Creating Smarter T Cells to Transform Treatment and Change Lives
Forward-looking statements

This presentation contains forward-looking statements. All statements other than statements of historical facts, including statements regarding our future results of operations or financial condition, business strategy, and plans and objectives of management for future operations, are forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as “believe,” “will,” “may,” “estimate,” “continue,” “anticipate,” “intend,” “should,” “plan,” “expect,” “predict,” “could,” “potentially,” or other similar expressions. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends, which we believe may affect our financial condition, results of operations, business strategy, and financial needs.

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Tmunity is developing the next generation of cutting-edge cancer therapies

We are a private, clinical stage, vertically integrated biotech company developing the next generation of cutting-edge CAR-T and TCR immunotherapies to cure cancer and save lives

Our focus is on developing products to address some of the most challenging solid tumors and underserved hematological cancers

We are restoring hope for patients
Built on a world-class foundation

Clinical Portfolio
PSMA CAR-T
TnMUC1 CAR-T
NY-ESO-1 TCR-T

Preclinical Portfolio
Licensed 12+ additional assets from UPenn, UCSF and CHOP

Foundation
Founded in 2015 with exclusive license to UPenn cell therapy technologies

People
~60 employees; 70% with cell and gene therapy experience

Financing
$10M seed
$135M A round
$75M B round
$231M raised to-date

Manufacturing
Building viral vector and cell therapy product manufacturing
Tmunity’s competencies:
Positioned to overcome the problems with current therapies

Expanding cell therapies to patients earlier in the treatment paradigm of every cancer

Radically reducing costs associated with current therapies

Experts in Synthetic Biology and Cell and Gene Engineering

Industry leading and highly innovative pipeline

Manufacturing the right product

Execution of pipeline via unique model

January 2020
Tmunity’s innovation to disrupt the tumor microenvironment

- Optimizing how the CAR-T/TCR ‘sticks to the target’
- Making T-cells express more than one targeting ‘warhead’

- Novel co-stimulators energizing cells
- Additional signal boosting that supercharges cells

- Using CRISPR gene-editing to knock-out checkpoints
- ‘Armoring’ cells to concurrently target checkpoints
- Adding payloads to make cells persist and endure

- Breaching the protective matrix surrounding the tumor
## Innovative pipeline of potentially transformative therapies

<table>
<thead>
<tr>
<th>Program</th>
<th>Indication</th>
<th>Preclinical Development</th>
<th>IND-Enabling</th>
<th>Phase 1</th>
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<tr>
<td><strong>Solid Tumors</strong></td>
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<tr>
<td>PSMA CAR-T</td>
<td>Metastatic castrate-resistant prostate cancer</td>
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<tr>
<td>NY-ESO-1 TCR-T Triple Knockout TCR (NYCE**)</td>
<td>Melanoma, synovial sarcoma</td>
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<tr>
<td>TnMUC1 CAR-T</td>
<td>Advanced TnMUC1 positive solid tumors</td>
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<td>FAP CAR-T</td>
<td>Pancreatic cancer, NSCLC, other solid tumors</td>
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<td>GPC2 CAR-T****</td>
<td>Neuroblastoma, neuroendocrine tumors</td>
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<td>H3.3K27M TCR***</td>
<td>Diffuse intrinsic pontine glioma</td>
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<td>IL13 Rα2 CAR-T</td>
<td>Glioblastoma</td>
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<td>PSCA CAR-T</td>
<td>Prostate cancer</td>
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<td><strong>Liquid Tumors</strong></td>
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<td>NY-ESO-1 TCR-T Triple Knockout TCR (NYCE**)</td>
<td>Multiple myeloma</td>
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<tr>
<td>CD33HSC/CD33 CAR-T</td>
<td>Acute myeloid leukemia</td>
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The table illustrates our discovery programs and opportunities as of January 2020 * Full pipeline not shown ** NYCE- New York CRISPR-edited ***In collaboration with UCSF **** In collaboration with CHOP
Potential for multiple therapeutic franchises

