NASDAQ:HTBX

October 2017

Forward Looking Statements

This presentation includes statements that are, or may be deemed, ‘‘forward-looking statements’’ within the meaning of the Private Securities Litigation Reform Act of 1995, as amended. In some cases, these forward-looking statements can be identified by the use of forward-looking terminology, including the terms “believes,” “estimates,” “anticipates,” “expects,” “plans,” “intends,” “may,” “could,” “might,” “will,” “should,” “approximately” or, in each case, their negative or other variations thereon or comparable terminology, although not all forward-looking statements contain these words. They appear in a number of places throughout this presentation and include statements regarding our intentions, beliefs, projections, outlook, analyses or current expectations concerning, among other things, our ongoing and planned discovery and development of drugs targeting cancer, the strength and breadth of our intellectual property, our ongoing and planned preclinical studies and clinical trials, the timing of and our ability to make regulatory filings and obtain and maintain regulatory approvals for our product candidates, our ability to partner our product development, the degree of clinical utility of our products, particularly in specific patient populations, expectations regarding clinical trial data, our results of operations, financial condition, liquidity, prospects, growth and strategies, the length of time that we will be able to continue to fund our operating expenses and capital expenditures, our expected financing needs and sources of financing, the industry in which we operate and the trends that may affect the industry or us.

By their nature, forward-looking statements involve risks and uncertainties because they relate to events, competitive dynamics, and healthcare, regulatory and scientific developments and depend on the economic circumstances that may or may not occur in the future or may occur on longer or shorter timelines than anticipated. Although we believe that we have a reasonable basis for each forward-looking statement contained in this presentation, we caution you that forward-looking statements are not guarantees of future performance and that our actual results of operations, financial condition and liquidity, and the development of the industry in which we operate may differ materially from the forward-looking statements contained in this presentation as a result of, among other factors, the factors referenced in the “Risk Factors” section of our Annual Report on Form 10-K for the year ended December 31, 2016 and our quarterly report on Form 10-Q for the subsequent quarters (collectively, our “SEC Filings”). In addition, even if our results of operations, financial condition and liquidity, and the development of the industry in which we operate are consistent with the forward-looking statements contained in this presentation, they may not be predictive of results or developments in future periods. Any forward-looking statements that we make in this presentation speak only as of the date of such statement, and we undertake no obligation to update such statements to reflect events or circumstances after the date of this presentation, except as required by law.

You should read carefully the factors described in the “Risk Factors” sections of our SEC Filings to better understand the risks and uncertainties inherent in our business.

Investment Opportunity

POTENTIAL BEST-IN-CLASS
Activation of
Cancer-Killing CD8+ T-cells

Multiple Platform **TECHNOLOGIES**

ROBUST Pipeline of **COMBINATION Therapies**

Favorable **Safety Profile**

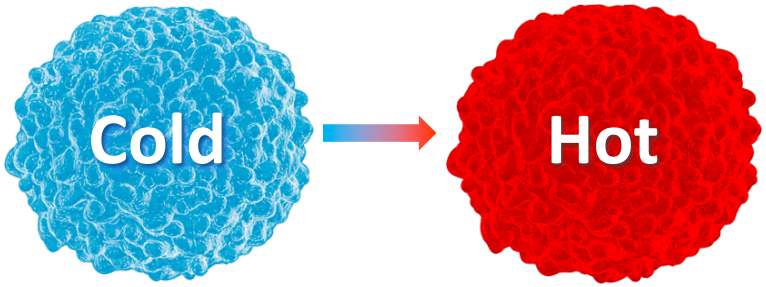
Signals in lung cancer with

CHECKPOINT Inhibitors

Heat Biologics - Turning COLD Tumors HOT

Mission

Our Mission is to Activate CD8+ ”Killer” T-cells to Turn “COLD” Tumors “HOT”



We seek to combine with checkpoint inhibitors and other immunotherapies to dramatically increase their effectiveness

Heat Biologics

What are COLD and HOT tumors?

Cold Tumors

Tumors that have not been subject to robust CD8+ "Killer" T-cell attack

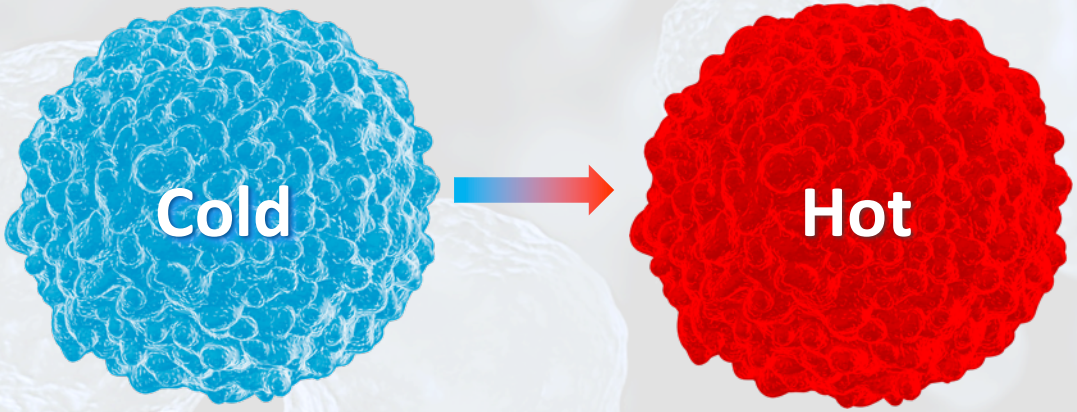
Biopsied tumors contain minimal CD8+ T-cells

Hot Tumors

Tumors that have been subject to robust CD8+ "Killer" T-cell attack

Biopsied tumors are loaded with CD8+ T-cells

***HOT** tumors are associated with clinical response*



Turning **COLD** Tumors **HOT**

Heat Biologics

The Checkpoint Revolution

Checkpoint inhibitors are revolutionizing cancer treatment standard-of-care

- Five checkpoint inhibitors approved since 2014
- Additional checkpoint approvals for new indicators expected late-2017

Checkpoint inhibitors are projected to:

1. *Treat up to **60%** of cancers*
2. *Generate **$30B - $40B** revenues per year*

- Citibank, Goldman Sachs

Approved Checkpoint Inhibitors

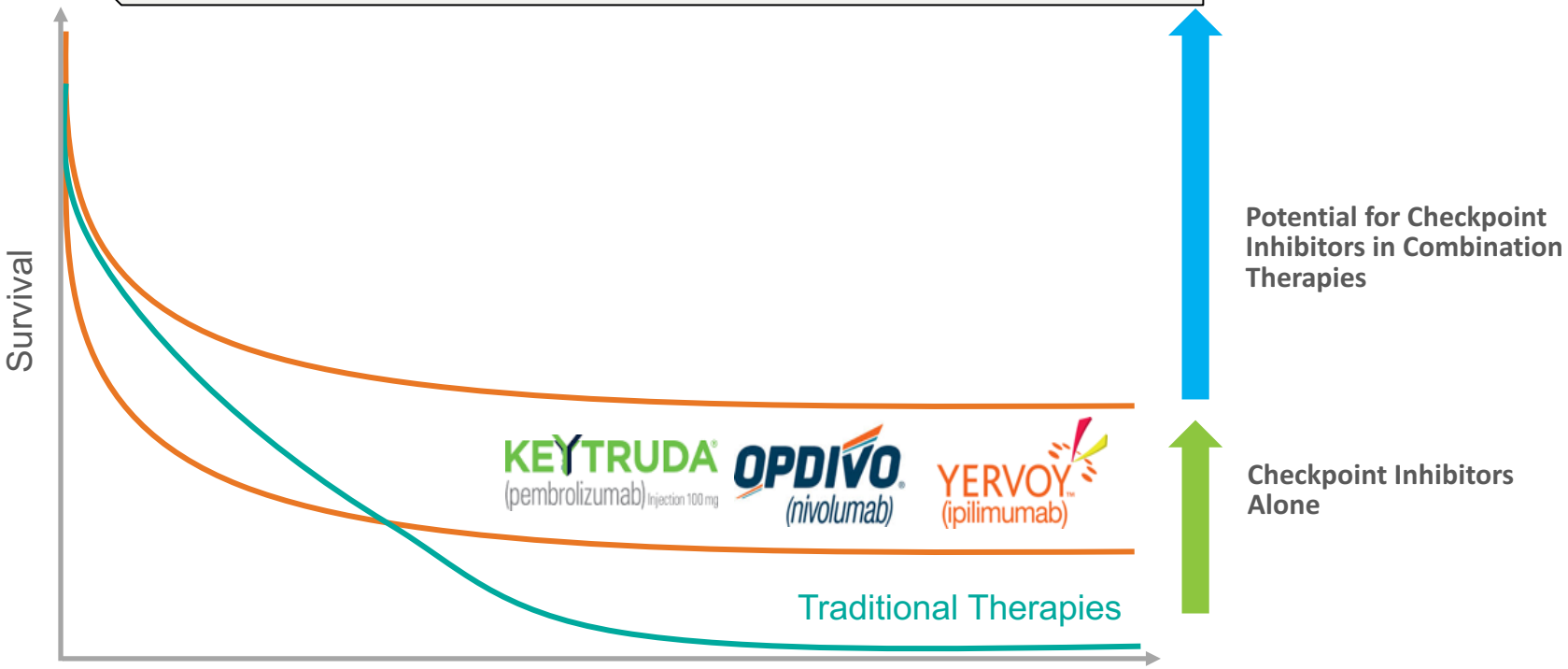
Targets	Drug	Company	Approved Indications
CTLA-4	Ipilumumab	BMS	Metastatic melanoma
PD-1	Nivolumab	BMS	Metastatic melanoma NSCLC Bladder cancer Hodgkin lymphoma Renal cell carcinoma
PD-1	Pembrolizumab	Merck	Metastatic melanoma NSCLC Head and neck
PD-L1	Atezolizumab	Genentech	Bladder cancer
PD-L1	Avelumab	Pfizer	Merkel cell carcinoma

