[C2-6]

Detection and Molecular Identification of Human Enteric Viruses in Urban Rivers in Korea

Cheonghoon Lee* and Sang-Jong Kim

School of Biological Sciences, College of Natural Sciences, Seoul National University, Seoul 151-747

Abstract

We monitored the occurrence of human enteric viruses in urban rivers by cell culture-PCR and RT-nested PCR. Water samples were collected monthly or semimonthly between May 2002 and March 2003 in four urban tributaries. Enteric viruses were detected by RT-nested PCR and cell culture-PCR based on a combination of Buffalo Green monkey kidney (BGMK) and A549 cell lines, followed by phylogenetic analysis of amplicons. By RT-nested PCR analysis, 45 (77.6%), 32 (55.2%), 32 (55.2%), 26 (44.8%), 12 (20.7%), 2 (3.4%), 4 (6.9%), and 4 (6.9%) of 58 samples showed positive results with adenoviruses, enteroviruses, noroviruses (NV) genogroup I (GI) and II (GII), reoviruses, hepatitis A viruses, rotaviruses and sapoviruses, respectively. Adenoviruses were most often detected and only eight (13.8%) samples were negative for adenoviruses and positive for other enteric viruses in the studied sites. Thirty-one (77.5%) of the 40 samples were positive for infectious adenoviruses and/or enteroviruses based on cell culture-PCR, and the frequency of positive samples grown on A549 and BGMK (65.0%) was higher than that grown on BGMK alone (47.5%). The occurrence of each enteric virus, except reoviruses and hepatitis A viruses was not statistically correlated with the water temperature and levels of fecal coliforms according to Binary logistic regression model. By sequence analysis, most strains of adenoviruses and enteroviruses detected in this study are similar to the causative agent of viral diseases in Korea and most NV GI- and GII-grouped strains were closely related to the reference strains from China and Japan, and GII/4-related strains had similar sequences to strains recognized as a worldwide epidemic outbreak. Our results suggested that monitoring human enteric viruses is necessary to improve microbial quality and cell culture-PCR using the combination of A549 and BGMK cells and the adenovirus detection by PCR could be useful for monitoring viral contamination in the aquatic environment.

Keywords: enteric viruses, cell culture-PCR, RT-nested PCR, urban rivers, BGMK, A549