Small circular single stranded DNA viral genomes in unexplained cases of human encephalitis, diarrhea, and in untreated sewage

Abstract

Viruses with small circular ssDNA genomes encoding a replication initiator protein can infect a wide range of eukaryotic organisms ranging from mammals to fungi. The genomes of two such viruses, a cyclovirus (CyCV-SL) and gemycircularvirus (GemyCV-SL) were detected by deep sequencing of the cerebrospinal fluids of Sri Lankan patients with unexplained encephalitis. One and three out of 201 CSF samples (1.5%) from unexplained encephalitis patients tested by PCR were CyCV-SL and GemyCV-SL DNA positive respectively. Nucleotide similarity searches of pre-existing metagenomics datasets revealed closely related genomes in feces from unexplained cases of diarrhea from Nicaragua and Brazil and in untreated sewage from Nepal. Whether the tropism of the cyclovirus and gemycircularvirus reported here include humans or other cellular sources in or on the human body remains to be determined.