LAVA Therapeutics N.V.

IR Presentation – May 2021

Legal Disclosure

FORWARD-LOOKING STATEMENTS

This presentation contains statements that constitute forward-looking statements. Many of the forward-looking statements contained in this presentation can be identified by the use of forward-looking words such as “anticipate,” “believe,” “could,” “expect,” “should,” “plan,” “intend,” “estimate” and “potential,” among others. Forward-looking statements appear in a number of places in this presentation and include, but are not limited to, statements regarding our intent, belief or current expectations. Forward-looking statements are based on our management’s beliefs and assumptions and on information currently available to our management. Such statements are subject to risks and uncertainties, and actual results may differ materially from those expressed or implied in the forward-looking statements due to various important factors.

Forward-looking statements speak only as of the date of this presentation, and we do not undertake any obligation to update them in light of new information or future developments or to release publicly any revisions to these statements in order to reflect later events or circumstances or to reflect the occurrence of unanticipated events, except as required by applicable law. You should, however, review the factors and risks and other information we describe in the reports we will file from time to time with the Securities and Exchange Commission (“SEC”) after the date of this presentation. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified and some of which are beyond our control, you should not rely on these forward-looking statements as predictions of future events. Although we believe that we have a reasonable basis for each forward-looking statement contained in this presentation, the events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. We qualify all of our forward-looking statements by these cautionary statements.

This presentation includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties as well as our own estimates of potential market opportunities. All of the market data used in this presentation involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such data. Industry publications and third party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. Our estimates of the potential market opportunities for our product candidates include several key assumptions based on our industry knowledge, industry publications, third-party research and other surveys, which may be based on a small sample size and may fail to accurately reflect market opportunities. While we believe that our internal assumptions are reasonable, no independent source has verified such assumptions.

Company Overview

Highly experienced management team

Steve Hurly, MSc, MBA
President & CEO

- 25+ years of leadership experience in life sciences industry
- Former President and CEO, Sesen Bio, NASDAQ listed oncology biotech
- Extensive experience in strategic drug development
- 15+ years investment banking experience

Ton Adang, PhD
CDO

- Vast experience in drug development
- Former roles with Organon, Schering-Plough and Merck/MSD
- Leadership positions in Lead Discovery and Project Management (i.e. Merck's KEYTRUDA)

Paul Parren, PhD
EVP and Head of R&D

- Industry leader in antibody science and drug development
- Former Head of Preclinical Development and Research, Genmab
- Inventor of four marketed antibody products
- Vast experience inventing and developing therapeutic antibodies and technologies, incl. DARZALEX and DuoBody

Edward Smith
CFO

- >20 years of executive finance and operational leadership experience in publicly traded biotechnology companies
- Former CFO of Marinus Pharmaceuticals, PolyMedix, Inc

Hans van der Vliet, MD, PhD
CSO

- Medical oncologist, professor at the Department of Medical Oncology, Amsterdam UMC, location VUmc
- Inventor of LAVA's gamma-delta T cell engager platform
- Extensive experience as clinical investigator

Benjamin Winograd, MD, PhD
CMO

- Extensive experience in drug development programs in Hematology and Oncology
- Former roles with Bristol-Myers Squibb, Pharmacia, Schering-Plough, and Celgene
- Previous Clinical R&D Head for Multiple Myeloma at Celgene

Targeted engagement of gamma-delta T cells for the evolution of cancer care

- Proprietary platform of bispecific gamma-delta T cell engagers (gamma-delta bsTCE) leveraging distinct characteristics of Vγ9Vδ2 T cells for killing tumor cells
    - Subset of T cells with exciting anti-cancer potential
- Significant advantages over first-generation T cell engagers and gamma-delta T cells alone
- Strong *in/ex vivo* data set, including proof of a well tolerated safety profile in non-human primates
- Leaders in gamma-delta T cell research with a goal of becoming leaders in cancer drug development
- Collaboration with J&J established May 2020
- September 2020 $83M Series C from strong investors:
- IPO completed March 24, 2021 raising $107 million

Gilde HEALTHCARE
VERSANT ventures
SANOFI VENTURES
novo holdings Investors in life science
Redmile Group

LAVA is a biotechnology company with two programs entering Phase I/IIa in 2021 (1st CTA approved Mar ’21)

Pipeline across both hematologic and solid malignancies

γδ-bsTCE CANDIDATE	TAA / INDICATIONS	DISCOVERY	PRECLINICAL	PHASE I*	PHASE II**	PHASE III
LAVA-051	CD1d Initial focus on CLL, MM, and AML					
LAVA-1207	PSMA Initial focus on mCRPC					
LAVA-1223	EGFR/Solid tumors					
LAVA-1278	CD40/Initial focus on hematologic malignancies					
Janssen Biotech Collaboration	Vγ9Vδ2/cancer					

