memgen

Playing a Key Role in Developing Life-Saving Cancer Immunotherapies

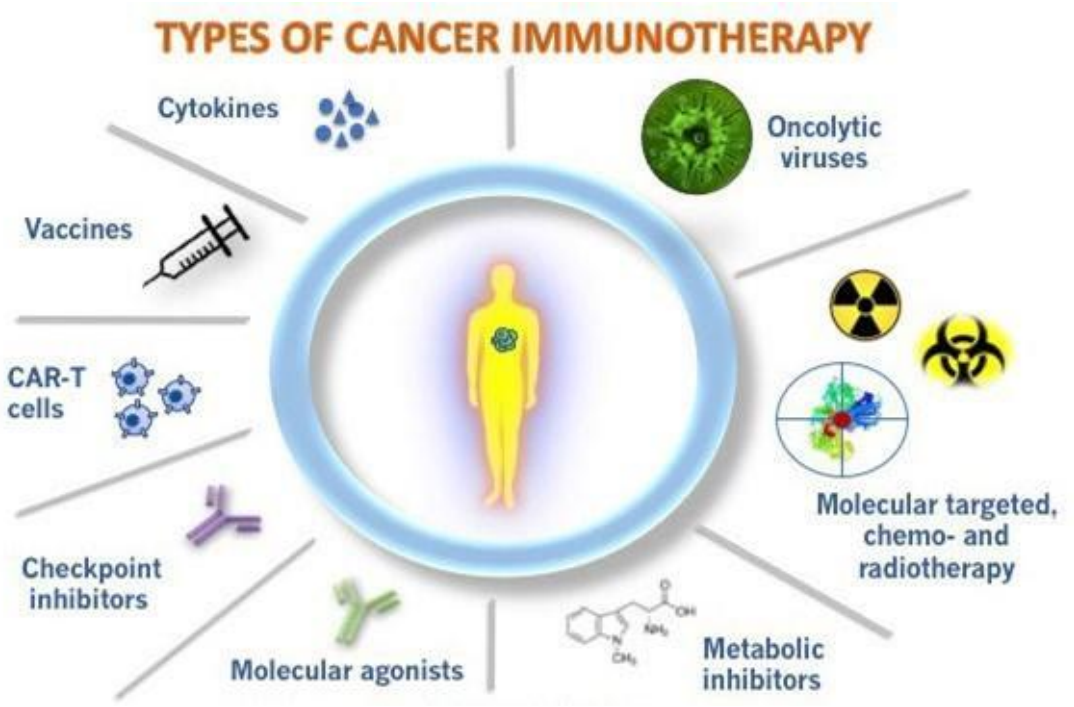
Non-Confidential Deck

Memgen Highlights

CD40L-based therapies to amplify the immune response	Memgen's CD40-ligand overcomes toxicity issues
Broad oncology applications	Activity demonstrated against 13 different types of cancer
Proof of Concept achieved in prior human trials	Strong immune enhancement with excellent safety profile
Lead oncology product in clinical trials	MEM-288 clinical trials enrolling and treating patients at Moffitt and Duke
Strong partnerships let us "punch above our weight"	Partnerships with centers of excellence drive our science forward

Cancer Immunotherapy

- The cancer immunotherapy market is estimated to grow to $158.8 billion by 2025
  - 2020 market size was $88 billion
  - Checkpoint inhibitor market expected to grow from $15 billion in 2020 to $40 billion by 2025
  - Immunotherapy increases specificity while limiting toxicity
- Immunotherapies have revolutionized cancer treatment
  - Melanoma 5-year survival rates increased from <10% to greater than 50% with combined immunotherapy
- *But* – 75% of cancers don't respond to cancer immunotherapies or relapse after a short time



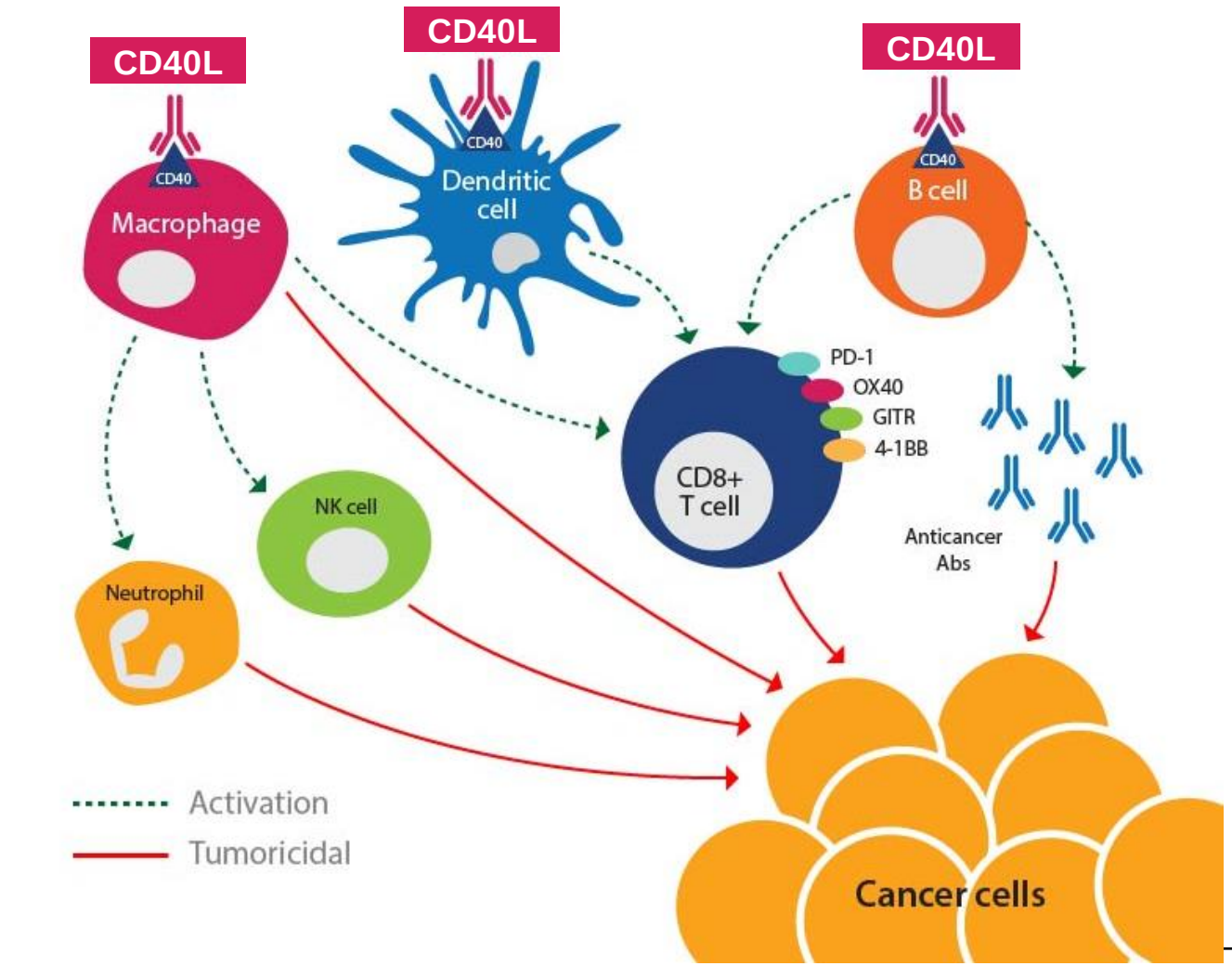
Novel mechanisms and approaches - such as Memgen's oncolytic viruses and TIL therapies - can expand the reach and promise of immunotherapy to new patients

