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Characterization of Human Cytomegalovirus Glycoprotein-Induced Cell-Cell Fusion

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ABSTRACT

Human cytomegalovirus (CMV) infection is dependent on the functions of structural glycoproteins at multiple stages of the viral life cycle. These proteins mediate the initial attachment and fusion events that occur between the viral envelope and a host cell membrane, as well as virion-independent cell-cell spread of the infection. Here we have utilized a cell-based fusion assay to identify the fusogenic glycoproteins of CMV. To deliver the glycoprotein genes to various cell lines, we constructed recombinant retroviruses encoding gB, gH, gL, and gO. Cells expressing individual CMV glycoproteins did not form multinucleated syncytia. Conversely, cells expressing gH/gL showed pronounced syncytium formation, although expression of gH or gL alone had no effect. Anti-gH neutralizing antibodies prevented syncytium formation. Coexpression of gB and/or gO with gH/gL did not yield detectably increased numbers of syncytia. For verification, these results were recapitulated in several cell lines. Additionally, we found that fusion was cell line dependent, as nonimmortalized fibroblast strains did not fuse under any conditions. Thus, the CMV gH/gL complex has inherent fusogenic activity that can be measured in certain cell lines; however, fusion in fibroblast strains may involve a more complex mechanism involving additional viral and/or cellular factors.

FOOTNOTES

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Characterization of human cytomegalovirus glycoprotein-induced cell-cell fusion, alo
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