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Sensitive detection of human cytomegalovirus in tumors and peripheral blood of patients diagnosed with glioblastoma.

Mitchell DA, Xie W, Schmittling R, Learn C, Friedman A, McLendon RE, Sampson JH.

Duke University Medical Center, Division of Neurosurgery, Department of Surgery, Durham, NC 27710, USA.
d.mitchell@duke.edu

Abstract

Human cytomegalovirus (HCMV) has been described to be associated with several human malignancies, though the frequency of detection remains controversial. It is unclear whether HCMV plays an active role in malignant tumor progression or becomes reactivated under pathologic conditions that result in chronic inflammation or immunosuppression. In this study, we report on the investigation of detecting HCMV in the tumors and peripheral blood of patients with newly diagnosed glioblastoma multiforme (GBM). Using immunohistochemistry, in situ hybridization, and polymerase chain reaction amplification of viral DNA, the detection of HCMV was investigated in tumor and blood specimens from patients with GBM as well as in the peripheral blood of normal volunteers and patients undergoing craniotomy for diagnoses other than GBM. We found that a high percentage (>90%) of GBM tumors, not surrounding normal brain, are associated with HCMV nucleic acids and proteins. Furthermore, a significant proportion of patients (80%) with newly diagnosed GBM have detectable HCMV DNA in their peripheral blood, while sero-positive normal donors and other surgical patients did not exhibit detectable virus, suggesting either a systemic reactivation of HCMV within patients with GBM or shedding of viral DNA from infected tumor cells into the periphery. These results confirm the association of HCMV with malignant gliomas and demonstrate that subclinical HCMV viremia (presence of viral DNA in blood without clinical symptoms of infection) is a previously unrecognized disease spectrum in patients with GBM.

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