GVHD Prophylaxis: A Novel Approach for Using the HCMV Glycoproteins to Downregulate MHC Class I and Class II Antigen Presentation Pathways

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Graft Versus Host Disease (GVHD) is an immune-mediated disease and a complication of allogeneic Bone Marrow Transplants (BMT). It develops in between 20 to 80% of those who've undergone a BMT. The Major Histocompatibility Complex (MHC), also known as Human Leukocyte Antigens (HLA) in humans, is a determinant of GVHD. It's known that differences between donor and recipient MHC initiate the disease, as the immunocompetent cells of the donor marrow recognize the cells of the immunocompromised host as non-self, thus commencing an immune response. The Human Cytomegalovirus (HCMV) is a member of the herpesvirus family that has developed strategies to escape the immune response. This research develops a systematic review leading to a novel approach of using the HCMV glycoproteins US2, US3, US6 and US11 to downregulate MHC classes I and II, and hence prevent GVHD from developing in patients having an allogeneic BMT. An inclusion criterion has been applied to 620 studies from PubMed, Epistemonikos, and Google Scholar. 21 studies have been included and three results have been deduced; 1) HCMV glycoproteins partner to downregulate MHC class I and class II, 2) HCMV glycoproteins US2, US3, US6 and US11 regulate demolition of class I MHC molecules, and 3) HCMV glycoproteins US2 and US3 degrade MHC class II. The findings of this research could replace the current preventive treatments, as it would not cause immunodeficiency, since HCMV virion envelope proteins will not be used. This approach could be applied to diseases apart from GVHD that are triggered by non-self recognition.

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