But there is a problem…

The Problem with Checkpoints

Checkpoint inhibitors dramatically increase survival in patients with **HOT** tumors

They are largely ineffective in patients with COLD tumors



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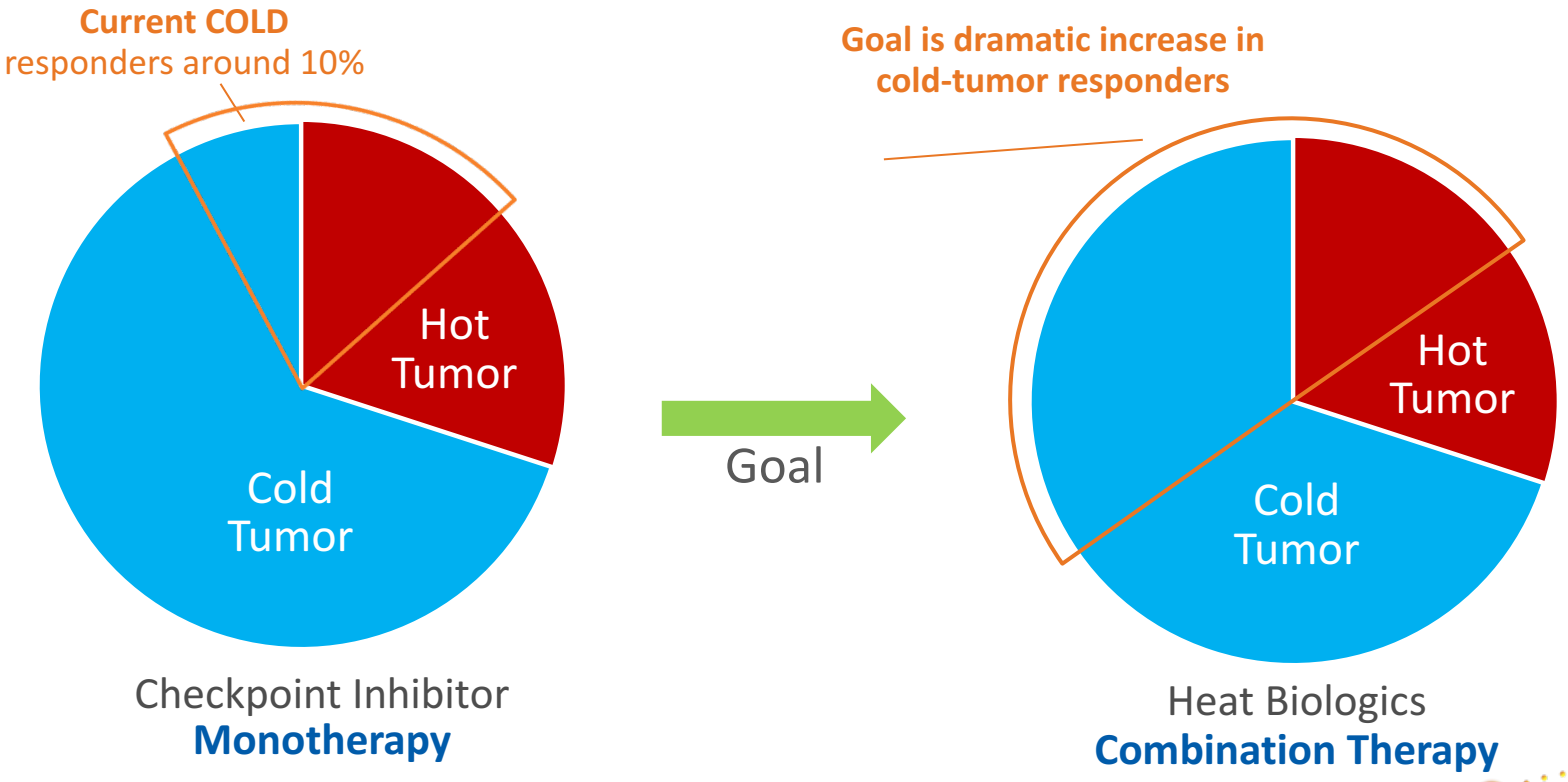
Turning COLD Tumors HOT

By turning COLD *tumors* HOT…

Heat Biologics seeks to dramatically increase the number of patients responding to checkpoint inhibitors



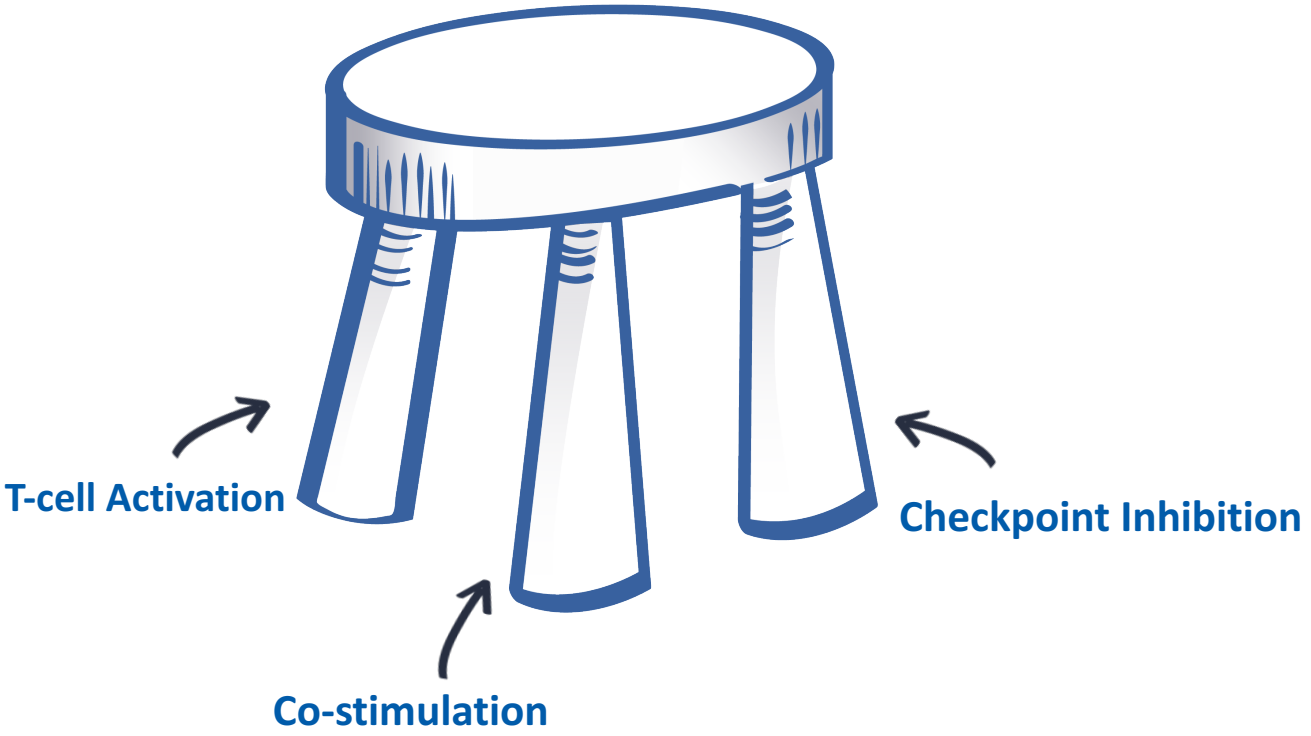
Checkpoint Inhibitor
Monotherapy

Heat Biologics
Combination Therapy

Heat Biologics

Immuno-oncology Combination Therapy

The 3 Legs of an Immuno-oncology Stool

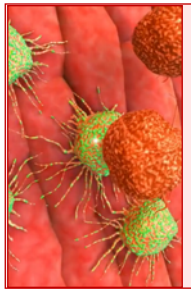


Heat Biologics

Combination Therapies

Unlocking the Body's Natural Defenses with a Broad Range of Combination Therapies

