Abstract

Human cytomegalovirus (HCMV, *Herpesviridae*) can cause severe complications in the infected individuals undergoing hematopoietic stem cell transplantation. Nowadays, these patients are treated using antivirotics or HCMV-specific T cells derived from the seropositive graft donor. This study explored the possibility of redirecting HCMV-non-specific T cells from a seronegative donor towards HCMV-infected cells via chimeric antigen receptor (CAR), i.e. artificially designed T cell receptor.

Viral glycoprotein B (gB) has been selected as a target for this receptor. Published sequence of a single chain variable fragment of a human antibody was used for the design of the CAR against gB (gBCAR). After the verification of production and surface localization in cell lines, gBCAR was being introduced into human T cells via lentiviral vectors. Human fetal lung fibroblasts (LEP) infected with HCMV were used as target cells after the expression of gB at their surface was demonstrated. gBCAR functionality was evaluated by the incubation of modified T cells with infected cells and subsequent analysis of media for IFNγ concentration, which was significantly higher in the setting of gBCAR T cells incubated with HCMV-LEP than in the control incubations.

The results obtained show the specificity of gBCAR against HCMV-infected cells and provide a basis for further functional testing and development of this and similar CARs against HCMV. Simultaneously, they reveal a room for optimization of the gBCAR introduction into T cells and of their following expansion.