Hematologic Tumors

- Hematology Franchise (Myeloma and AML)
  - NY-ESO-1 KO TCR
  - CD33 HSC/CD33 CAR-T

Solid Tumors

- CNS Franchise
  - H3.3K27M TCR
  - GPC2 CAR-T
  - IL13 Ra2

- Lung Franchise
  - TnMUC1

- Pancreatic Franchise
  - TnMUC1

- Prostate Franchise
  - PSMA
  - PSCA

- Ovarian Franchise
  - TnMUC1

January 2020
PSMA*: Opportunity in metastatic castrate-resistant prostate cancer

![Image](https://cancerstatisticscenter.cancer.org)

**Challenge:**
- ~20% of prostate cancer patients develop mCRPC within 5 years of diagnosis

**Program status:**
- 12 patients dosed across 5 cohorts (enrollment in cohort 4 and cohort 5 ongoing)
- Opened Tmunity-sponsored trial with additional dosing options and sites

**Future milestones**
- Identify phase 2 dose (4Q20) and commence phase 2 trial (2021)
- Explore path to progress PSMA CAR-T therapy rapidly in the earlier treatment paradigm
- Life-cycle: humanized CAR-T, multivalency

* Prostate Specific Membrane Antigen  https://cancerstatisticscenter.cancer.org
PSMA-TGFβDN* CAR-T: Structure of the clinical CAR

- **antigen recognition**
  - Single chain variable fragment (scFv) from *murine scFv domain J591* recognizing the PSMA antigen
  - **Extracellular targeting domain**

- **subcellular localization**
  - **CD8 Transmembrane linker**

- **signaling**
  - **CD3ζ** costimulatory domain delivers initial activation signal in the CAR-T
  - **Intracellular signaling 1**
  - **4-1BBζ** T cell signaling and amplification domain delivers signal 2 in the CAR-T
  - **Intracellular signaling 2**

- **TGFβDN receptor** Renders the T cell “uninhabitable” by a key immunosuppressive pathway linked to the myeloid compartment “The Armor”

*PSMA-TGFβDN: Prostate Specific Membrane Antigen-Transforming Growth Factor beta Dominant Negative*
**Key differentiator: TGFβ (Transforming growth factor beta)**

*A potent immunosuppressor of T-Cells expressed in prostate cancer tumor microenvironment*

TGFβ receptor type I and II couple to complete signaling mechanism leading to T-cell immunosuppression and anergy.
PSMA CAR-T & TGFβ dominant negative receptor type II

A dual mechanism of action targeting approach in prostate cancer

The lentiviral vector contains coding for both a PSMA CAR-T and a TGFβ DNR-II.

The TGFβ DNR-II has a truncated component preventing coupling with TGFβ R-I and blocking signaling within T-cell.

January 2020
Expansion kinetics in first three cohorts compared with CD19 based CAR-T expansion

The first patient in cohort 3 (first to receive LD) demonstrated increased expansion kinetics when compared to the expansion of CTL019 (CD19 CAR-T) in acute lymphoblastic leukemia patients with CD19 CAR-T.

Source: Unpublished data, University of Pennsylvania
Data from PSMA-01
Patient 1 Cohort 3: Medical History and Clinical Course

• 72 year old male originally diagnosed with non-metastatic prostate cancer in 2006 and diagnosed as metastatic in 2014
• Treatments included: surgery, radiation and four lines of standard therapy
• Patient had a low disease burden with bone-only disease (non-measurable by RECIST criteria) at presentation
• Although the Grade 4 CRS was resolving, the patient developed enterococcal septicemia
• The patient passed away due to sepsis

^RECIST = response evaluation criteria in solid tumors; CRS = cytokine release syndrome

Source: Unpublished data, University of Pennsylvania
Phase I trial: CART-PSMA-TGFβRDN cells for metastatic castrate-resistant prostate cancer (mCRPC)

