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(54) Title: RATIONALLY-DESIGNED SYNTHETIC PEPTIDE SHUTTLE AGENTS FOR DELIVERING POLYPEPTIDE CARGOS FROM AN EXTRACELLULAR SPACE TO THE CYTOSOL AND/OR NUCLEUS OF A TARGET EUKARYOTIC CELL, USES THEREOF, METHODS AND KITS RELATING TO SAME

(57) Abstract: The present description relates to methods for delivering polypeptide cargos from an extracellular space to the cytosol and/or nucleus of a target eukaryotic cell. The methods involve contacting the cell with the polypeptide cargo in the presence of a peptide shuttle agent at a concentration sufficient to increase the polypeptide cargo's transduction efficiency. Also described here are parameters that may be used in the rational design of such synthetic peptide shuttle agents, peptide shuttle agents that satisfy one or more of these design parameters, as well as methods and compositions relating to the use of the synthetic peptide shuttle agents for delivery of a variety of polypeptide cargos (such as transcription factors, antibodies, CRISPR-associated nucleases and functional genome editing complexes) from an extracellular space to the cytosol and/or nucleus of target eukaryotic cells. Applications and targets for genome-editing NK cells for improved immunotherapy are also described.

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