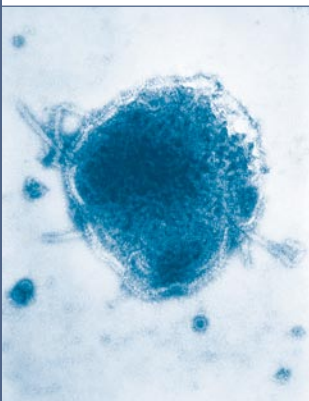


SV-40 Virus Overview

ABOUT THE VIRUS

SV-40 is a member of the Polyomaviridae family, along with BK virus (BKV) and JC virus (JCV). They are small, nonenveloped viruses with a closed, circular double-stranded DNA genome. Polyomaviruses are ubiquitous in nature and can be isolated from a number of species.

SV-40 was discovered in 1960 and has frequently been used in medical research because of its high oncogenicity and potent transforming capacity. It is unclear how SV-40 infection originated in humans, but it is known that potentially contaminated polio vaccines derived from rhesus monkey kidney cells were administered to approximately 98 million people in the United States between 1955 and 1963. It is estimated that up to one-third of these vaccines could have been contaminated with infectious SV-40. However, infections in individuals who did not receive polio vaccines and recent data supporting the transmission of HIV from monkeys to humans, suggest that other modes of transmission are involved.



This electron micrograph reveals both a paramyxovirus measles virus, and virions of the polyomavirus, SV-40. Image courtesy of CDC.

CLINICAL MANIFESTATIONS

SV-40 is asymptomatic in monkeys, however, it transforms cultured human cells and produces tumors when injected into newborn rodents. SV-40 DNA has been discovered in human tumors, specifically in mesotheliomas, brain tumors, osteosarcomas, choroids plexus tumors and ependyomas. The presence of SV-40 in human mesotheliomas and other human tumors has been confirmed by the work of more than 26 research groups. However, the role of SV-40 as a pathogen in the human population continues to be debated.

There is little published data on the role of SV-40 infections in transplant patients. One report found specific neutralizing antibodies to SV-40 in 18% of adult renal transplant patients. More recently, clinical studies have isolated SV-40 in allografts of children who underwent renal transplantation, as well as in the blood, urine and kidneys of people with focal segmental glomerulosclerosis, a known cause of end stage renal disease.

LABORATORY DIAGNOSIS

Serological analysis has proved helpful for epidemiological purposes, but is not conclusive in diagnosing clinical syndromes. Unfortunately, there is considerable cross reactivity between SV-40 and BKV antibodies. Real-time PCR is a sensitive method for detecting the presence of SV-40 DNA, allowing further research into possible disease manifestations of the virus. Standardization of serological assays and molecular assays for SV-40 could assist researchers in understanding and drawing conclusions regarding the role of SV-40 in rare cancers.

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