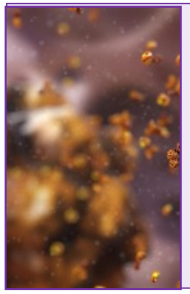
T-cell Activation



***ImPACT®* Therapy**

Cell-based Delivery of Multiple Antigens

Activation of Patients' CD8+ "Killer" T-cells



***ComPACT™* Therapy**

Cell-based Delivery of Multiple Antigens

Activation of Patients' CD8+ "Killer" T-cells

Co-Stimulation

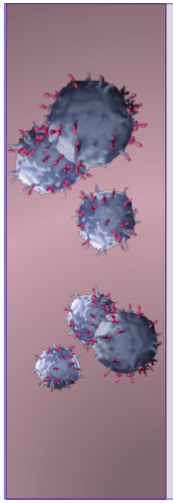
Pelican **PTX-35**
Monoclonal Antibody

Pelican **PTX-15**
Fusion Protein

Co-Stimulation to Enhance T-cell Activation and Expansion

Combined with

Checkpoint Inhibitors



PD1/PDL1

CTLA-4

Lag-3

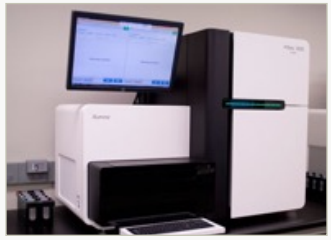
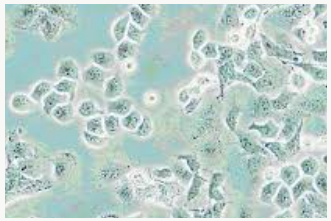
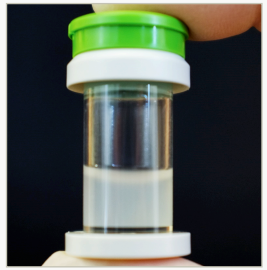
TIM-3

Plus others

Heat Biologics

ImPACT®/ComPACT™ Manufacturing

Robust, Multi-antigen T-cell Activation

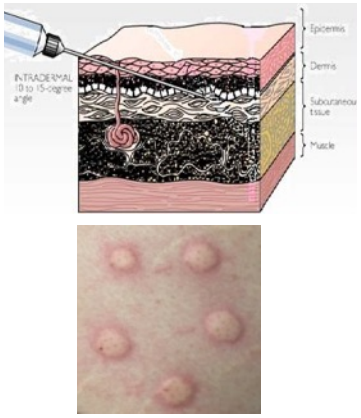
Sample	Screen	Select	Scale-Up
Collect Cancer Cell Line & Patient Tissue Samples 	Compare Using Our Proprietary Technology 	ID Cell Line with Most Antigen Overlap  Transfect with Activation Technology	Scale-up for Manufacturing by CMO 

- Same process for *ComPACT* and *ImPACT*
- Frozen, fully-diluted single-dose vial
- Final drug product: 1 million or 10 million cells
- Easily scaled manufacturing

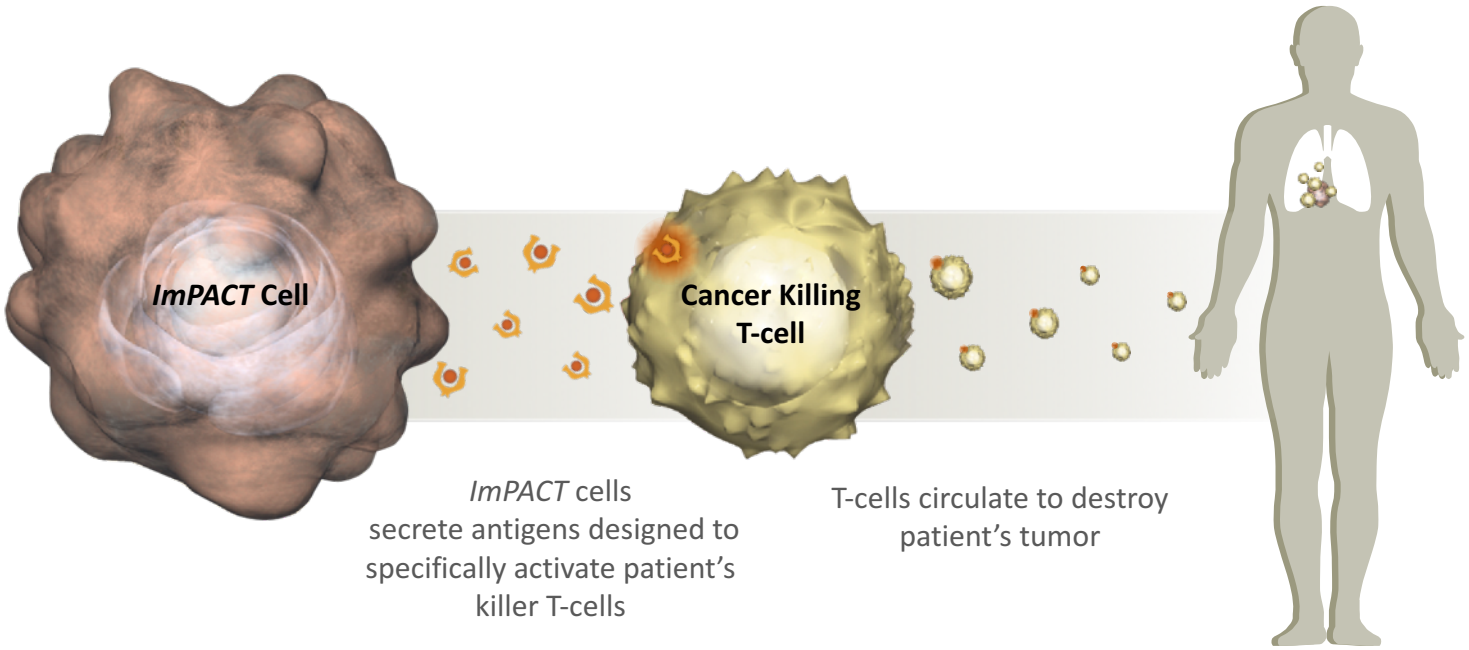
Low COG, off-the-shelf alternative to autologous therapies

Heat Biologics

ImPACT: Immune Pan-antigen Cytotoxic Therapy

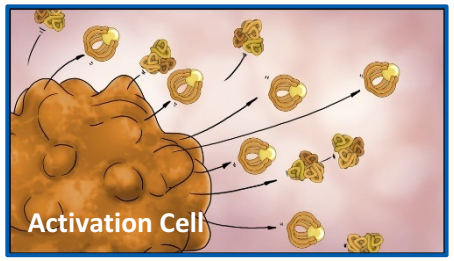


Cluster of five 0.1 mL intradermal injections

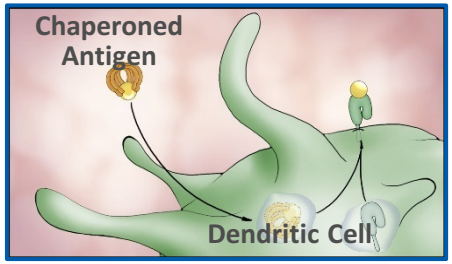


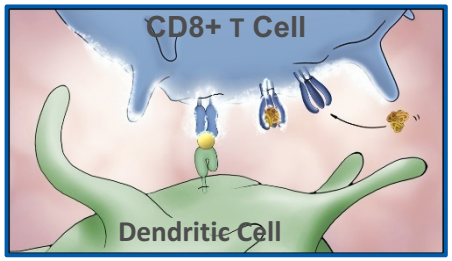
ImPACT cells secrete antigens designed to specifically activate patient's killer T-cells

T-cells circulate to destroy patient's tumor

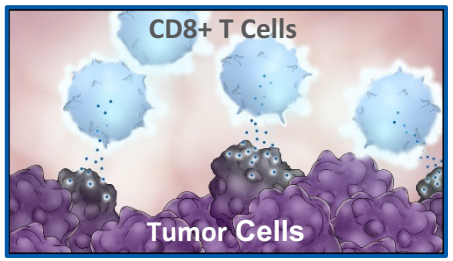


Activated cells **EXPRESS** chaperoned antigens





Chaperoned antigens activate dendritic cells, which then **ACTIVATE** & **PROLIFERATE** CD8+ T-cells



CD8+ T-cells locate and **ELIMINATE** cancer cells

Heat Biologics

Heat Pipeline

Combination Therapies Designed to Activate CD8+ T-cells to Fight Cancer

Combination Therapies	Indication	Phase	Comments
HS-110 (viagenpumatucel-L)	**NSCLC**	**Phase 2**	*ImPACT* activation technology in combination with nivolumab and other checkpoint inhibitors TBA
HS-120	**NSCLC**	**Pre-clinical**	*ComPACT* activation technology in combination with checkpoint inhibitors TBA
Co-Stimulators			
PTX-35	**TBA**	**Pre-clinical**	Humanized monoclonal antibody, functional agonist of human TNFRSF25 ($15.2M CPRIT grant)
PTX-15	**TBA**	**Pre-clinical**	TL1A-Ig fusion protein, functional agonist of human TNFRSF25