Study Design and Planning: A single center, single arm Phase I study to establish the safety and feasibility of intravenously administered lentivirally transduced dual PSMA-specific/TGFβ-resistant CAR modified autologous T-cells (CART-PSMA-TGFβRDN cells) in patients with metastatic castrate-resistant prostate cancer

ClinicalTrials.gov Identifier: NCT03089203

TGFβ Transformational Growth Factor Beta
Cy Cyclophosphamide
Flu Fludarabine
CT c/a/p Computer Tomography chest, abdomen, pelvis
PSA Prostate Specific Antigen

Follow-up every 3 months until 2 years; long term follow-up until 15 years

Day 0 Day 28
CT c/a/p staging, bone scan research studies, PSA
Month 2 Safety and research
PSA

Day 1 Day 7 Day 10 Day 14 Day 21
CT c/a/p staging, bone scan research studies, PSA

* Enrollment will follow in succession from Cohort 1 to Cohort 4; **Lymphodepletion (LD) regimen: Cytoxan + Fludarabine x 3 days
PSMA-02 Trial: CART-PSMA-TGFβRDN Phase 1 to explore dosing
Single infusion v. fractionated dosing to manage toxicity

**Study Design and Planning:** A multi-center, single arm Phase I study to establish the safety and feasibility of lentivirally transduced dual PSMA-specific/TGFβ-resistant CAR modified autologous T-cells (CART-PSMA-TGFβRDN cells) in patients with metastatic castrate-resistant prostate cancer (ClinicalTrials.gov Identifier: NCT04227275)

- **Confirm mCRPC and tumor PSMA expression**
- **Study screening, apheresis, T-cell manufacture, disease staging**

**CART cell infusion**
- **COHORT 1:** Single dose with LD, 1-3 x 10^7
- **COHORT 2:** Single dose with LD, 5-6 x 10^7
- **COHORT 3:** Fractionated dose with LD, 1-3 x 10^8
- **COHORT 4:** Fractionated dose with LD, 5-6 x 10^8
- **COHORT 5:** Single dose with LD, 5-6 x 10^8

**Follow-up:**
- **Safety and research**
  - Day 0
  - Days 1, 3, 7, 10, 14, 21
  - Day 28:
    - CT c/a/p staging, bone scan research studies, PSA
    - Month 2:
      - Safety and research PSA
    - Month 3:
      - CT c/a/p staging, bone scan research studies, PSA
    - Month 6:
      - CT c/a/p staging, bone scan research studies, PSA
  - Frequent follow-up until 2 years; long term follow-up until 15 years

**Lymphodepletion (LD) regimen:** Cytoxan + Fludarabine x 3 days

January 2020
TnMUC1: Potential high-value target
First patient dosed safely

**NON-SMALL CELL LUNG CANCER**
Incidence (U.S.): 194K
5 yr OS (metastatic): 6%

**PANCREATIC CANCER**
Incidence (U.S.): 57K
5 yr OS (metastatic): 3%

**TRIPLE NEGATIVE BREAST CANCER**
Incidence (U.S.): 41K
5 yr OS (metastatic): 11%

**OVARIAN CANCER**
Incidence (U.S.): 22.5K
5 yr OS (metastatic): 29%

**MULTIPLE MYELOMA**
Incidence (U.S.): 32K
5 yr OS (R/R*): 22%

Program status:
- Clinical sites initiated in 4Q19
- First patient dosed; Expect to dose 3 cohorts in 2020

All statistics for U.S.: [https://seer.cancer.gov/statfacts](https://seer.cancer.gov/statfacts), Overall Survival (OS) in the metastatic (distant) stage of cancer
* R/R: relapsed / refractory
TnMUC1 targeting abnormal glycosylation

Gastric epithelial cell: TnMUC1 only found in the Golgi complex as a precursor to the epithelial lining (mucin1)