Memgen's Product Pipeline with Scientific Validation from World-Renowned Academic Institutions

Therapeutic Areas	Program	Candidate	Discovery	Preclinical	Clinical Phase 1/2	Indications
Oncology	Oncolytic Virus	MEM-288 (Lead Product)				NSCLC and select other solid tumors (**Monotherapy and in combination with PD-1 checkpoint inhibitor**)
					2H2022	Metastatic melanoma
					2H2022	Pancreatic cancer
					2H2022	Neoadjuvant prostate cancer
	Cell Therapy	TIL			2H 2023	
		Dendritic Cell				
Infectious Disease Vaccines	Vaccine Adjuvant	MemVax			1H2022	COVID-19 Vaccine Adjuvant

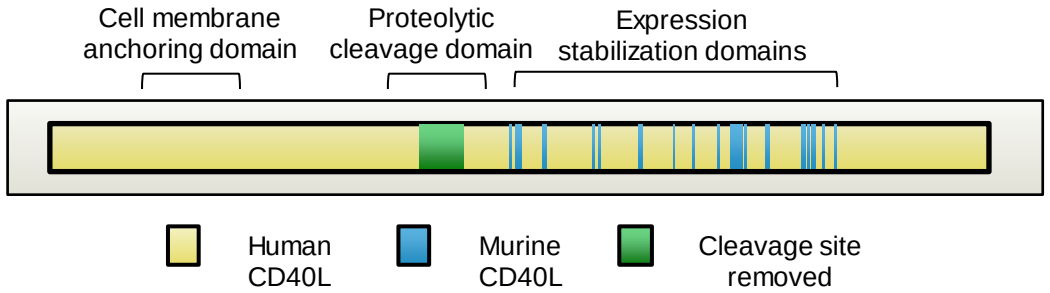
- **MD Anderson Cancer Center** conducted much of our early R&D with outstanding preclinical results showing our drugs dramatically improve responses to blockbuster checkpoint inhibitors
- **Baylor College of Medicine** is manufacturing the cGMP drug supply of MEM-288
- Both **Moffitt Cancer Center** and **Duke Cancer Institute** are prioritizing our first-in-human clinical trial of MEM-288

Memgen's CD40L activates CD40 without toxicity



MEM40: Memgen's Clinically Validated Chimeric CD40 Ligand Anticancer Agent

- **Groundbreaking technology:** Patented chimeric CD40 ligand developed out of the first CD40 ligand gene therapy for chronic lymphocytic leukemia[1]



- **Benign safety profile:** Mild side effects with transient (mostly 1-2 days) low-grade, flu-like symptoms
- **Systemic activity (abscopal effect):** single or repeat administration to a single tumor nodule using a replication-defective adenovirus encoding MEM40 reduced lymphocytosis, lymphadenopathy, and splenomegaly in most patients[1]

1. Castro et. al., Cancer Research. 2012, Jun 15;72(12):2937-48

MEM40's Benign Safety Profile and Activity in Early Clinical Trials

- ✓ Clinical trials used a MEM40 armed non-oncolytic adenovirus[1,2]
- ✓ **Benign safety profile:** Mild side effects with transient (mostly 1-2 days) low-grade, flu-like symptoms
- ✓ Substantial clinical systemic activity (**abscopal effect**) with single or repeat administration
- ✓ **Immune-activating pharmacodynamic profile**: Upregulation of Th1 cytokines (IFN-γ and IL-6) and T cell expansion that translates from preclinical results
- ✓ Repeat dose regimen feasibility (administered biweekly up to 6 doses)

Safety Profile (Pooled data from monotherapy studies)

Adverse Event	Grade I/II No. Pts (%)	Grade 3 No. Pts (%)	Grade 4 No. Pts (%)
Flu-like symptoms	33 (97%)	1 (3%)[2]	
Neutropenia	5 (14%)	3 (8%)	1 (3%)
Headache	8 (24%)	1 (3%)	
Vomiting	5 (15%)	1 (3%)	
Hypophosphatemia[1]	2 (6%)	3 (8%)	
AST Elevation	3 (8%)	1 (3%)	
Hyponatremia		1 (3%)	

[1]Hypophosphatemia resolved in subsequent studies by patients drinking milk prior to injection

Clinical Response

Dosing Regimen	No. of Patients	Objective Response Rate	Disease Control Rate (SD+PR+CR)
Single Dose	24	12.5%	54%
Repeat Dose	10	30%	63%
Repeat Dose + Chemo*	10	70%	80%

