were able to isolate a Campylobacter-like organism in the fecal specimen taken on hospital admission from a 5½-year-old boy. The boy suffered vomiting of several hours’ duration, frontal headaches, and loose stools; he was afebrile. The boy had experienced a similar episode 4 days earlier. The same stool sample was also positive for rotavirus by latex agglutination.

Phenotypic tests for campylobacters were performed as described elsewhere (1), and these included tests for arylsulfatase, pyrazinamidase, and polymyxin B resistance (5). All Campylobacter isolates were identified by dot blot DNA hybridization (4). The protocol was modified by extracting the DNA for digoxigenin labelling with guanidium thiocya-
nate (8). Campylobacter-like organisms closely resembling the boy’s isolate had been isolated from approximately 1% of the diarrheic dogs in previous studies (3, 9). All strains fitted the description of the Campylobacter-Helicobacter complex, being gram negative, oxidase positive, rapidly motile, in the form of curved rods, and showing no action on glucose in oxidation-fermentation medium. The results of selected phenotypic tests are summarized in Table 1. The strains could be differentiated from H. fennelliae by their negative reactions in catalase, indoxyl acetate hydrolysis, and arylsulfatase tests. They could be differentiated from all other catalase-negative Campylobacter species (C. sputorum, C. mucosalis, C. concisus, C. upsaliensis, and C. helveticus) by at least two tests. The isolates could be differentiated from the nitrate-negative Helicobacter pylori and H. fennelliae by catalase and urease and catalase, arylsulfatase, and indoxyl acetate hydrolysis, respectively (Table 1). To further confirm the identity of the strains, they were hybridized with labelled DNA of C. jejuni subsp. doylei, C. sputorum, C. concisus, C. upsaliensis, and C. helveticus. After none of these hybridizations gave a detectable signal, the new strains were then hybridized with digoxigenin-labelled whole cellular DNA of one representative of the novel Campylobacter-like organisms, strain E787-90, isolated from a dog with diarrhea. The result of this hybridization is shown in Fig. 1. All eight isolates of the new Campylobacter-like organism, including strain E787-90, hybridized strongly with labelled DNA from E787-90. None of the type strains of named Campylobacter and Helicobacter species included on the filter gave a strong hybridization signal with DNA from E787-90. In particular, H. fennelliae, H. cinaedi, and strain CLO2 gave only weak hybridization signals (Fig. 1). The boy’s isolate has been deposited with the National Collection of Type Cultures (London, United Kingdom) under accession no. NCTC 12740.

Both phenotypic and DNA hybridization evidence indicates that this group of Campylobacter-like organisms is different from H. fennelliae, other named campylobacters, and related organisms. There are only a few distinguishing phenotypic characteristics, but evidence from DNA hybridization shows that the new group of Campylobacter-like organisms is indeed homogeneous also by this criterion. However, because the nonradioactive hybridization signal cannot be quantified and because the digoxigenin label may
affect the hybridization reaction, the results do not yet constitute sufficient evidence to postulate a new species. Phylogenetic analysis and polyphasic taxonomy for the new group are currently being performed in the participating laboratory in London, United Kingdom. The fact that the new group of Campylobacter-like organisms is resistant to polymyxin B suggests that they may constitute a novel Helicobacter species rather than a Campylobacter species (5). Further evidence is needed in order to resolve this point.

With respect to the clinical relevance of these organisms, our information is presently limited. However, healthy as well as diarrheic household pets may potentially act as a reservoir for human infections.

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REFERENCES