Normal tissue heavily glycosylated mucin1

Normal glycosylated mucin1

Cancer with aberrant “stumpy” TnMUC1

Under-glycosylated mucin1

Ovarian cancer cell: Stumpy mucin1 (TnMUC1) generated as the enzyme process to glycosylate the mucin1 protein backbone is disabled

COSMC mutations thought to enhance the process of metastasis by permitting easy slippage of transformed cells to the extracellular space
TnMUC1 CAR-T improved signal boosting vs. first-generation CAR-Ts leading to a more persistent product
**TnMUC1-01 Trial: CART-TnMUC1 in initial dose escalation**

**Study Design and Planning:** A multi-center, two parallel arms Phase I/Ia study to establish the safety and feasibility of intravenously administered lentivirally transduced TnMUC1-targeting CAR modified autologous T-cells (CART-TnMUC1 cells) in patients with advanced solid tumors or relapsed/refractory multiple myeloma (ClinicalTrials.gov Identifier: NCT04025216)

- **Confirm TnMUC1 expression**
  - Cohort 1 (ST) 1-2 x 10^7 tr cells Without LD
  - Cohort 1 (MM) 1-2 x 10^7 tr cells Without LD
  - Cohort 2 (ST) 1-2 x 10^7 tr cells With Flu/Cy
  - Cohort 2 (MM) 1-2 x 10^7 tr cells With Flu/Cy
  - Cohort 3 (ST) 5-6 x 10^7 tr cells With Flu/Cy
  - Cohort 3 (MM) 5-6 x 10^7 tr cells With Flu/Cy
  - Cohort 4 (ST) 1-2 x 10^8 tr cells With Flu/Cy
  - Cohort 4 (MM) 1-2 x 10^8 tr cells With Flu/Cy
  - Cohort 5 (ST) 5-6 x 10^8 tr cells With Flu/Cy
  - Cohort 5 (MM) 5-6 x 10^8 tr cells With Flu/Cy
  - Cohort 6 (ST) 1-2 x 10^9 tr cells With Flu/Cy
  - Cohort 6 (MM) 1-2 x 10^9 tr cells With Flu/Cy

- **Follow-up:** Safety and research
  - Day 0 CART Infusion
  - Days 1 3 7 10 14 21
    - Disease assessments (restaging)
    - Safety and research
  - Day 28
    - Month 2 Safety and research
    - Translational endpoints
    - MM restaging
  - Month 3
    - ST/MM
    - Restaging
  - Month 6
    - Follow-up every 3 months until 2 years; long term follow-up until 15 years

- Enrolment will follow in succession from Cohort 1 to Cohort 5
- **LD** Lymphodepletion (LD) regimen: Cytoxan + Fludarabine x 3 days
- MM: multiple myeloma; ST: solid tumors; Flu/Cy: fludarabine/cyclophosphamide; LD: lymphodepletion; tr cells: transduced cells

January 2020
NY-ESO-1-TCR: 1st CRISPR-based product tested in humans
One of the top 10 Science News stories of 2019*

✓ Tmunity has developed in-house gene-editing capabilities, including multiplexing via CRISPR

✓ Tmunity has proven ability to manufacture a CRISPR-based product

✓ Tmunity building upon current in-house gene-editing platform for translation to manufacture of future allogeneic therapies

• First clinical of evidence of CRISPR edited T cells persisting in circulation in 3 patients with myeloma and sarcoma
• Data presented at American Society of Hematology in Dec 2019

*Science News Dec 16th 2019
NY-ESO-1-TCR: First clinical evidence of CRISPR edited T cells persisting in circulation

- All patients received out-patient T cell infusion and required no hospitalization by day 28
- No CRS or Neurotoxicity
- Best response: Stable Disease

Source: Stadtmauer E., et. al., American Society of Hematology Dec 7th 2019
Phase I trial of autologous T-cells engineered to express NY-ESO-1 TCR and CRISPR gene edited to eliminate endogenous TCR and PD-1 (NYCE T-cells)

This is a first-in-human trial proposed to test HLA-A*0201 restricted NY-ESO-1 redirected T-cells with CRISPR edited endogenous T-cell receptor and PD-1