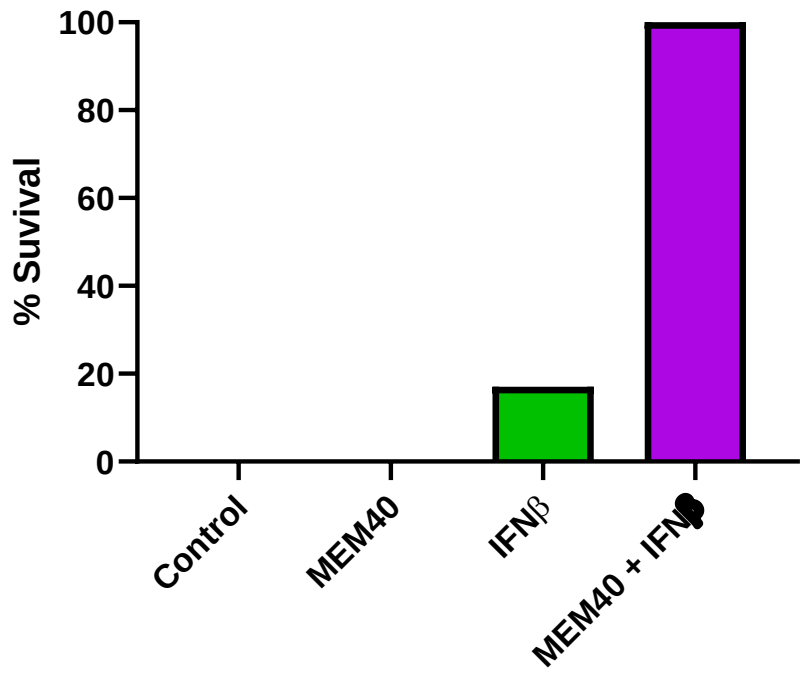
*50% complete response rate Ad-MEM40 combination with FCR or BR chemoimmunotherapy

[1] *Castro et. al., Cancer Research. 2012, Jun 15;72(12):2937-48*

2 Wierda et. al., Leukemia, 2010, Nov;24(11):1893-900

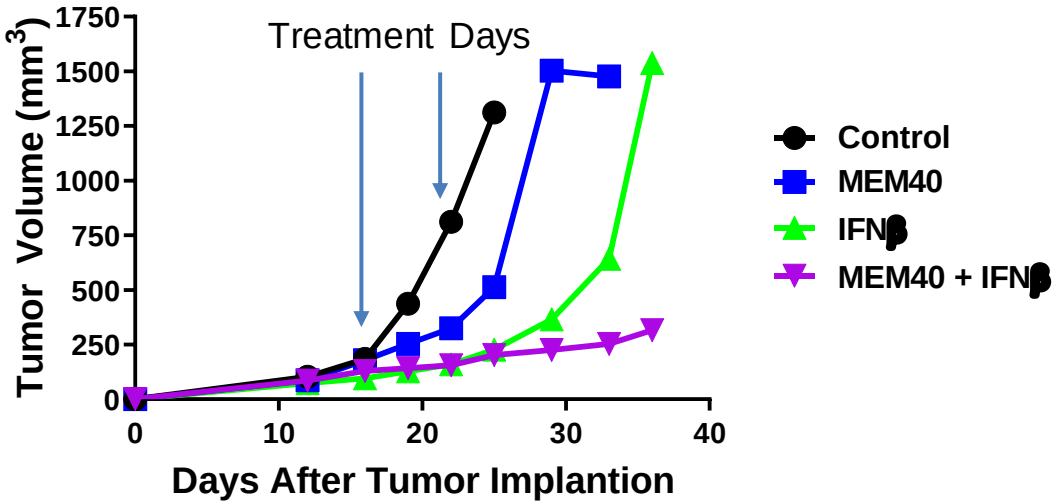
MEM-288 Prototype Test: 100% Survival in Aggressive Tumor Model

Mouse Survival



100% of mice implanted with the aggressive B16 melanoma tumor model remained alive at completion of experiment following treatment with the MEM40 + IFNβ transgene combination.

Tumor Growth Inhibition

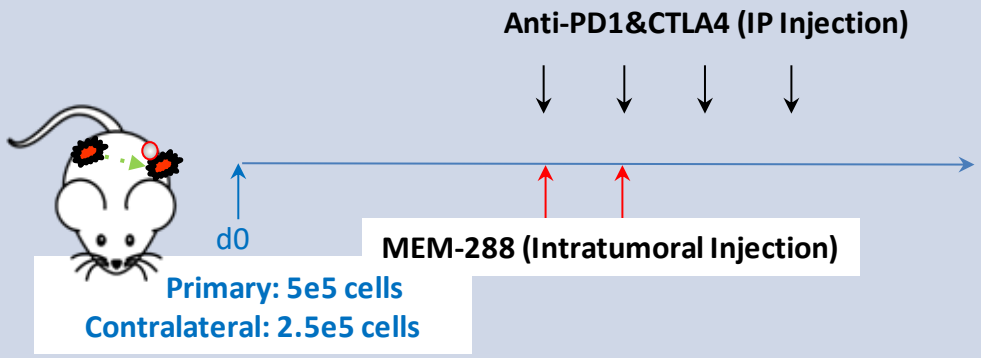


MEM40 + IFNβ combination led to optimum tumor inhibition with **100% of mice surviving** at completion of experimental observation period.

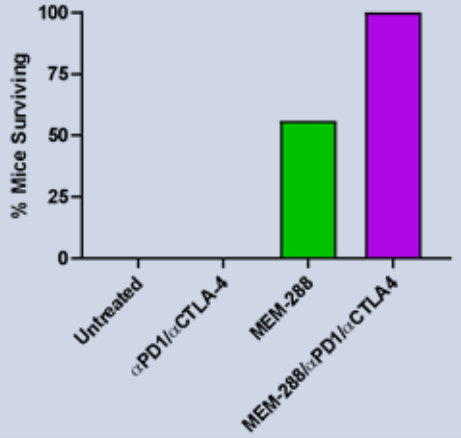
Beg, A. Moffitt Cancer Center. Unpublished data.

MEM-288: Potent Systemic (Abscopal) Effectiveness as both a Standalone and Combination Therapy with Checkpoint Inhibitors