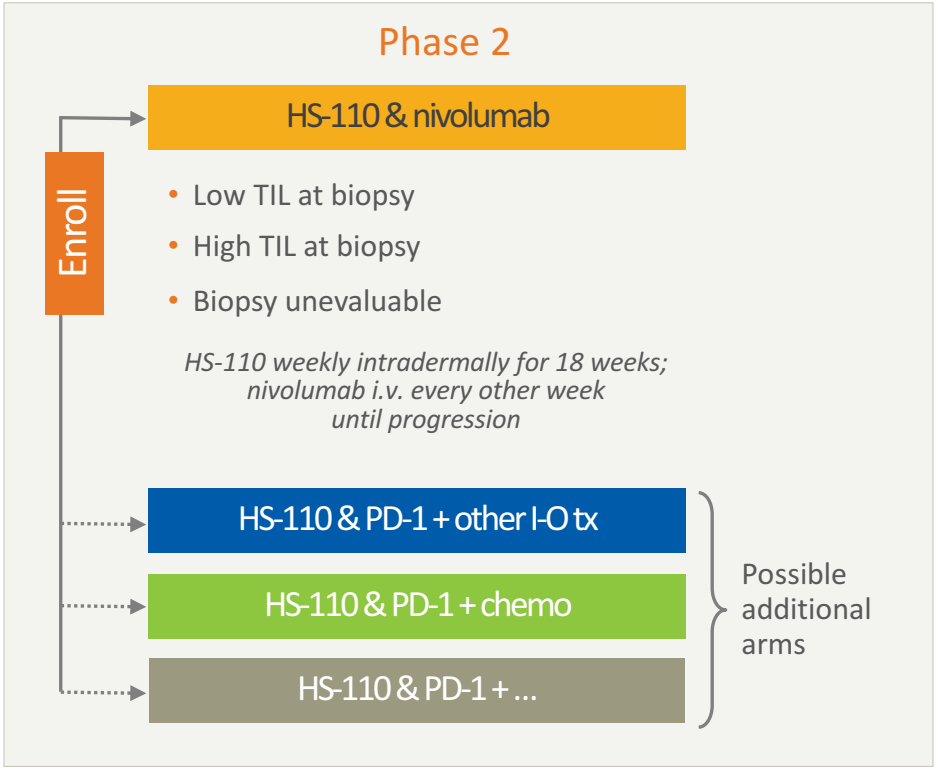
- Clinical proof of mechanism activating an immune response
- Activated T-cell immune response seen at 10 weeks
- T-cell infiltration seen deep inside tumors
- Positive safety profile, to-date

Met Clinical Endpoints to Progress to Phase 2

HS-110 Phase 2 Lung Trial Design

Flexible trial design permits additional combinations

Objective	• Evaluate objective response rate of HS-110 with a PD-1 checkpoint inhibitor • Currently 2nd line therapy or greater
Patient Population	• Phase 1b expanded to Phase 2 in 1Q17
Secondary Endpoints	• Safety and tolerability, immune response, overall survival and progression-free survival
Enrollment	• 5-10 U.S. sites • Up to 60 patients • Partnership with Yale Cancer Center on TIL analysis



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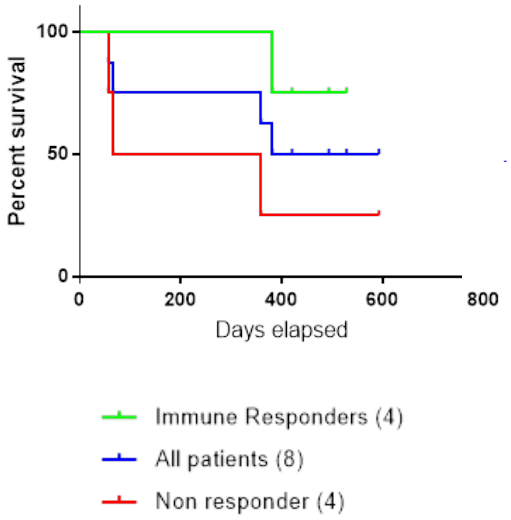
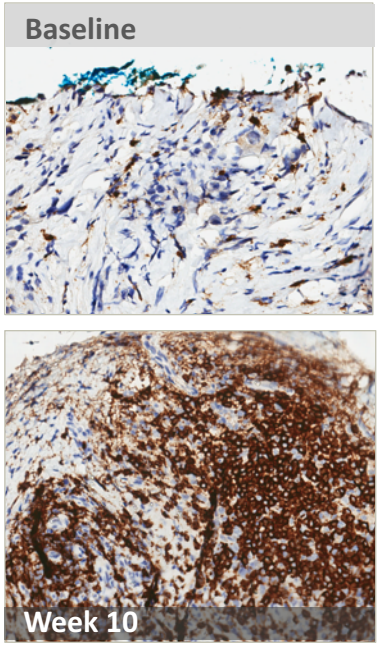
Activated Immune Response Correlates to Clinical Response

Overall Survival



Source: HS-110 Ph 1b NSCLC data (left); HS-110 Ph 1b NSCLC data reported at World Lung Dec. 2016 (right)

Response at Week 10



Key Findings

- Immune response to HS-110 observed in all 5 patients with reduced tumors; no reduced tumors in patients without immune response
- Immune response timing to HS-110 corresponded to clinical responses
- 60% (3 out of 5) patients enrolled in the low TIL cold tumor cohort **exhibited substantial tumor reduction**
- **Exceeds 10% response** observed in low TIL patients treated with nivolumab alone

Source: March, 2017 Heat Biologics Trial Update

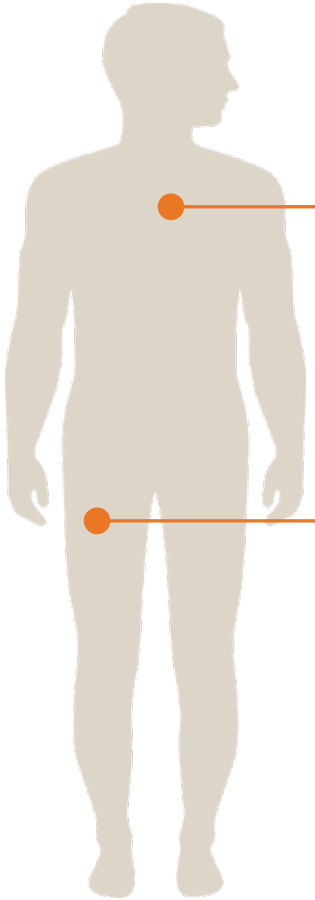
Heat Biologics

Positive Safety Signals

1,000+ Doses – No Serious Adverse Reactions

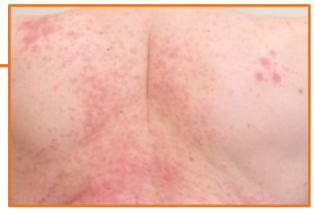
Favorable Safety Profile To Date

- Over 1,000 doses administered to ~200 patients
- Only one patient ended treatment due to a non-serious adverse reaction*
- No systemic use of steroids required to treat reactions
- No serious adverse reactions
- No additive toxicities



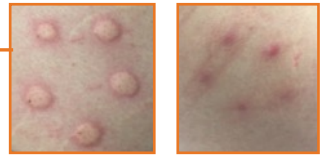
Immune Reaction*

≤ Grade 3 toxicity



Injection Reactions

Week 1 Week 2



*Represents the only patient of ~200 patients dosed who discontinued treatment for a study related adverse event

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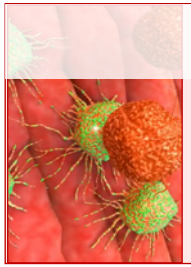
T-cell Co-Stimulation

T-cell Co-stimulation to Enhance Immune Response Against Cancer

T-cell Activation

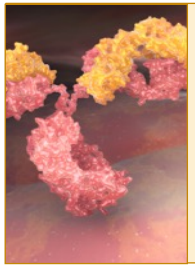


***ImPACT* Therapy**

Cell-based Delivery of Multiple Antigens

Activation of Patients' CD8+ "Killer" T-cells

Co-Stimulation

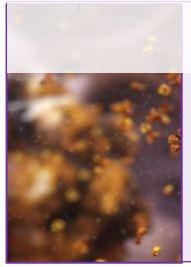


Pelican **PTX-35**

Monoclonal Antibody

Pelican **PTX-15**

Fusion Protein



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CO-STIMULATORS			
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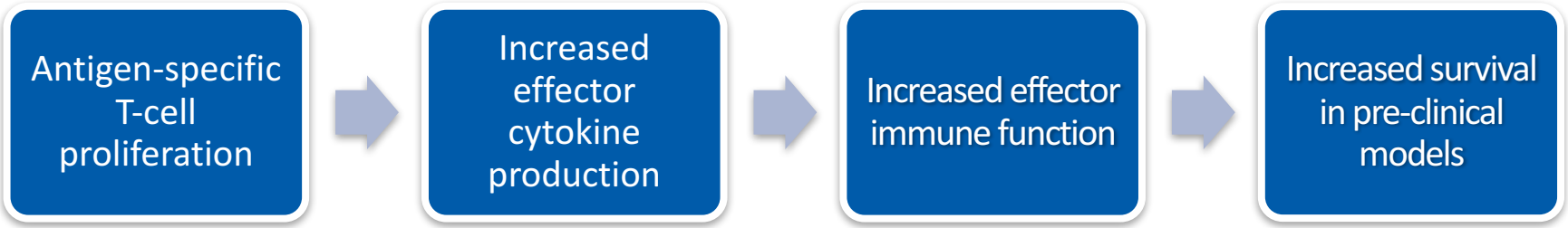
Heat Biologics Acquires Pelican Therapeutics

- Heat **acquired 80% controlling interest** in Pelican
- Pelican to operate as a subsidiary in Texas
- Pre-clinical synergy with Heat's *ImPACT* and checkpoint therapy
- **$15.2M grant award** from the Cancer Prevention Research Institute of Texas (CPRIT) propels PTX-35 through a **~70-patient, first-in-human clinical program**
- PTX-35 is a potential **best-in-class T-cell co-stimulator** specific to "killer" CD8+ "memory" T-cells

Pre-clinical studies highlight advantages over competing T-cell co-stimulator programs based on CD8+ T-cell specificity



Emerging Target in T-cell Co-Stimulation

Many companies are pursuing co-stimulators with less specificity for CD8+ "memory" activation

