

# Full-Length Variant Survivin Vaccine Potentiates Autologous Hematopoietic Stem Cell Transplantation in Multiple Myeloma



***A new cancer vaccine consists of dendritic cells transduced with a full-length double mutant survivin gene delivered via an adenoviral vector. The vaccine will target survivin expressing tumors. The survivin protein is crucial for cancer cell function and is expressed in over 50% of patients in twelve distinct types of cancer. In a Phase 1 clinical trial, multiple myeloma patients were given this variant survivin vaccine prior to and post autologous stem cell transplantation with 4 out of 13 patients (31%) achieving a complete response (CR). Historical rates are expected to be closer to 17%. Patients with CRs have better survival outcomes years later.***

## COMMERCIAL OPPORTUNITY

- Survivin was designated a Top 25 tumor-associated (TAA) antigen by the NCI based on immunogenicity and differential expression in 50-80% of patients with more than 12 distinct cancer types. Survivin plays an essential role as an inhibitor of cancer cell death and promotes growth, metastasis, and treatment resistance of malignant cells.
- Multiple myeloma (MM) is an incurable cancer with an estimated 30,280 cases in the US in 2017. Over 40% of MM samples overexpress survivin and have significantly reduced T-cell responses against survivin protein. Approximately 5,000 MM patients receive high-dose chemotherapy and adoptive stem cell transplant (ASCT) each year in North America. Extensive clinical studies find that patients achieving CR post-transplant have significantly higher long-term overall survival (OS) and progression-free survival (PFS) at 12-15 years.
- The survivin vaccine market is attractive, as evidenced by two products in ongoing clinical trials. First, SurVaxM, a synthetic peptide vaccine (SurVaxM) produced by MimiVax LLC, is currently in Phase I/II trials for multiple myeloma, glioblastoma, and auto-immune diseases. Recent Phase 2 data for SurVaxM in glioblastoma suggest patients may live longer with 91% survival at 12 months (n=55) compared to 60-65% for historical controls. Second, DPX-Survivac, a survivin-based peptide antigen produced by Immunovaccine Inc., is in Phase 2 trials for ovarian cancer and lymphoma. In contrast to SurVaxM and DPX-Survivac, the Moffitt full length variant survivin protein vaccine DC:AdmS should enable the presentation of multiple peptide epitopes, and recognition by a more diverse immune repertoire in patient populations.

## TECHNOLOGY

Antigen presenting cells displaying a variant survivin polypeptide were produced through transduction of dendritic cells (DCs) with an adenovirus containing a double mutant (T34A and C84A) full-length survivin construct. In a Phase I clinical trial, MM patients who did not achieve CR after induction therapy were administered the DC:AdmS pre- and post-autologous stem cell transplant. Results indicate that 4/13 (30.8%) of the vaccinated patients achieved a CR post-transplant compared with a historical CR rate of 9/51 (17.6%). Out of the 13 evaluable patients, there were no serious adverse events (SAEs) attributable to the vaccine.

## PUBLICATION

- U.S. and European patent applications filed in 2017 for Drs. Antonia, Locke, Anasetti, Altieri, and Gabrilovich

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### LICENSING OPPORTUNITY

