Human iPSC-derived chimeric antigen receptor expressing macrophages for improved cancer treatment.

Grant Award Details

Human iPSC-derived chimeric antigen receptor expressing macrophages for improved cancer treatment.

Grant Type: Quest - Discovery Stage Research Projects

Grant Number: DISC2-12657

Project Objective: To enable identification and optimization of novel chimeric antigen-receptor (CAR) targeted macrophages that can be routinely produced from human iPSCs to improve treatment of refractory malignancies such as ovarian cancer; and to enable the therapeutic candidate to advance to the next stage of translational and clinical development.

Investigator:

Name:	Dan Kaufman
Institution:	University of California, San Diego
Type:	PI

Disease Focus: Cancer, Ovarian Cancer, Solid Tumors

Human Stem Cell Use: iPS Cell

Award Value: $1,256,332

Status: Active

Grant Application Details

Application Title: Human iPSC-derived chimeric antigen receptor expressing macrophages for improved cancer treatment.

Public Abstract:

Research Objective

These studies will produce a new CAR-targeted iPSC-derived macrophage-based cell therapy product for treatment of refractory malignancies such as ovarian cancer.

Impact

These studies eliminate a bottleneck in macrophage production and enable these cells to be engineered and manufactured in a standardized, off-the-shelf manner, rather than on a patient-specific basis.

Major Proposed Activities

- Generate of human iPSCs with stable expression of tumor antigen-targeted chimeric antigen receptor constructs
- Generate and evaluate in vitro anti-cancer activity of human iPSC-derived CAR-expressing macrophages (human iPSC-CARMAs) with different intracellular signaling modalities
- Demonstrate efficacy of human iPSC-CARMAs against ovarian cancer in vivo
- Improve efficacy of human iPSC-CARMAs in vitro and in vivo by combination with additional immune stimulating agents agents
- Enable large-scale expansion of iPSC-CARMACs via autonomous cytokine expression.
- Improved cryopreservation of iPSC-CARMACs

Statement of Benefit to California:

Over 2500 women per year in California are diagnosed with ovarian cancer, and the majority of these women will die of their disease. If this cancer is not cured at an early stage, the disease will almost inevitably relapse. Therefore, new and better treatments are desperately needed. This project to use human iPSC-derived macrophages for a targeted cancer treatment provides a completely new strategy for better treatment and cure of ovarian cancer and other refractory malignancies.