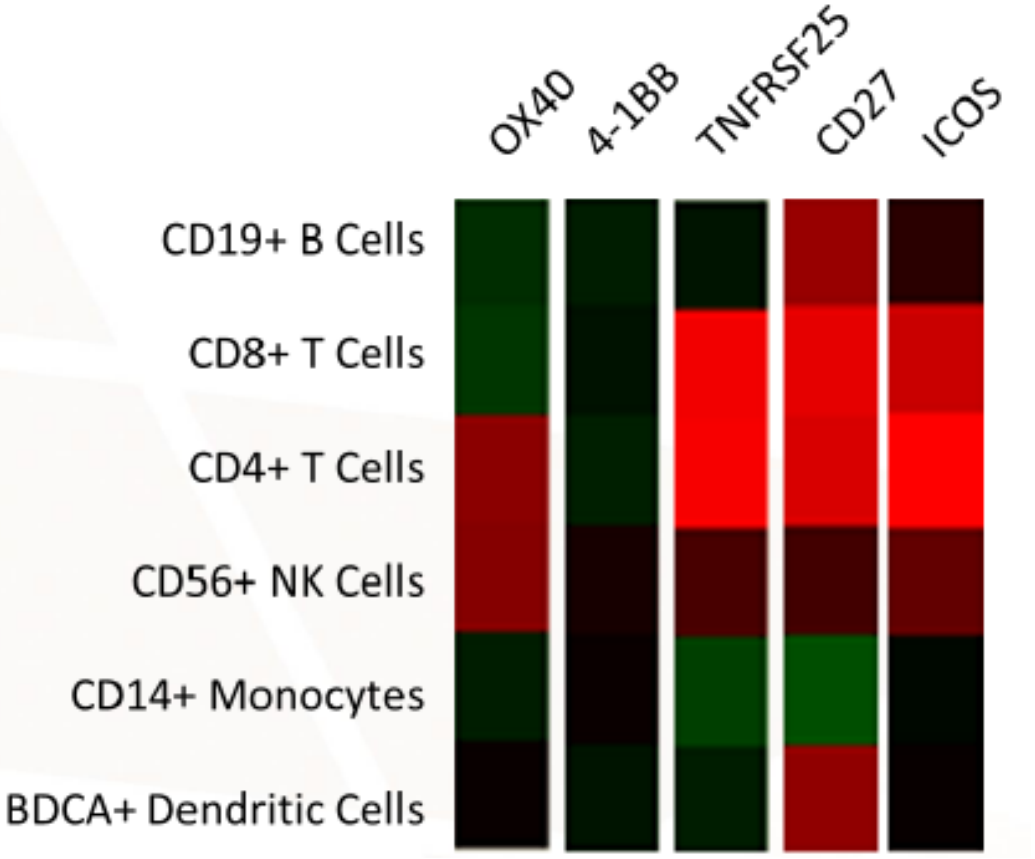
Target	Lead mAb	Clinical Stage	Companies	Comments
4-1BB/4-1BBL	Urelumab, PF-05082566	Phase 1/2	BMS Pfizer	Original phase 2 halted, now enrolling at lower doses
CD27	Varlilumab	Phase 2	BMS Celldex	mAb works by ADCC, no clinical evidence of agonism
OX40/OX40L	MEDI0562, MEDI6383	Phase 1	Genentech GSK Medimmune	Enrolling
GITR	TRX518	Phase 1	Merck	Enrolling
CD40/CD40L	CP-870893	Phase 1	Pfizer	Enrolling
HVEM/BTLA		Pre-clinical	BMS	IND Enabling
HVEM/LIGHT		Pre-clinical	BMS	IND Enabling
TNFRSF25/TL1A	**PTX-35, PTX-15**	**Pre-clinical**	**HEAT/PELICAN**	**IND Enabling**

None of these co-stimulators have advanced beyond phase 2 trials

Only Pelican is targeting TNFRSF25, an emerging target in immuno-oncology

Expression of T-cell Co-stimulators

TNFRSF25 is preferentially expressed on CD8+ T-cells compared to other T-cell co-stimulators



(red = high expression)

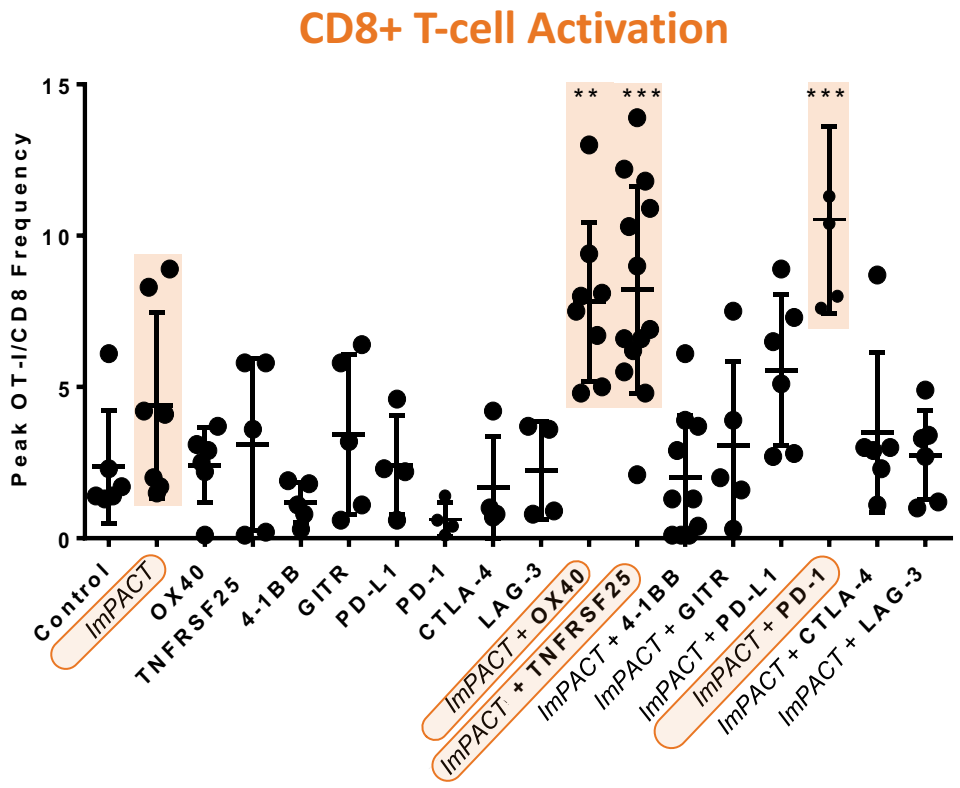
Genomics Institute of the Novartis Research Foundation

Su *et al*. PNAS 2004:**101**(16);6062-7

Heat Biologics

Pre-clinical Data

Strong supporting pre-clinical data



- Higher T-cell responses observed in mice treated with *ImPACT* alone
- *ImPACT* boosted CD+ T-cells to even higher levels when combined with co-stimulator agonist antibodies: OX40, TNFRSF25, PD-1
- Findings suggest synergies when combining *ImPACT* with Pelican's TNFRSF25 antibody

Source: Fromm et al. Society for Immunotherapy of Cancer Annual Meeting, 2016

Heat Biologics

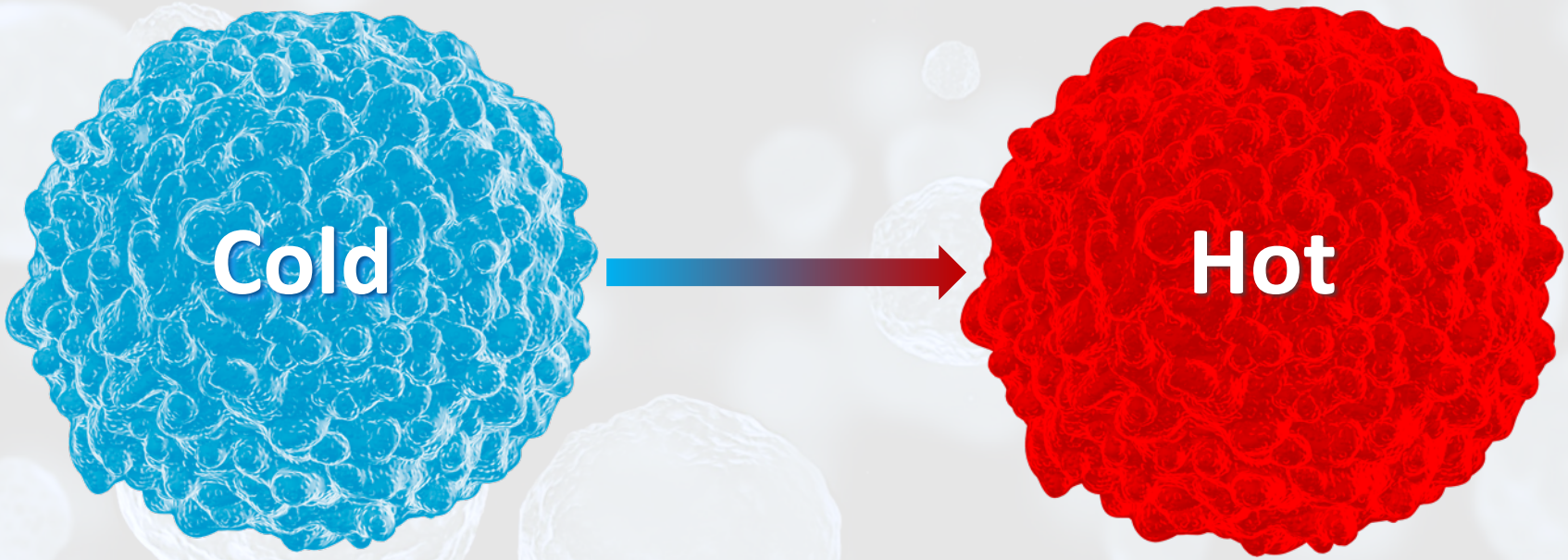
Corporate Highlights

Nasdaq **HTBX**	Shares Outstanding **35.8M**[2]	Shares Price **$0.64**[1]
Market Cap **$22.9M**[1]	Cash & Equiv. **$8.3M**[2]	Grant Funds **$15.2M**