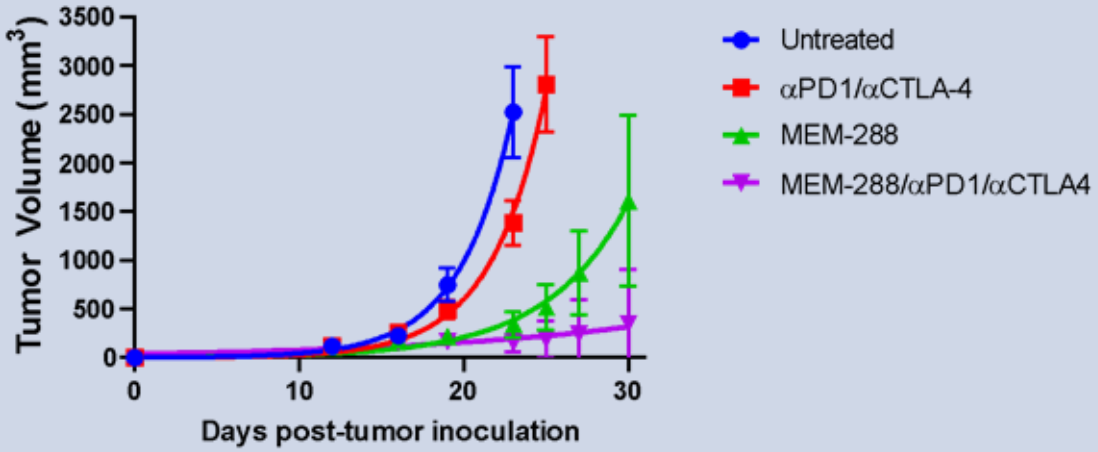
Study Treatment Schema



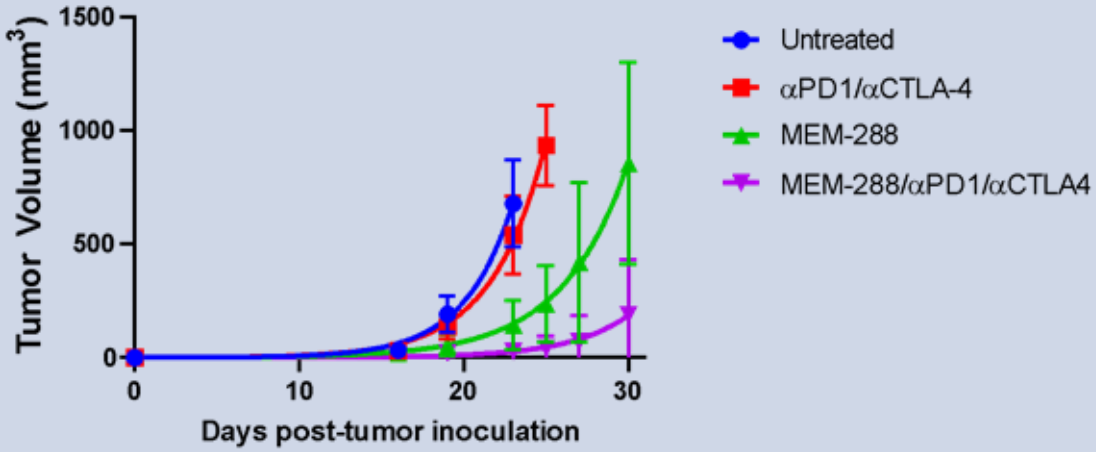
Mouse Survival



Primary Tumors (MEM-288 Intratumoral Injected)



Contralateral Tumors (Non-Injected)

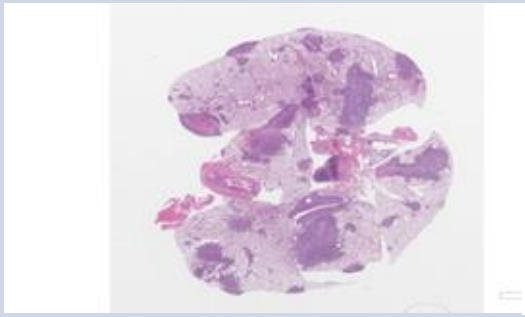


Beg, A. Moffitt Cancer Center. AACR 2020 Annual Meeting

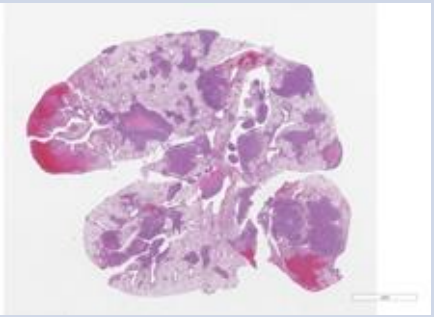
MEM-288 Abscopal Inhibition of Lung Metastases

Metastatic Lung Tumor Lesions

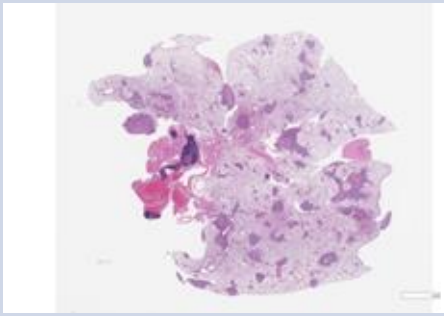
No Treatment



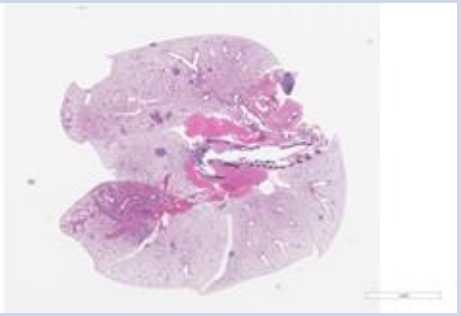
Control oAdv



MEM40-oAdv

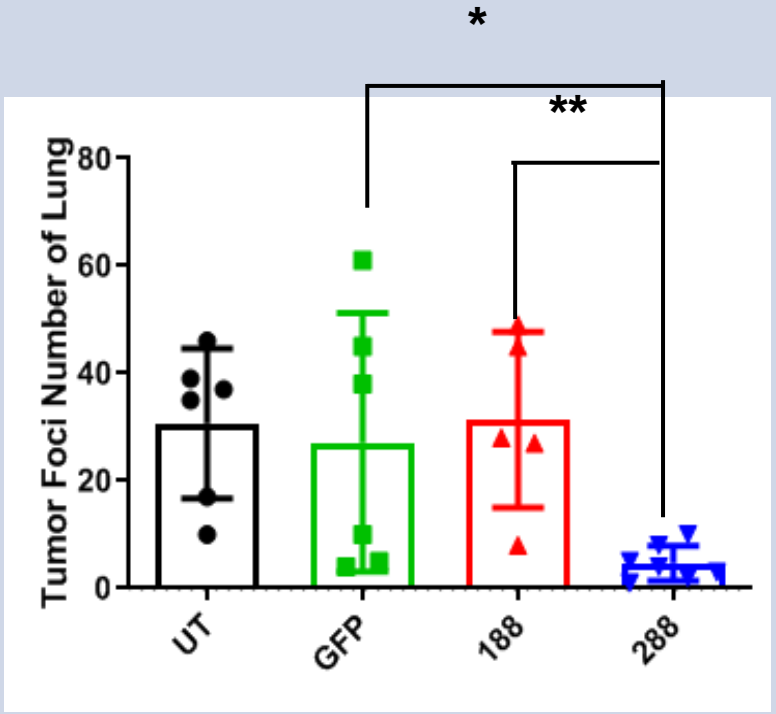


MEM-288



Subcutaneously implanted 344-SQ lung tumors were treated with indicated viruses and controls. Lungs were excised and analyzed by immunohistochemistry. Dark pink and purple regions are tumor metastases.

