Isolation and identification of potentially pathogenic free-living amoeba in drinking, surface, and stagnant water sources from Alborz Province, Iran

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Abstract:

Free-living amoebas (FLAs) can cause neurological and ocular complications in humans. Water supplies play a critical role in transmitting FLAs to humans. The aim of the present study was to investigate the presence of FLAs in various aquatic sources including drinking water, stagnant water, and surface water in Alborz province, northern Iran, using morphological and molecular techniques. A total of 70 water samples were collected from 34 drinking waters, 23 surface waters, and 13 stagnant waters. Filtration and cultivation were employed to isolate FLAs. PCR assay was applied by using the genus-specific primers on positive samples. Pathogenicity tests (osmo- and thermo-tolerance properties) were performed for Acanthamoeba spp., positive sample. Considering the morphological criteria, four positive samples of Acanthamoeba sp., three Vermamoeba sp., two mixed Vermamoeba sp. with Vahlkamfiids, and one mixed Acanthamoeba sp. with Vahlkamfiids were isolated. Five Acanthamoeba sp. isolates were amplified using the JDP primer pairs. Among them, two genotypes, T4 (three isolates) and T5 (two isolates) corresponding to A. lenticulata, were identified. Four V. vermiformis samples were confirmed using the sequencing. This study highlighted the occurrence of potentially pathogenic waterborne FLAs in water habitats associated with high human activity. The results of such research on the prevalence of FLAs, as a human hazard, should be communicated to health policymakers.

Keywords: free-living amoeba, Iran, pathogenicity, water sources