

Project Title: Surveillance system of acute flaccid paralysis
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Executing Institute:Center for Disease Control Department of Health
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Abstract

Keyword: AFP, vaccine-derived poliovirus, wild strain poliovirus

Genetic mutations occur in all circulating polioviruses. Mutations in the VP1 region provide the basis for differentiating wild poliovirus isolates into genotypes and lineages. Mutations further characterize isolates of OPV origin. A difference in the range of 0-1% from the parent OPV strain by sequence homology of the full VP1 region is consistent with normal virus shedding or limited person-to-person spread. A difference in the range of 1-15% is characteristic of isolates from OPV-derived poliovirus (VDPV) outbreaks, consistent with extensive transmission and the capacity to cause paralytic disease.

According to the WHO guideline, once an AFP case is reported, the case investigation should be proceeded with in less than 48 hours, and the case's fecal samples be collected twice during the first fourteen days after the onset of the disease. Also, five contacts of the case should be selected and their fecal specimens collected and examined. In 28 days the test report of the case should be completed. The two fecal samples collected from each one of the case and his or her five contacts should be 24 to 72 hours apart. After arriving at the laboratory, the fecal sample is first processed following a standard procedure of pretreatment. Then the possible virus in the sample is cultured using each of three different cell lines, i.e. RD, Hep-2, and L20B as the medium. The viruses propagated from those specimens and capable of causing CPE in cells are further analyzed with IFA, antibody neutralization, and RT-PCR. Finally, the virus is typed through gene sequencing and comparing the resulting sequences with those of some references.

What is chosen to be sequenced in this laboratory is the VP1 section in the nucleic acid variation zone of the poliovirus isolated from the AFP case, and the results are compared with that of OPV to find out whether it is a vaccine-like strain, a vaccine-derived strain, or a wild strain. If it happens to be a vaccine-derived strain or wild strain, we ought to check the OPV completion record for the neighborhood of the case, expand the specimen collection and testing program in that neighborhood to determine if the virus has already invaded there, and necessary measures to be taken to stop the outbreak from running out of control.