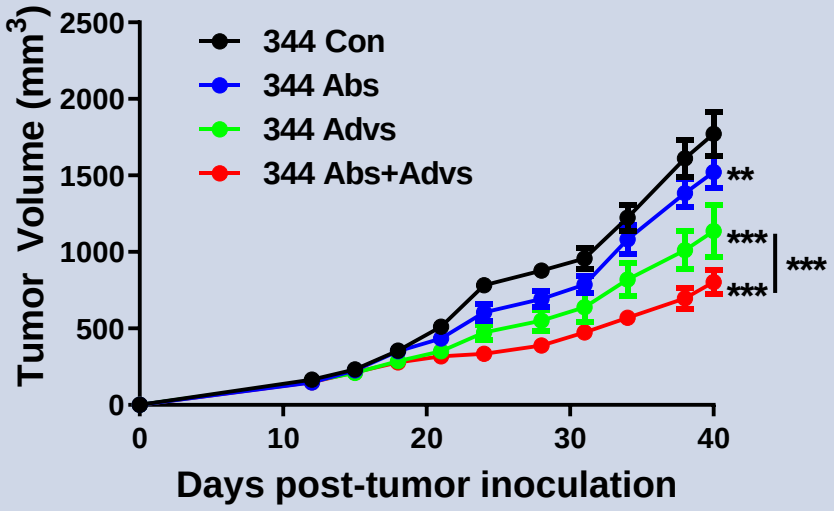
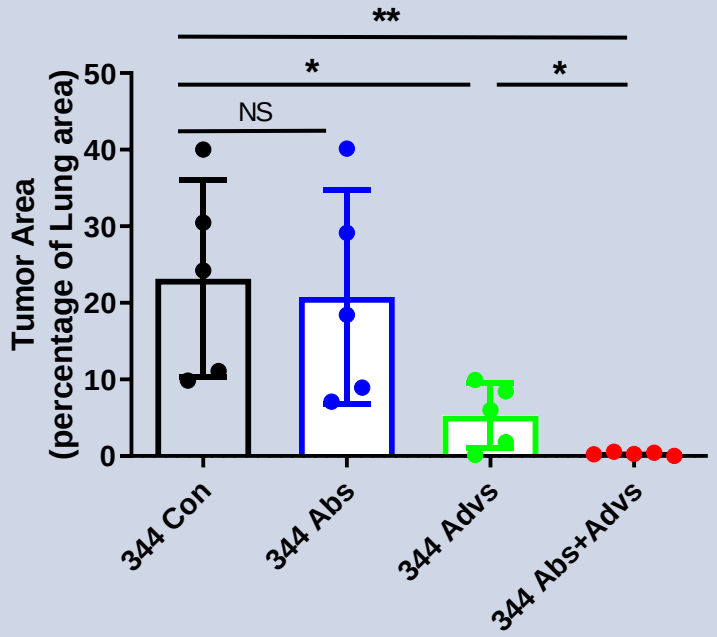
Lung Tumor Foci Quantitation



Metastatic lung tumor foci quantitation in excised lung tissue immunohistochemistry samples (p values *<0.05 and **<0.01)

Beg, A. Moffitt Cancer Center. AACR 2020 Annual Meeting

Checkpoint Refractory Lung Tumor Activity with MEM-288 plus ICI Combination Treatment

Metastatic Lung Tumor Lesions	Lung Tumor Area of Lung
	
Subcutaneously implanted 344-SQ lung tumors were treated with indicated virus plus PD-1/CTLA-4 ICI antibodies. Lungs were excised and analyzed by immunohistochemistry.	Metastatic lung tumor foci quantitation in excised lung tissue immunohistochemistry samples (p values *<0.05 and **<0.01)

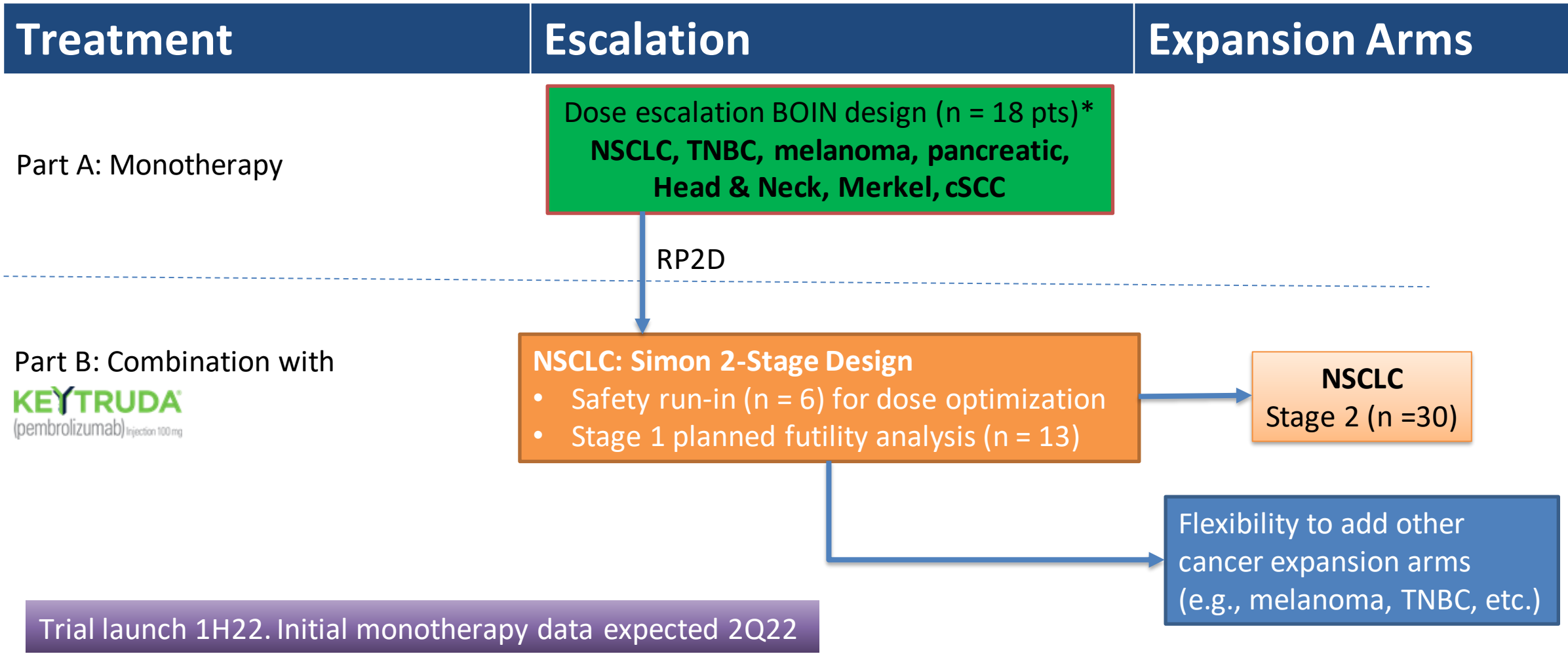
Beg, A. Moffitt Cancer Center. Unpublished Data

