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Engineering customized anti-tumor immune response: Biology of MHC class I restricted TCR engineered CD4 T cells

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TCR engineered anti-tumor T cells have produced remarkable responses in cancer patients, however, generation of customized anti-tumor T cells with predefined functional characteristics remains a challenge. We are working on characterizing the biology of tumor antigen specific TCR engineered T cells, to develop methodologies for generating T cells with predefined functional profiles. We have recently shown that TCR engineering approach can also be utilized to program human CD4 T cells to function as MHC class I restricted anti-tumor effectors that can simultaneously exhibit a helper response as well as cytolytic effector response. Interestingly, we have found that these MHC class I restricted multifunctional CD4 T cells can also mitigate regulatory T cell (Treg) mediated immune suppression. Furthermore, we have found that these engineered CD4 T cells are also susceptible to epitope specific activation induced cell death (AICD), that has distinct differences from AICD in TCR engineered CD8 T cells. We will share our recent findings on biology of MHC class I restricted CD4 T cells, such as their effector function profile, ability to mitigate Treg-mediated immune suppression, and their susceptibility to undergo AICD. We will also discuss molecular pathways involved in development of multifunctional effector profile of MHC class I restricted CD4 T cells, and strategies for generating customized anti-tumor T cells with predefined functional profiles.

Biography

Arvind Chhabra is working as an Assistant Professor in the Department of Medicine, University of Connecticut Health Center, and Farmington, Connecticut. His research is aimed at developing an effective immune based cancer therapy. He has published more than 15 research manuscripts in prominent journals, and has also received several awards at international cancer immunotherapy meetings. Besides his work on human melanoma antigen specific T cells, he is also working towards utilizing the human pluripotent stem cells [hPS, i.e. human embryonic stem cells (hES) and induced pluripotent stem cells (iPS)] for developing patient specific cancer immunotherapy approaches through TCR engineering approach.

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