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(54) Title: INTERLEUKIN-9 SIGNALING IN CHIMERIC ANTIGEN RECEPTOR (CAR) IMMUNE CELLS

(57) Abstract: The present disclosure provides chimeric cytokine receptors comprising an intracellular signaling domain of an interleukin-9 receptor alpha (IL9Ra). The present disclosure also provides modified cell(s), *i.e.*, immune cell(s) or precursor cell(s) thereof, wherein the cell(s) are engineered to express a) interleukin-9 receptor alpha (IL9Ra), or a chimeric cytokine receptor disclosed herein; and b) a chimeric antigen receptor (CAR). The present disclosure further provides a vector (*e.g.*, an oncolytic adenoviral vector) comprising a nucleic acid sequence encoding a cytokine, as well as methods of using the modified cells and the vector for treating cancer in a subject in need thereof. Also provided are modified immune cell(s) or precursor cell(s) thereof which are engineered to express a chimeric antigen receptor (CAR), wherein expression of Cullin 5 in the cell(s) is reduced and/or eliminated. Also provided are methods and uses of the modified cells, *e.g.*, for treating at least one sign and/or symptom of cancer. Related nucleic acids, vectors, and pharmaceutical compositions are also provided.



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