Additional Data

Extensive additional preclinical data are available under confidentiality that support the mechanisms driven by MEM-288. These include, among other:

- Data confirming the conditionally replicative oncolytic activity of MEM—288
  - Oncolytic activity 2-log higher than control OV
- Data demonstrating dendritic cell migration and maturation
  - Migration of activated DCs to draining lymph nodes
  - Increased DC expression of CD86 and CCR7
- scRNA-seq data demonstrating expansion of DC1 and Mature DC/DC3 subsets
  - M-DC/DC3-high subset associated with improved survival in NSCLC
- scRNA-seq data showing activation of mature DCs and antigen-presentation and NF-κB pathways

First-In-Human MEM-288 Phase 1 Clinical Development Plan



Trial launch 1H22. Initial monotherapy data expected 2Q22

*MEM-288 is dosed every 3 weeks up to 6 intratumoral doses; RP2D = Recommended Phase 2 Dose; BOIN = Bayesian Optimal Interval Design

MEM-288 Clinical Development Roadmap

PART I

Monotherapy Dose Escalation

Multiple ascending dose in NSCLC, TNBC, pancreatic, CSCC, SCCHN, Merkel cell cancer (n = 18)

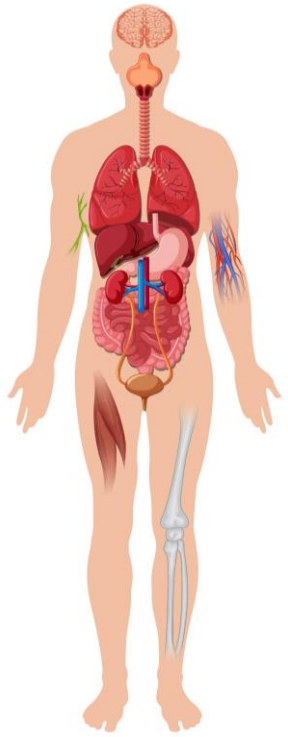
PART 2/3 - EXPANSION

PD-1 Combination Therapy

NSCLC – refractory / resistant to checkpoint inhibitor (n = 43) already evaluated by FDA for initiation pending completion Part 1

Multiple Clinical Expansion Arms (n = 10/indication)

- **Triple Negative Breast Cancer**
- **Bladder Cancer**
- **Cervical Cancer**
- **Prostate Cancer**



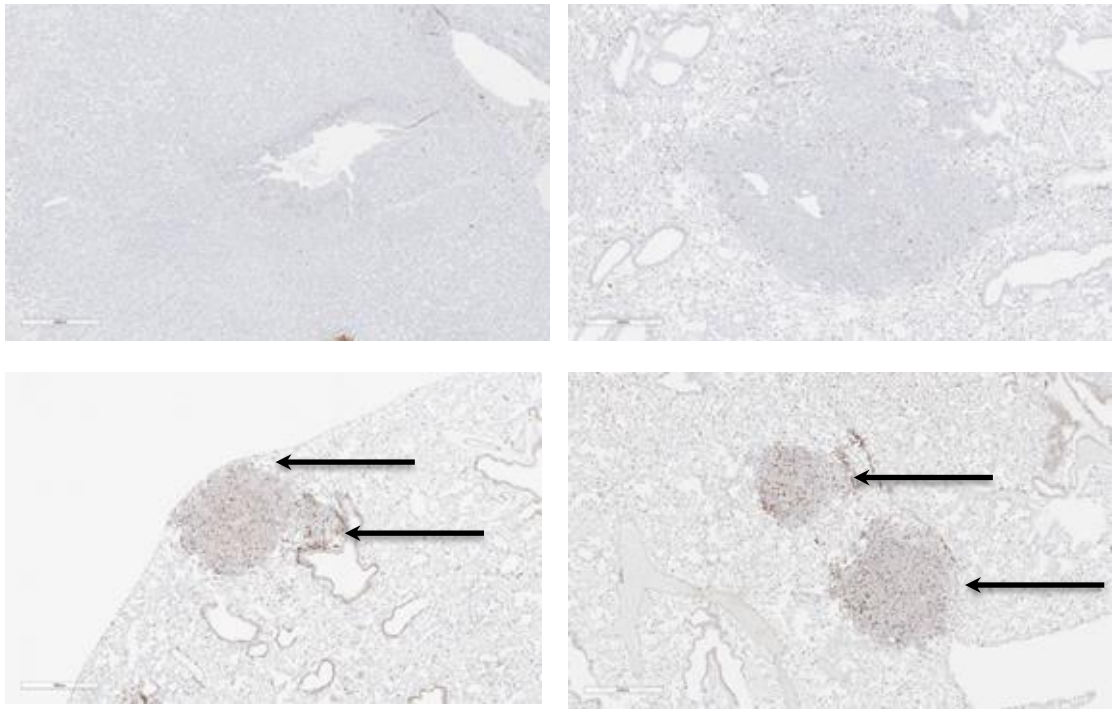
- **Melanoma**
- **Pancreatic Cancer**
- **Colorectal Cancer**
- **Ovarian Cancer**

