

# IL13R $\alpha$ 2 Targeting Chimeric Antigen Receptor Expressing T cell (CAR-T) for Melanoma Immunotherapy



*Our technology is a chimeric antigen receptor-expressing T cell targeting IL13R $\alpha$ 2, a receptor subunit for IL13 that is more highly expressed in metastatic melanoma. The CAR enables T cell targeting of the cancer via variable light and heavy antibody domains, as well as T cell activation through the incorporation of several co-stimulator and intracellular signaling regions into the CAR construct. Our CAR-T cells specifically recognize malignant melanoma cells and exhibit cytotoxicity at low effector:target ratios, demonstrating the possibility for effective treatment at reduced CAR-T doses that may minimize potential side effects.*

## COMMERCIAL OPPORTUNITY

- According to the American Cancer Society, over 70,000 new cases of melanoma were diagnosed in 2016. Stage 4 melanoma (metastatic melanoma) has a low mean survival of 8-10 months. While surgery is commonly used to remove the cancerous lesions, the method cannot resolve those circulating melanoma cells that result in further metastasis to other organs.
- Current immunotherapies to treat this cancer include checkpoint inhibitors, cytokines, and oncolytic viruses. Certain therapies however, such as cytokine treatment with IL-2, have come under scrutiny due to harsh side effects including liver, kidney, and cardiac complications.
- The marketplace is attractive for CAR-T development, as there are 27 current CAR-T clinical trials being carried out by companies including Kite Pharma (market cap \$2.3B), Juno Therapeutics (market cap \$2.0B), Collectis (market cap \$614.4M), and Bluebird Bio (market cap \$2.9B). Several of these CAR-T therapies have received breakthrough therapy designation allowing priority review by the FDA.
- IL13R $\alpha$ 2-targeting CAR-T cells may be less risky than other CAR-T opportunities. This is because Mustang Bio recently reported Phase 1 data on IL13R $\alpha$ 2-specific CAR-T cells being used to treat glioblastoma, and Mustang Bio claimed that the therapy was safe and well tolerated and was capable of eliciting an anti-tumor response. The Mustang Bio CAR-T construct is different in that it uses part of the IL-13 ligand.

## TECHNOLOGY

Two CARs targeting IL13R $\alpha$ 2 were designed and cloned into a MSGV-1 retroviral vector. Constructs included a primary intracellular domain CD3 $\zeta$ , and a second costimulatory domain being CD28. The organization of the variable heavy and light chain antibody regions in the antigen binding domain for each CAR construct was optimized, resulting in enhanced tumor specificity and killing ability. CAR-Ts produced significantly more interferon gamma (IFN $\gamma$ ), a cytokine indicative of tumor killing, upon interaction with a A375 malignant melanoma cell line than a Panc02.03 pancreatic cell line. Both CAR-T constructs exhibited low effector:target ratios of approximately 5:1, resulting in less than 20% viability in A375 cells.

## PUBLICATION/PATENT

- Provisional patent filed for Dr. Abate Daga in January 2017.

### CONTACT

Haskell Adler PhD MBA  
Senior Licensing Manager  
Haskell.Adler@Moffitt.org  
(813) 745-6596

### LICENSING OPPORTUNITY



16MB069.2017.01