IMMUNOPHERESIS®: A NOVEL IMMUNOTHERAPY PLATFORM FOR EXTRACORPOREAL REMOVAL OF SOLUBLE TARGET MOLECULES IN ONCOLOGY

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Background Immunopheresis® is a novel immunotherapeutic approach for treating cancer that employs Immunicom, Inc.’s proprietary technology platform for extracorporeal removal of soluble target molecules from plasma. The technology platform consists of patent-protected apheresis columns containing an affinity matrix to which customized ligands are coupled for capturing one or more cytokines, cytokine receptors and/or growth factors. The lead product, the LW-02 Column, selectively removes soluble tumor necrosis factor receptors (sTNF-Rs) from plasma, which are shed by tumors to neutralize TNF-α and evade its anti-tumor activities. Performance of the LW-02 Column demonstrates the effective and selective target molecule capture that is achievable using the Immunopheresis platform.

Methods The LW-02 Column comprises a trimeric single-chain TNF-α molecule covalently conjugated to an agarose bead matrix to form a proprietary high affinity resin. Laboratory performance testing of the LW-02 Column includes: 1) Capture efficiency and binding capacity for sTNF-Rs (sTNF-R1 and sTNF-R2) measured using MSD assays; 2) Leaching of ligand from the affinity matrix evaluated using MSD assays; 3) Potential off-target binding assessed by measuring plasma protein profiles and cytokine concentrations pre- and post-column exposure using HPLC and immunoassays.

Results In laboratory testing, the LW-02 Column has a capture efficiency of >80% removal of both sTNF-R1 and sTNF-R2, during recirculation of 1L test plasma through the column to model a clinical apheresis procedure. The column binding capacity exceeds the sTNF-R quantities that are typically present in cancer patients’ plasma (approximately 30 micrograms total). The quantities of TNF-α ligand that leach from the affinity matrix (equivalent to < 1 microgram per procedure) are significantly lower than TNF-α levels reported to cause clinical adverse events. The LW-02 Column exhibits selectivity for sTNF-Rs with negligible off-target binding of cytokines, immunoglobulins, or other plasma components.

Conclusions LW-02 Column Immunopheresis has a highly specific and selective mechanism of action and offers a novel subtractive therapy approach for treating cancer that avoids the typical toxicities associated with systemic drug therapy. Clinical performance of the LW-02 Column is currently being monitored as part of three ongoing clinical trials as monotherapy or as an adjunct to chemo- or immunotherapy for various solid tumors. The technology platform is being leveraged with novel high-affinity capture ligands to address other clinically relevant target molecules in immuno-oncology.