ClinicalTrials.gov Identifier: NCT03399448

NY-ESO-1: New York Esophageal Squamous Cell Carcinoma -1, a well-known cancer-testis antigen (CTA)

CRISPR: Clustered Regular Interspaced Short Palindromic Repeats

HLA: Human Leukocyte Antigen

Follow-up:
Safety and research

Follow-up every 3 months until 2 years

Day 0
Days 1 3 7 10 14 21
Day 28
Staging, biopsy

Month 2
Month 3
Month 4,5,6

Staging
Building next-generation manufacturing

Reduced costs and improved reliability

### Capabilities

- Fully integrated product and process development
- Manufacturing expertise: Vector and T-cell
- Technology innovation and integration: cell and vector processing + analytics + automation + digital applications

**Timeline:**

- **2018**
  - Clinical CAR-T / TCR manufacturing @ UPenn
  - CRISPR-edited T-cell manufacturing capability @ UPenn

- **2019**
  - T-cell manufacturing platform technology transfer to Tmunity completed

- **2020**
  - Tmunity proprietary lentiviral manufacturing platform developed
  - Next-gen T-cell manufacturing platform developed

- **2021**
  - Tmunity in-house clinical vector manufacturing operational
  - Tmunity in-house clinical T-cell manufacturing operational

- **2022+**
  - Scale to meet global clinical and commercial development and supply
Advanced planning for commercial success

- Integration of real-world data and health technology assessments
- Implementation of novel pricing and reimbursement models
- Customized selling model focusing on new company capabilities in medical and account management
- Integration of chain of identity to medical center hubs

January 2020
Oct ‘19 Series B Closed: $75M Untranched
$231M raised-to-date

Penn
WESTLAKE VILLAGE BIOPARTNERS
ANDREESSEN HOROWITZ
PING AN VENTURES
Lilly Asia Ventures
PARKER INSTITUTE for CANCER IMMUNOTHERAPY
GILEAD
THE MATCH BioTherapies®
KLEINER PERKINS
American Cancer Society
BrightEdge
Pioneers for the upcoming decade in cell therapies

**First** to generate human data with an armored CAR in mCRPC
- CAR targeting prostate specific membrane antigen (PSMA)
- Armor-targeting checkpoint of transformation growth factor beta (TGFβ dominant negative receptor)

**First** to dose a patient with a CAR targeting a unique antigen in solid tumors (TnMUC1)
- Ovarian, pancreatic, non-small cell lung, triple negative breast

**First** to safely dose patients in the U.S. with a CRISPR-engineered TCR product and demonstrate persistence of edited cells
- Initial cohort of first-in-human in sarcoma and myeloma
2019 Accomplishments and Future Milestones:

**COMPLETED MILESTONES**

- First-in-human data from PSMA-01 CAR-T in mCRPC
- First patient dosed with TnMUC1 CAR-T
- Data on initial cohort of first-in-human CRISPR-engineered TCR product
- Delivered viral vector research-grade production, process dev, analytical dev and full tech-transfer of CAR-T platform
- Series B financing: $75 million

**FUTURE MILESTONES**

- Dose first 3 cohorts PSMA-02 trial, expand clinical site footprint (2020) and select phase 2 dose
- Commence phase 2 trial PSMA U.S. and ROW (2021)
- Establish safety TnMUC1-01 and develop signal in different tumor types, expand clinical site footprint
- Advance and file new INDs
- cGMP manufacturing readiness —vector (2020) + internal cell product manufacturing (2021)
Our approach: Developing next-generation cancer therapies

- Become the recognized world leader in T cell therapies with focus in solid tumors
- Forming vertically integrated company with manufacturing capability and early commercial insights
- Build rich pipeline with broad coverage of tumor type that lends to many franchises
- Established translational engine & best-in-class research and unique model with UPenn
- Assembled winning team with unique experiences: Founders & Management with track record in developing and commercializing CAR-T therapies