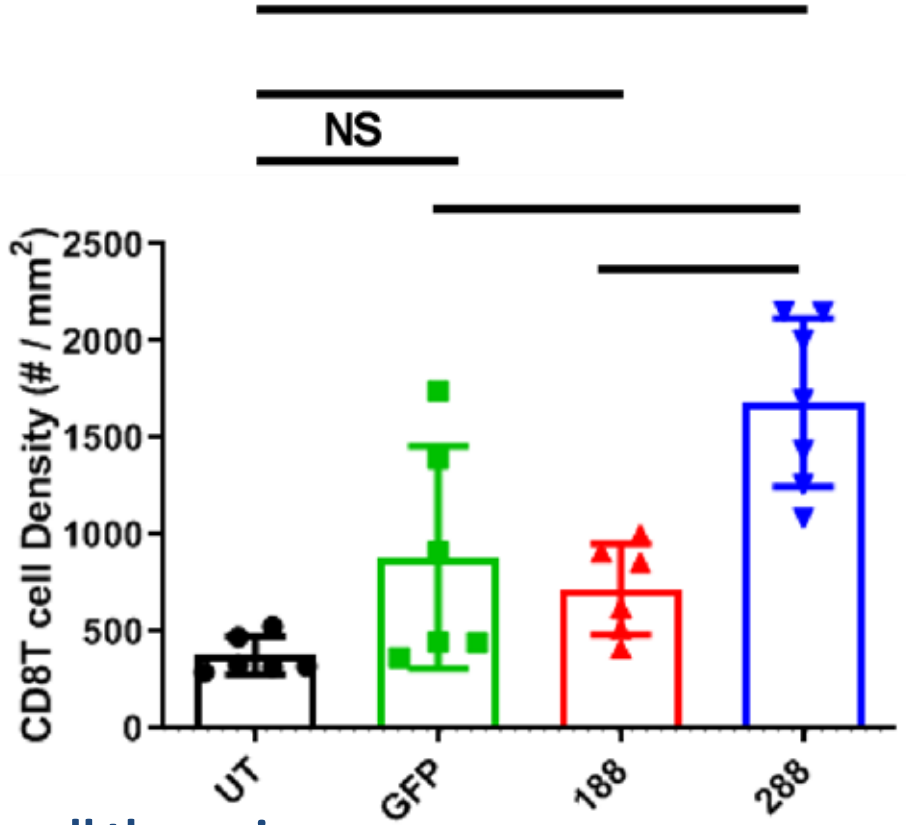
TIL Therapy Development: Novel Enhancement of TIL Harvest

Ability to induce Robust CD8 T Cell Infiltrate in Lung Tumors

No Treatment

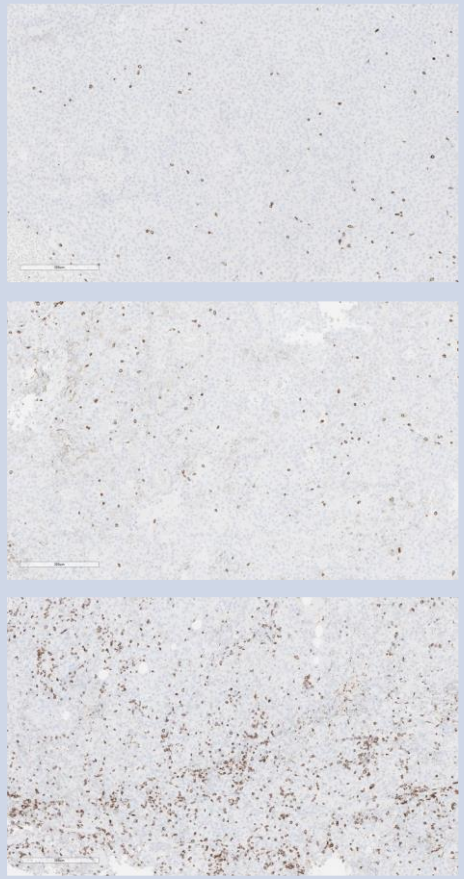
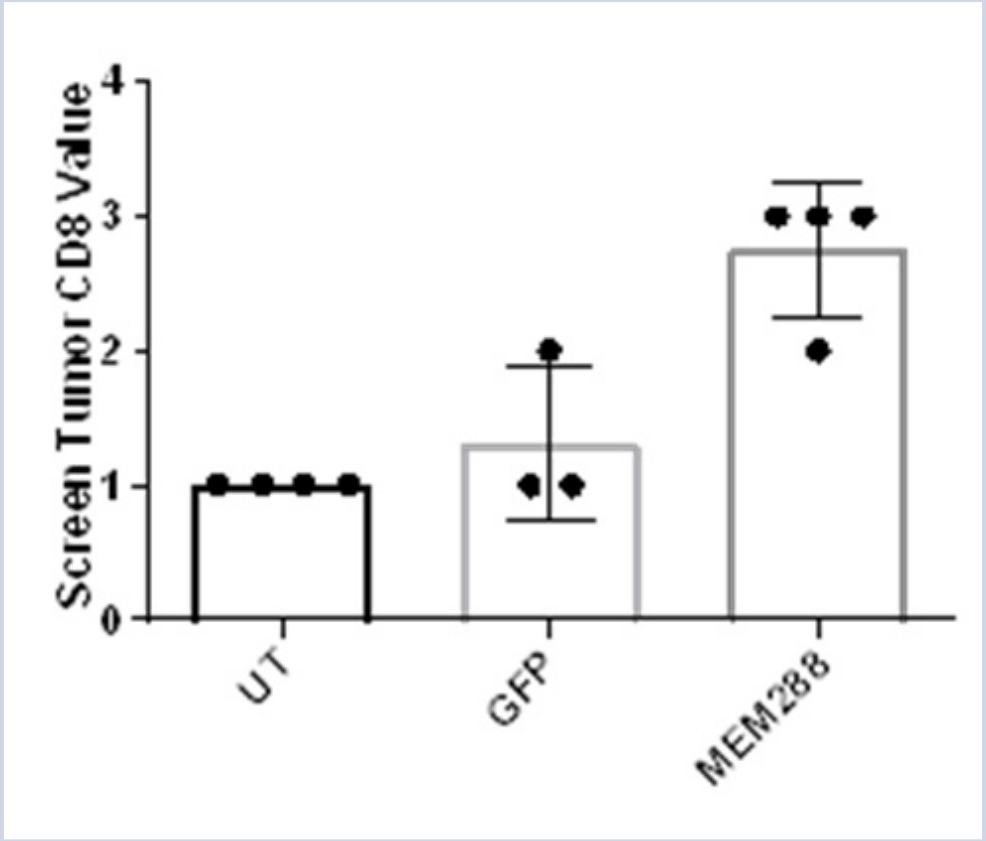
MEM-288





