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# CAR-T Cells/-NK Cells in Cancer Immunotherapy and the Potential of MSC to Enhance Its Efficacy: A Review

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## Abstract

The chimeric antigen receptor (CAR) plays a dynamic role in targeting tumour-associated antigens in cancer cells. This novel therapeutic discovery combines fragments of monoclonal antibodies with the signalling and co-stimulatory domains that have been modified to its current fourth generation. CAR has been widely implemented in T-cells and natural killer (NK) cells immunotherapy. The significant advancement in CAR technology is evident based on numerous ongoing clinical trials on CAR-T/-NK cells and successful CAR-related products such as Kymriah (Novartis) and Yescarta (Kite Pharma, Gilead). Another important cell-based therapy is the engineering of mesenchymal stem cells (MSC). Researchers have been exploring MSCs and their innate homing abilities to tumour sites and secretion cytokines that bridge both CAR and MSC technologies as a therapeutic agent. This combination allows for both therapies to overcome each one's flaw as an immunotherapy intervention. Herein, we have provided a concise review on the background of CAR and its applications in different cancers, as well as MSCs' unique ability

as delivery vectors for cancer therapy and the possibility of enhancing the CAR-immune cells' activity. Hence, we have highlighted throughout this review the synergistic effects of both interventions.