**ABSTRACT**

SV-B1 is a GM-CSF-engineered whole-cell targeted immunotherapy derived from a breast cancer cell line (SV-B1). We are currently assessing SV-B1 in a phase I trial, supported by a mechanism-of-action study (ClinicalTrials.gov identifier NCT03066947). Subjects who fail with response to tumor regression are offered a phase II clinical trial (ClinicalTrials.gov identifier NCT03328026). To identify patients likely to respond to SV-B1, we are conducting a companion diagnostic assay.

In a pilot phase I study with four evaluable patients, one subject (A002), with metastatic breast cancer, showed a decrease in tumor size by 95% and an increase in CD107a (HLA-DR, CD80, CD86) levels with its killing of both CD4+ and CD8+ T-cells in vitro (pre-treatment vs. post-treatment; Figure 2). No other patients showed the same response.

**RESULTS**

**Tumor Response in Subject A002**

**HLA Allele Matching**

Out of 4 evaluable subjects (A001, A002, A003, 004), Table 1: in the phase I clinical trial, only A002 and A001 showed tumor regression at the end of the trial. Similarly, according to the AARC 2018 poster (Abstract Control Tumor Response to SV-B1), we found a significant association between HLA DRB1 and tumor regression (p = 0.01).

**Mechanism of Action**

The Immunoassay for the detection of the “Immuno signature,” comprised of factors including those mentioned above, we hypothesized that SV-B1 can elicit the presentation of tumor cells and present tumor-associated antigens (TAA) directly to HLA-matched T-cells, which in turn may induce an immune response to the targeted patients. To evaluate this hypothesis, we have begun developing biomarkers for assessing anti-tumor T-cell responses. SV-B1 cells, in our pilot study, demonstrated a decrease in tumor size by 95% and an increase in CD107a (HLA-DR, CD80, CD86) levels with its killing of both CD4+ and CD8+ T-cells in vitro (pre-treatment vs. post-treatment; Figure 2).

**Cytokine Responses**

For the subjects included in our phase I clinical trial for which cytokine responses were assessed, we observed significantly higher cytokine levels (IL-2, IL-6, IFN-γ) in serum samples of patients enrolled in our phase I trial 11 days after SV-B1 treatment as compared to the baseline. As demonstrated in Figure 4, & 6 levels never rose, only the two baseline samples were tested (A001, A003, A002). Figure 4 demonstrates that SV-B1 was able to directly activate immune responses.

**SUMMARY & DISCUSSION**

- **Tumor regressions were observed, especially in breast cancer patients matching with HLA (HLA-DRB1) with SV-B1.**
- **Anti-SV-B1 antibody titers change upon SV-B1 immunization**
- **Interleukin (IL) 6 Increase in HLA-DRB1 matched subjects**
- **Limitations: very small sample size**

**ACKNOWLEDGEMENTS**

We are grateful to Gerhard Biscar, Brian Forys, Gindy Lynn Raffelmann, Todd Daniel Pers, Danie P, Jaime Lender, and Todd Daniel Pers for their support and guidance. We thank Merck, the National Cancer Institute, the National Cancer Institute, and the National Institute of Health for funding.

**REFERENCES**


**METHODS AND PATIENTS (OF WHOM DATA SHOWN)****

**Patient Treatment**

The experiment was conducted in a phase I trial, and only one subject (A002) with metastatic breast cancer showed a decrease in tumor size by 95% and an increase in CD107a (HLA-DR, CD80, CD86) levels with its killing of both CD4+ and CD8+ T-cells in vitro (pre-treatment vs. post-treatment; Figure 2). No other patients showed the same response.

**Figure 2.** Time course of absolute number of tumor cells and serum levels of relevant cytokines in serum samples from patients enrolled in our phase I trial 11 days after SV-B1 treatment as compared to the baseline.

**Figure 3.** Time course of absolute number of tumor cells and serum levels of relevant cytokines in serum samples from patients enrolled in our phase I trial 11 days after SV-B1 treatment as compared to the baseline.

**Figure 4.** A 6. 5 levels never rose, only the two baseline samples were tested (A001, A003, A002). Figure 4 demonstrates that SV-B1 was able to directly activate immune responses.

**Figure 5.** A 8. Figure 6 demonstrates the increase in IL-2, IL-6, and IFN-γ levels in serum samples of patients enrolled in our phase I trial 11 days after SV-B1 treatment as compared to the baseline.

**Figure 6.** A 6. Levels never rose, only the two baseline samples were tested (A001, A003, A002). Figure 6 demonstrates that SV-B1 was able to directly activate immune responses.