Characterization of a Cholera Toxin Gene-Negative Clinical Strain of Vibrio cholerae O139 Bengal

Until the emergence of Vibrio cholerae O139 in 1992, toxigenic strains of V. cholerae O1 were considered to be the only causative agents of epidemic and pandemic cholera (3). Molecular studies using pulsed-field gel electrophoresis (4), ribotyping (3), enterobacterial repetitive intergenic consensus sequence (ERIC)-PCR (1), and restriction fragment length polymorphism analysis of the CTX genetic element of toxigenic V. cholerae O139 Bengal have demonstrated the emergence of new clones with temporal changes in phenotypic and genetic properties. However, cholera toxin-negative O139 strains that failed to hybridize with ctxA, zot, and ace probes either shared the ribotype of toxigenic strains or belonged to a different ribotype distinct from those of toxigenic O139 strains (3).

We report the characterization of a cholera toxin gene-negative V. cholerae O139 Bengal strain CO788 isolated from a stool sample of a diarrheal patient and provided by Dr. G. B. Nair of the National Institute of Cholera and Enteric Diseases, Calcutta, India.

Using hexaplex PCR, we found that V. cholerae O139 strain CO788 was negative for the ctxA, zot, and ace genes but positive for the tcpA, ompU, and toxR genes. This strain was also negative for ctxA, zot, and ace as determined by colony blot assay and failed to produce cholera toxin in the enzyme-linked immunosorbent assay. The strain showed resistance to ampicillin, cotrimoxazole, furazolidone, streptomycin, and the vibriostatic agent (O/129) pteridin and amplified a portion of the SXT element encoding resistance to trimethoprim, sulfamethoxazole, and streptomycin (2).

Genomic DNA of cholera toxin gene-negative V. cholerae O139 strain CO788 digested with BglII and hybridized with rRNA probes produced a ribotype pattern identical to that of ribotype B-I (Fig. 1), described in the standardized ribotyping scheme of toxigenic V. cholerae O139 (3), but was different from those reported for cholera toxin gene-negative strains. The ribotype patterns (patterns I through V and pattern VII) of representative V. cholerae O139 strains showing restriction patterns consisted of 8 to 10 bands between 12.5 and 1.8 kb in size and are shown in Fig. 1. Recent studies demonstrated five ERIC-PCR fingerprint profiles consisting of 4 to 15 bands between 0.31 and 3.5 kb in size among toxigenic V. cholerae O139 strains (1). The fingerprint profile produced by the cholera toxin gene-negative V. cholerae O139 strain CO788 was identical to that of ERIC profile IV reported previously for O139 strains (1).

We conclude that cholera toxin gene-negative V. cholerae O139 strain CO788 possessing the SXT element belongs to ribotype I and ERIC type IV, which has not been described before to occur among cholera toxin gene-negative strains.

REFERENCES

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