1. Closing price as of October 12, 2017
2. Reported as of June 30, 2017

Heat Biologics

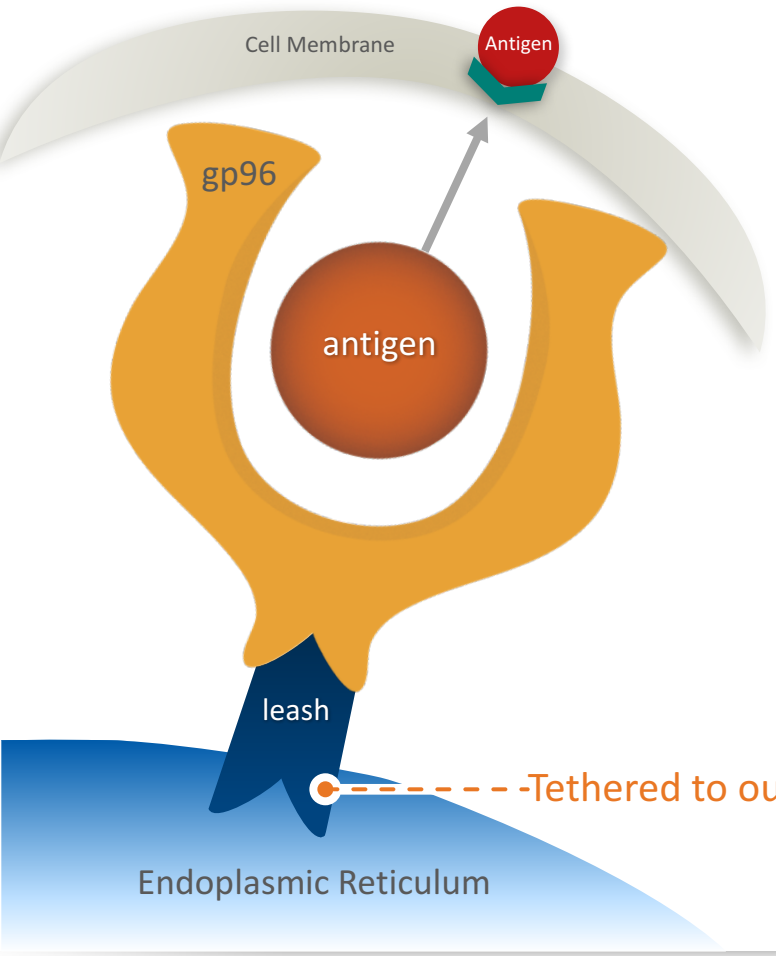
Turning **COLD** Tumors **HOT**



Appendix

Introducing gp96

*The Immune System's "Swiss Army Knife"**



"Molecular Warning System"

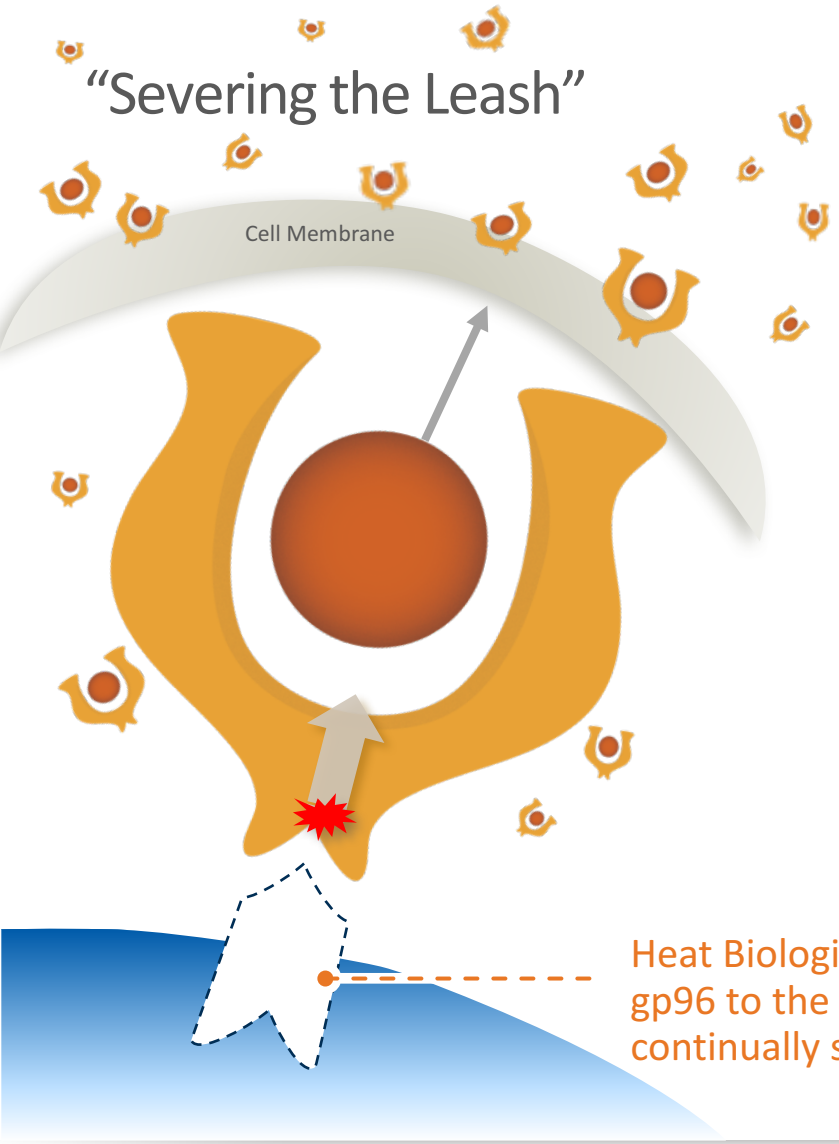
- Natural biological process to deliver proteins (antigens) & gp96 adjuvant to our immune system
- Gp96 "chaperones" newly-created proteins to the cell membrane where they are released and embedded
- Activates a cytotoxic T-cell response to the antigen it is carrying when cells die through necrosis
  - Enables MHC I antigen cross-presentation to CD8+ T-cells
- Gp96 + protein are only naturally released via necrosis
  - Exposure of gp96 outside the cell activates an immune response to the antigen it is carrying
  - Enables MHC I antigen cross-presentation specifically to CD8+ T-cells
- Among the most powerful adjuvants and the only adjuvant to show exclusive specificity to CD8+ ("killer") T-cells
  - Provides long-term immunity against the infectious agent

-Tethered to our cells with a "KDEL" leash

*Schild, H. & Rammensee, H. ***Gp-96 – The Immune System's Swiss Army Knife***. Nature Immunology 2, 100-101 (2000)

Heat Biologics

ImPACT Therapy



Heat Biologics *ImPACT* technology reprograms cancer cells to continuously secrete their own antigens bound to heat shock protein gp96 to seek out and destroy a variety of tumors

- Genetically modify tumor cells by "severing the leash" that binds the gp96 to the endoplasmic reticulum of the cell and replacing it with a sequence that pumps gp96 out of the cell
- Enables living cancer cells to "pump-out" their own surface antigens along with their gp96 chaperone
  - Mimics necrotic cell death
- Activates a powerful pan-antigen cytotoxic T-cell immune response

Heat Biologics ***ImPACT*** technology removes the leash that binds gp96 to the cell, replacing with a sequence that allows cells to continually secrete gp96 along with their "chaperoned" antigen

Heat Biologics

Substantial Antigenic Overlap with Patient Tumors

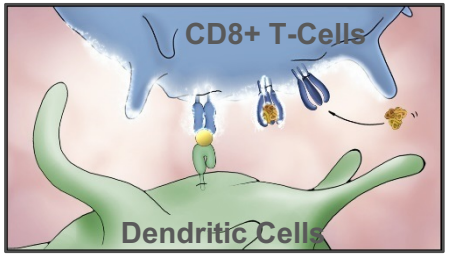
HS-410 selected due to high expression of >30 shared cancer antigens

Antigen	HS-410
ACTL8	+++
ADAM22	+++
ADAM23	+++
ATAD2	+++
ATAD2B	+++
BIRC5	+++
CASC5	+++
CEP290	+++
CEP55	+++
CTAGE5	+++
DCAF12	+++
DDX5	+++
FAM133A	+++
IL13RA2	+++
IMP3	+++
KIAA0100	+++
MAGEA11	+++
MAGEA3	+++
MAGEA6	+++
MPHOSPH10	+++
ODF2	+++
ODF2L	+++
OIP5	+++
PBK	+++
RQCD1	+++
SPAG1	+++
SPAG4	+++
SPAG9	+++
TMEFF1	+++
TTK	+++