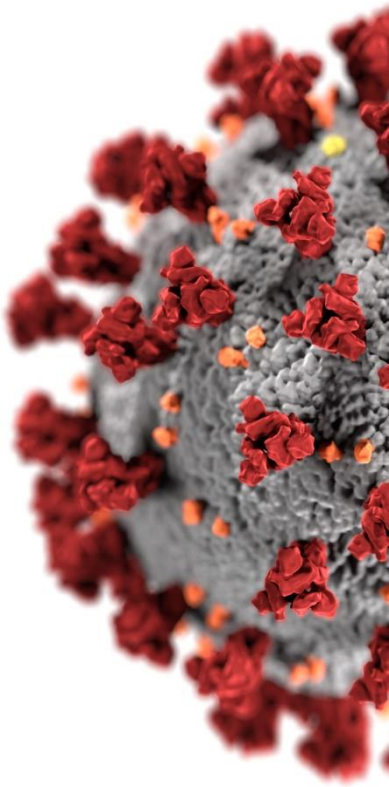
- Memgen has recently expanded its immunotherapy pipeline to cell therapies
- We are now actively exploring ways our technology can augment the initiation, expansion, and generation of TILs
- Collaboration with Moffitt Cancer Center (Recognized center of excellence in TIL Therapy)

MEM-288 Promotes CD8+ TIL Expansion

CD8+ TIL Immunohistochemistry (IHC)	CD8+ TIL Scoring
Untreated (UT) GFP Control Virus MEM-288 	
IHC staining for CD8+ T cells in B16-OVA tumors following intratumoral treatment with MEM-288; control GFP virus (GFP); and no treatment (UT)	CD8 T cells scoring (scale of 0-3; low to high TIL) by a pathologist blinded to the treatment groups

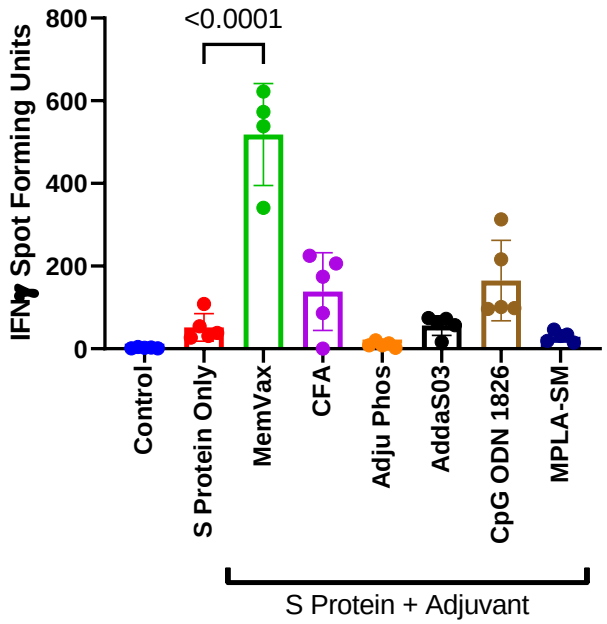
MemVax: COVID-19 Vaccine Adjuvant

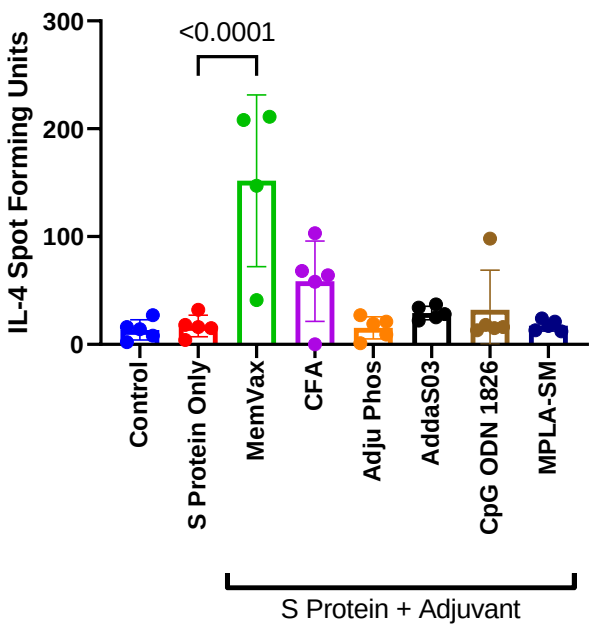
Effective in enhancing both cellular and humoral immunity	• Generates robust antigen-specific antibody and T cell responses • Potent Th1 immune responses
MEM40 is the core adjuvant component	• Nonreplicating adenovirus encoding MEM40 • Prior clinical proven experience with products ready-to-go into the clinic
Flexibility to use with a range of coronavirus vaccine types and routes of delivery	• Vaccine types: whole virus, protein subunits, viral delivery platforms, mRNA platforms • Delivery routes: intramuscular, subcutaneous, inhaled, oral
Addresses many challenges facing coronavirus vaccine development	• Suitable for single-dose administration • Long-term immune protection • Stable under standard refrigerated conditions and even room temperature



MemVax Outperforms Other Adjuvants: Excellent Cellular and Humoral Immune Response Enhancement

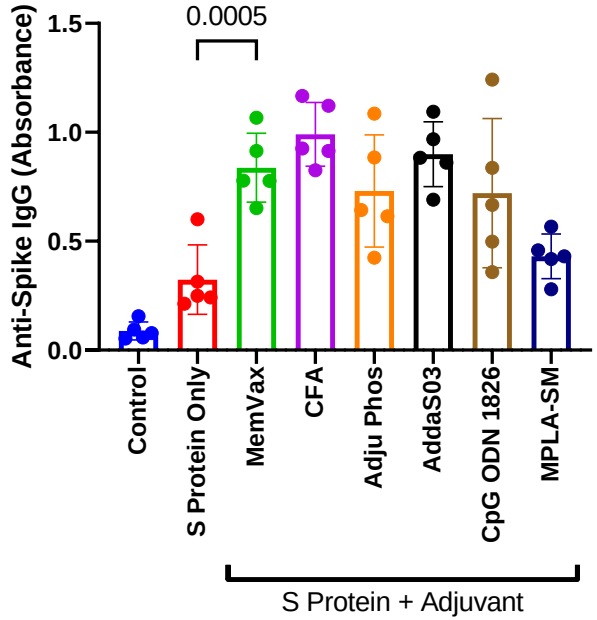
Th1 and Th2 Cellular Immune Response





MemVax outperforms all other adjuvants, plus Th1 > Th2 response

Antibody Response



All adjuvants capable of enhancing antibody response

CFA (Complete Freund's Adjuvant); Adju Phos (aluminum phosphate gel); AddaSO3 (GSK AS03 homologue); CpG ODN 1826 (TLR9 agonist CpG Dynavax homologue); MPLA-SM (monophosphoryl lipid A).

Memgen unpublished mouse data