Immune Cell-Mediated Cell and Drug Delivery Platform

Abstract: Efficient drug delivery strategies into solid tumors that target primarily malignant cells and avoid damaging healthy tissue are limited by the pharmacokinetics, solubility and specificity of the chemotherapeutic drugs. Drug delivery into brain tumors is significantly more challenging due to the presence of the blood brain barrier. Glioblastoma, with a 5-year survival rate of only 5% is the most aggressive type of brain tumor. Despite modern treatment techniques (e.g. chemotherapy, radiation, and surgical removal), the prognosis remains dismal. To address this clinical challenge, we designed a targeted drug delivery system using genetically modified chimeric antigen receptor (CAR)-T cells to target glioblastoma tumors and polymeric nanoparticles to encapsulate the therapeutic drug. Nanoparticles provide a great opportunity to develop a targeted delivery system that in conjunction with immune cells can specifically deliver drugs to brain tumors.