>15 antigens also found in individual patient tumors

Antigen	23-002	25-001	25-004	25-005	25-003	25-007	25-008
ACTL8	–	–	–	–	–	–	–
ADAM22	+++	+++	++	+++	+++	+++	+++
ADAM23	+	++	+++	–	+++	+++	+++
ATAD2	+++	+++	–	+++	+++	+++	+++
ATAD2B	+++	+++	–	+++	+++	+++	+++
BIRC5	+++	+++	–	–	++	++	+++
CASC5	+++	+++	++	++	+++	+++	+++
CEP290	+++	+++	++	+++	+++	+++	+++
CEP55	+++	+++	++	++	+++	++	++
CTAGE5	+++	+++	++	+++	+++	+++	+++
DCAF12	+++	+++	–	+++	+++	+++	+++
DDX5	+++	+++	–	+++	+++	+++	+++
FAM133A	–	–	–	–	+	–	–
IL13RA2	++	++	–	–	+	+++	–
IMP3	+++	+++	–	+++	+++	+++	+++
KIAA0100	+++	+++	–	+++	+++	+++	+++
MAGEA11	+	+	+++	–	–	–	+
MAGEA3	–	+	++	–	+	–	++
MAGEA6	–	++	–	–	+	–	++
MPHOSPH10	+++	+++	+++	+++	+++	+++	+++
ODF2	+++	+++	++	+++	+++	+++	+++
ODF2L	+++	+++	–	+++	+++	+++	+++
OIP5	++	+	+++	+	+	++	+
PBK	+++	++	+++	–	+	+	++
RQCD1	+++	+++	++	+++	+++	+++	+++
SPAG1	++	+++	+++	+++	+++	+++	+++
SPAG4	++	++	–	++	++	+	++
SPAG9	+++	+++	+++	+++	+++	+++	+++
TMEFF1	–	+	–	–	–	–	–
TTK	+++	+++	–	+	++	++	+

This information used to track T-cells antigen specificity



Source: Heat's HS-410 Phase 1 trial results

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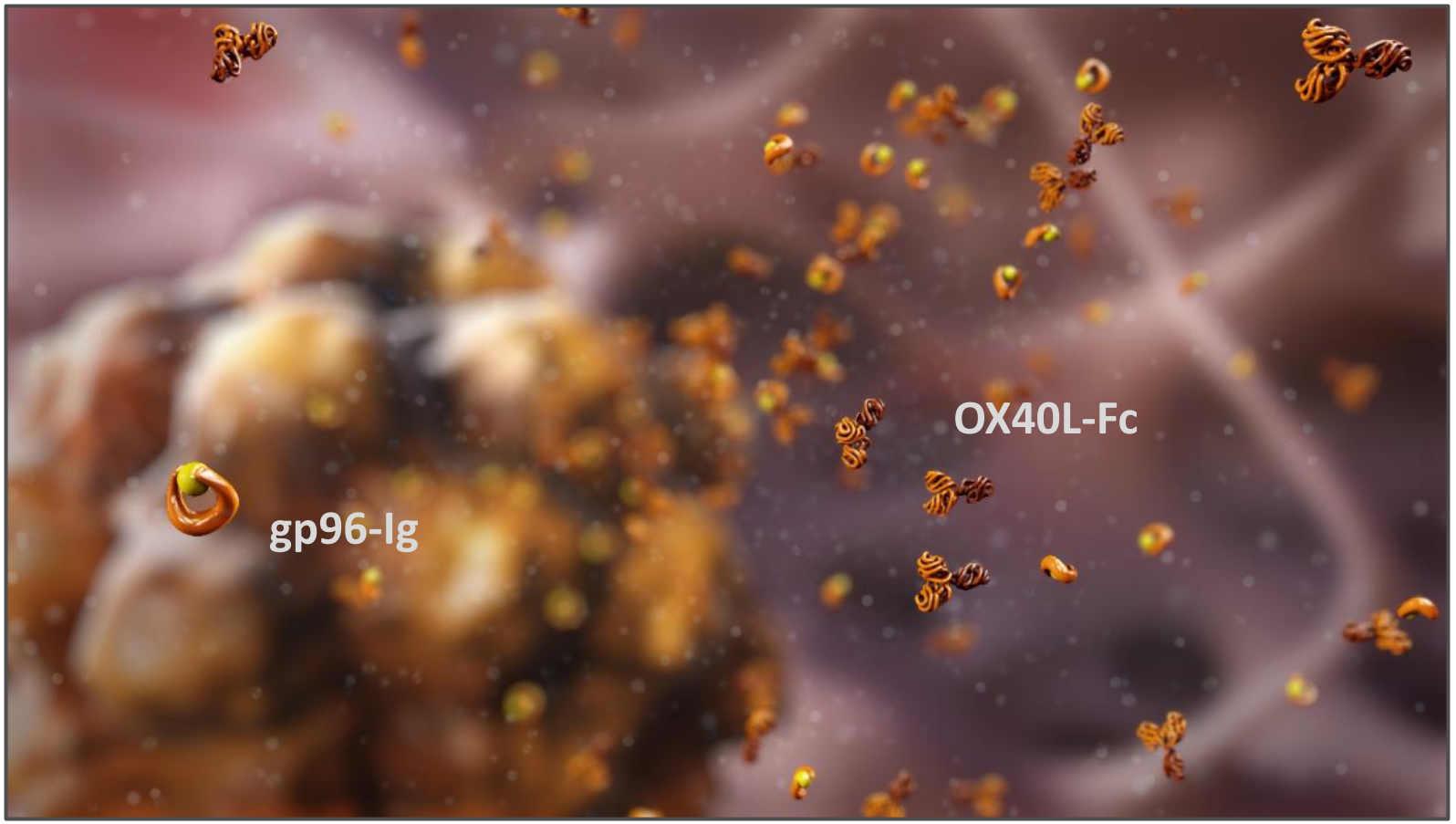
ComPACT Platform Technology



The first potential dual-acting immunotherapy designed to deliver T-cell activation and co-stimulation in a single product – combination therapy without additive costs

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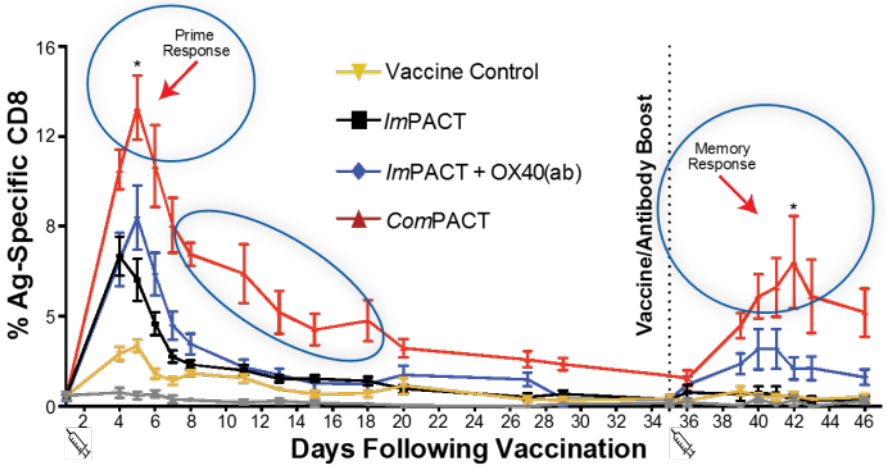
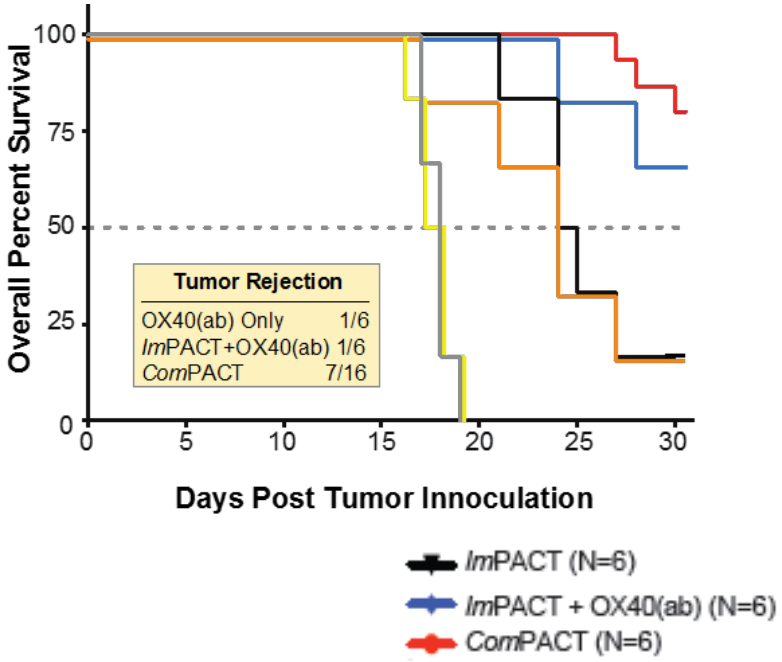
ComPACT Outperforms OX40 Monoclonal Antibodies in Pre-clinical Models

Superior primary and memory T-cell response in mouse model



Translates into increased overall survival and tumor reduction in a mouse tumor model



ComPACT generates ~50% complete tumor rejection compared to ~16% with OX40 agonist antibody combinations

