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Neoplasia. 2009 January; 11(1): 1-9.

PMCID: PMC2606113

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## The Story of Human Cytomegalovirus and Cancer: Increasing Evidence and Open Questions

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Received September 16, 2008; Revised October 16, 2008; Accepted October 16, 2008.

### Abstract

Although human cytomegalovirus (HCMV) is generally not regarded to be an oncogenic virus, HCMV infection has been implicated in malignant diseases from different cancer entities. On the basis of our experimental findings, we developed the concept of “oncomodulation” to better explain the role of HCMV in cancer. Oncomodulation means that HCMV infects tumor cells and increases their malignancy. By this concept, HCMV was proposed to be a therapeutic target in a fraction of cancer patients. However, the clinical relevance of HCMV-induced oncomodulation remains to be clarified. One central question that has to be definitively answered is if HCMV establishes persistent virus replication in tumor cells or not. In our eyes, recent clinical findings from different groups in glioblastoma patients and especially the detection of a correlation between the numbers of HCMV-infected glioblastoma cells and tumor stage (malignancy) strongly increase the evidence that HCMV may exert oncomodulatory effects. Here, we summarize the currently available knowledge about the molecular mechanisms that may contribute to oncomodulation by HCMV as well as the clinical findings that suggest that a fraction of tumors from different entities is indeed infected with HCMV.

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