CMV Vaccines: Phase 2 Clinical Trial Results in Stem Cell Transplant Patients and Development Plans for Solid Organ Transplant and Congenital Infection

The type 5 beta herpesvirus called cytomegalovirus (CMV) infects 50-80% of most population groups in the USA and worldwide by the time they reach middle age, though rarely has consequences for the healthy host. In contrast, immunosuppressed transplant recipients who have the infection are at high risk of developing consequential viremia, and if left unchecked could progress in severity and cause end organ disease. Harnessing the immune system to suppress CMV adverse effects caused by uncontrolled replication was pioneered at FHCRC by Riddell and Greenberg in the form of adoptive immunotherapy. At City of Hope, the approach has been to use a vaccine strategy by targeting well-recognized and immunodominant antigens of CMV expressed as a chimeric peptide with the Pfizer CpG adjuvant PF03512676 or from the well-studied vector referred to as MVA, a highly attenuated poxvirus that has been repeatedly shown to be tolerable in immunosuppressed HIV and HSCT patients. Clinical development of the peptide and MVA approaches will be discussed by showing results from Phase 1 and 2 trials of both vaccines in healthy adults and HSCT patients. Successful attributes of both vaccines will be highlighted, and the preferred approach will be discussed for use in patients as a strategy to prevent viral replication and its negative consequences and to achieve FDA registration.