Efficient generation and expansion of antigen-specific CD4+ T cells by recombinant influenza viruses.

Abstract:
Adoptive transfer of in vitro generated antigen-specific T cells has been successfully used to treat viral infections in immunodeficient patients. Therefore, methods for the rapid in vitro expansion of antigen-specific T cells are needed. Influenza virus efficiently infects dendritic cells, and peptides derived from viral proteins are processed and presented to CD8(+) cytotoxic T cells. However, both, CD4(+) and CD8(+) T cells are necessary for the efficient control of viral infections, and it is becoming increasingly clear that a T helper cell response is very important for the maintenance and strength of the immune response. Here we show that recombinant influenza virus efficiently infects a wide range of professional antigen-presenting cells and does not interfere with antigen presentation pathways. Using T cell clones for three different MHC class II-restricted antigens we demonstrate that peptides derived from these antigens are efficiently presented on MHC class II molecules. Importantly, it was possible to generate and expand antigen-specific CD4(+) T cells following in vitro infection of professional antigen-presenting cells with recombinant influenza virus. These findings support the notion that recombinant influenza virus is a valuable tool for the expansion of antigen-specific CD4(+) T cells in vitro.