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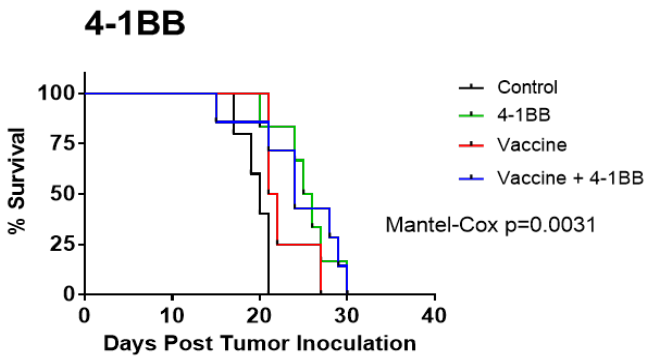
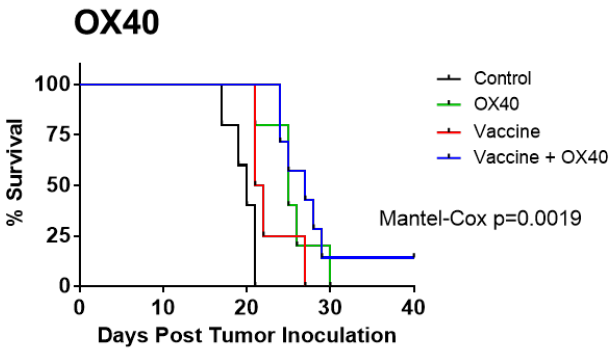
PTX-35 Comparative Pre-clinical Anti-tumor Activity

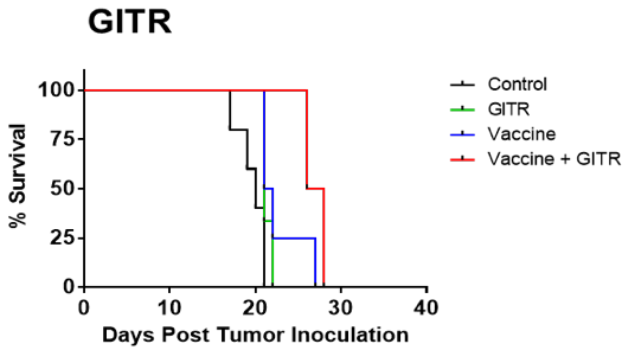
Activity of agonists TNFRSF25, 4-1BB, OX40 and GITR during 9-day B16-F10 melanoma model

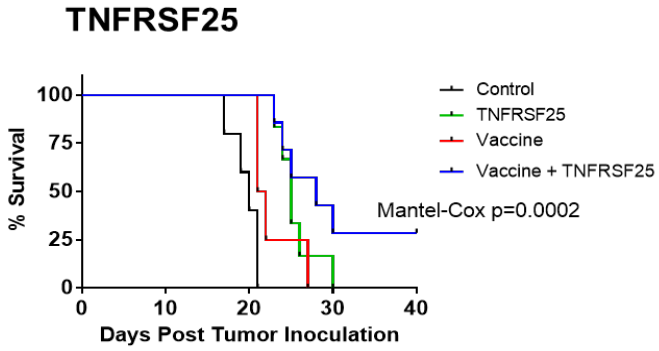
4-1BB and GITR agonists have a moderate impact on survival

TNFRSF25 agonist leads to markedly increased survival compared to other co-stimulatory antibodies









TNFRSF25 agonists leads to increased survival compared to other co-stimulatory antibodies

Schreiber T. *et al*. SITC 2014

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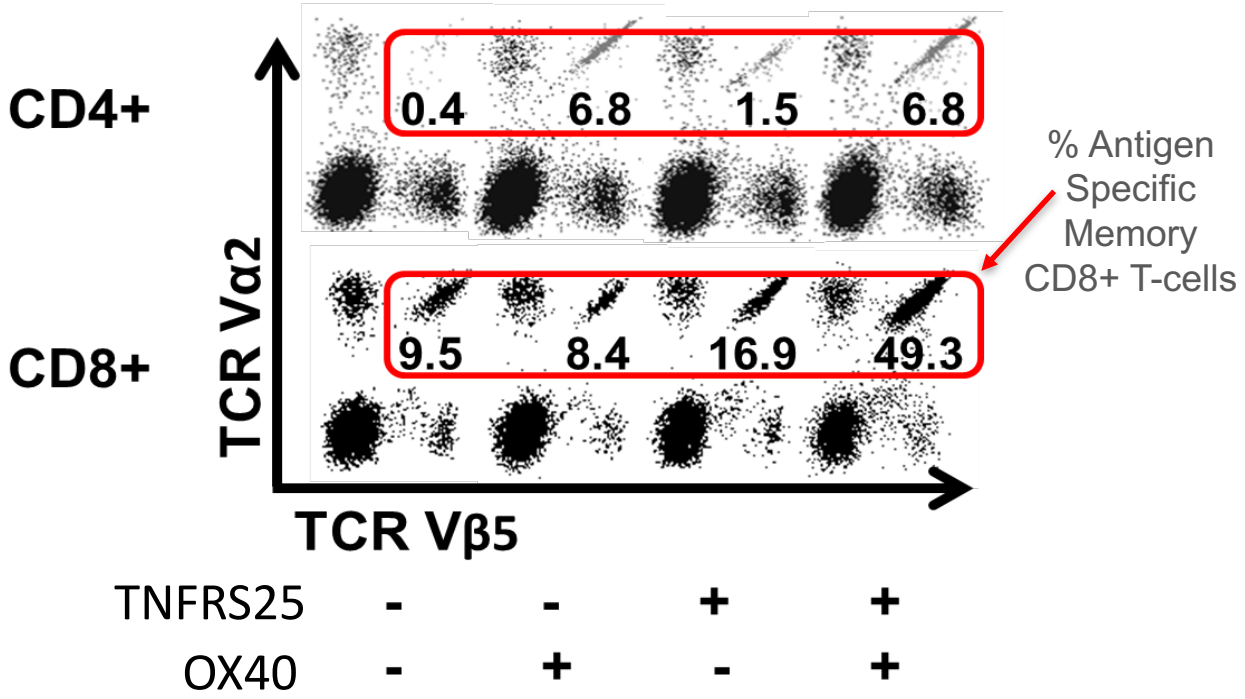
Preferential CD8+ T-cell Induction with TNFRSF25

Pre-clinical studies with murine agonist antibody shows preferential CD8+ T-cell Induction; differentiation from other T-cell co-stimulators

The frequency of antigen-specific memory CD4+ or memory CD8+ T-cells following treatment of mice with *ImPACT* alone, or in combination with OX40 or TNFRSF25 antibodies



TNFRSF25 preferentially 'boosts' CD8+ T-cell immunity, whereas OX40 is preferential to CD4+ T-cells

Schreiber et al. J Immunol 2012:189(7);3311-8

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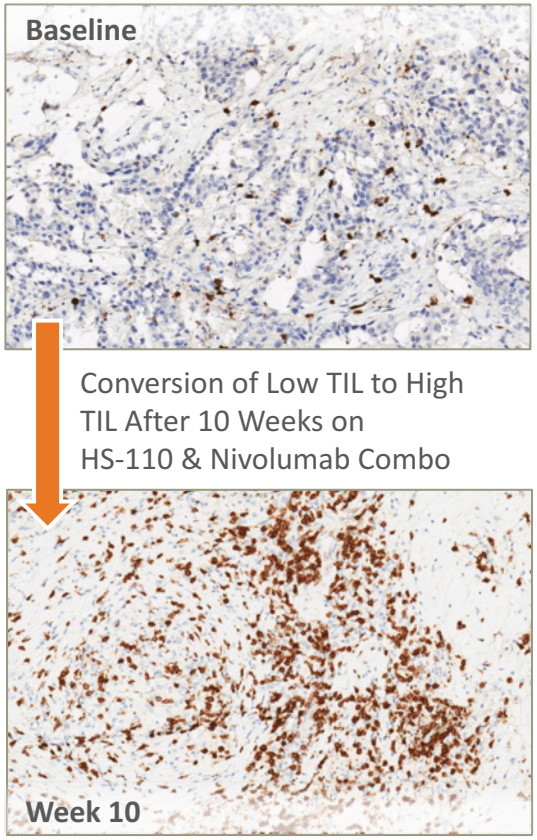
T-cell Tumor Infiltration

T-cell Infiltration Observed Deep Inside Tumors

CD8+ Staining



Clinical evidence that HS-110 is turning COLD tumors HOT

- "Killer" CD8+ T-cells driven deep into tumors
- "Cold" tumors with no previous activation made highly active ("HOT")
- Expression of PD-L1 increased with CD8+ T-cell infiltration in some tumors

Source: Data extracted from a patient as reported in Heat's HS-110 Ph 1b NSCLC trial results, Dec 2016

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Highlights from Pelican Pre-clinical Studies

- mAb to TNFRSF25:
  - Drives the development of **antigen-specific CD8+ T-cells** (mimics TL1A, the specific ligand of TNFRSF25)
  - Equals co-stimulation and expansion of antigen-experienced memory T-cells: CD4+ and CD8+
  - Significantly enhanced effect on **memory CD8+ T-cells**
  - Co-stimulation occurs only in the context of **TCR recognition of antigen**
- **Superior activity** is seen with TNFRSF25 in stimulating memory CD8+ cells relative to OX40, 4-1BB and GITR
- Agonism with TNFRSF25 mAb increases:
  - **Effector cytokine function**
  - **Effector immune function**
  - **Survival in mouse models**
- In mouse melanoma models, TNFRSF25 mAb results in increased survival **compared to agonism of OX40, GITR, 4-1BB** with respective agonist mAbs