NEXT-GENERATION IMMUNOTHERAPY USING PATIENT-DERIVED APC


Background Immune cell-based therapies with monocytes-derived macrophages and/or dendritic cells (DC), both phagocytic antigen-presenting cells (APCs), have arisen to be a powerful branch of immunotherapy against cancer. The promises of phagocytic APCs are their abilities to not only initiate phagocytosis towards cancer cells (to “eat off” tumor) but also, more importantly, to mediate antigen presentation to activate tumor-specific adaptive immunity, including tumoricidal T cells and long-lasting anticancer antibodies. However, the absence of technology that robustly drives monocytes from cancer patients to differentiate into proinflammatory DC/macrophage-like, effective APCs hinder the clinical application of APC therapy.

Results We through a proprietary process created a unique cellular agent (termed Karnelian X) that robust differentiate monocytes from cancer patients (cancer monocytes, cMo) to be potent antigen presenting cells (termed kAPC) that have profoundly enhanced phagocytic capability and, most importantly, antigen presentation machinery, resulting in enhanced uptake and presentation of tumor neoantigens that activate tumor-specific CD4 and CD8 T cells derived from patients TIL (tumor-infiltrating lymphocytes) or the patients peripheral T cells. The expanded tumor-specific CD8 T cells are highly tumoricidal demonstrated in both murine and human tumors, whereas the CD4 T cells contribute memory and supports that create a favorable environment for CD8 T cell, NK cell and other anticancer activation and expansion.

Conclusions We believe kAPC and Neo-T are novel drug vectors with unique features.

Ethics Approval All experiments using animals and procedures of animal care and handling were carried out following protocols approved by the Institutional Animal Care and Use Committee (IACUC) of the T3 lab at the Georgia Institute of Technology. Patient and healthy donor’s peripheral blood mononuclear (PBMC) were provided by the Coopérative Human Tissue Network or purchased from StemCell Technology. All of the samples were anonymized.