TAA: Tumor Associated Antigen

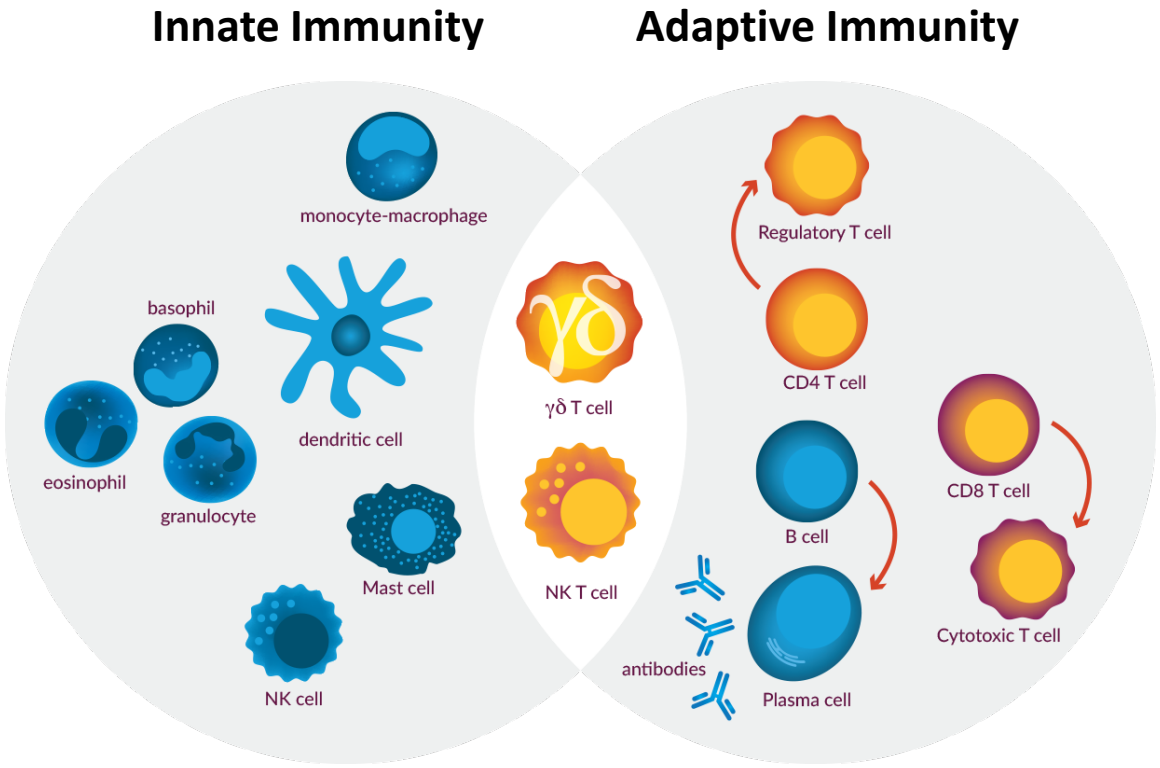
*the primary focus of Phase 1 programs is to test for safety and preliminary efficacy

**pending data, Phase 2 programs might be subject to accelerated approval

LAVA will consider seeking accelerated development strategies in patient populations with high unmet need

Gamma-Delta T Cells

Vγ9Vδ2 T cells have unique properties making them particularly suitable for an anti-cancer T cell engager approach



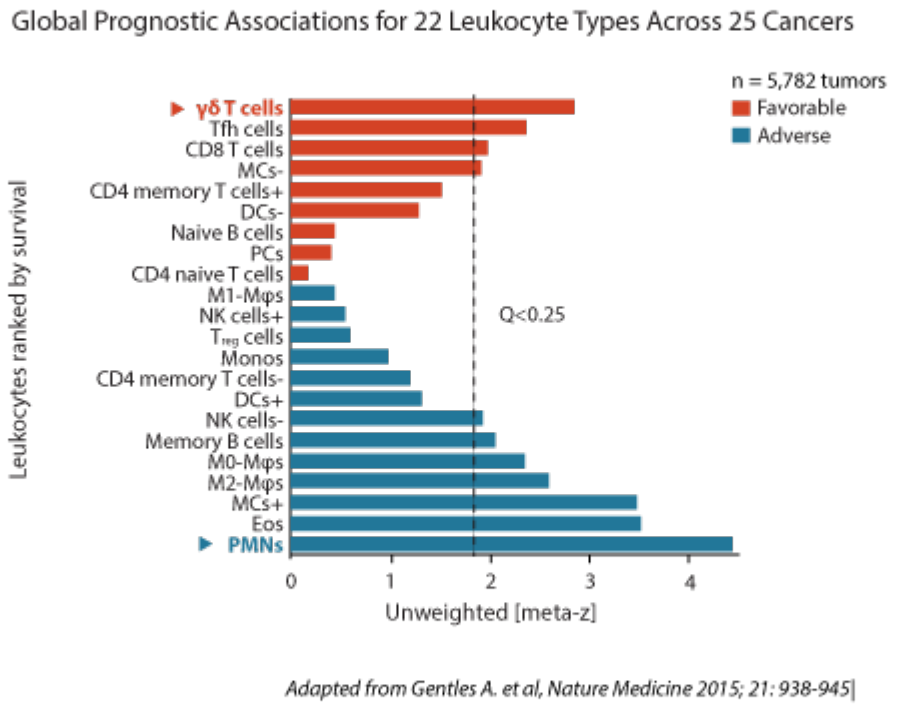
Adapted from Dranoff G., Nature Rev. Cancer 2004; 4: 11-22

Vγ9Vδ2 T cells:

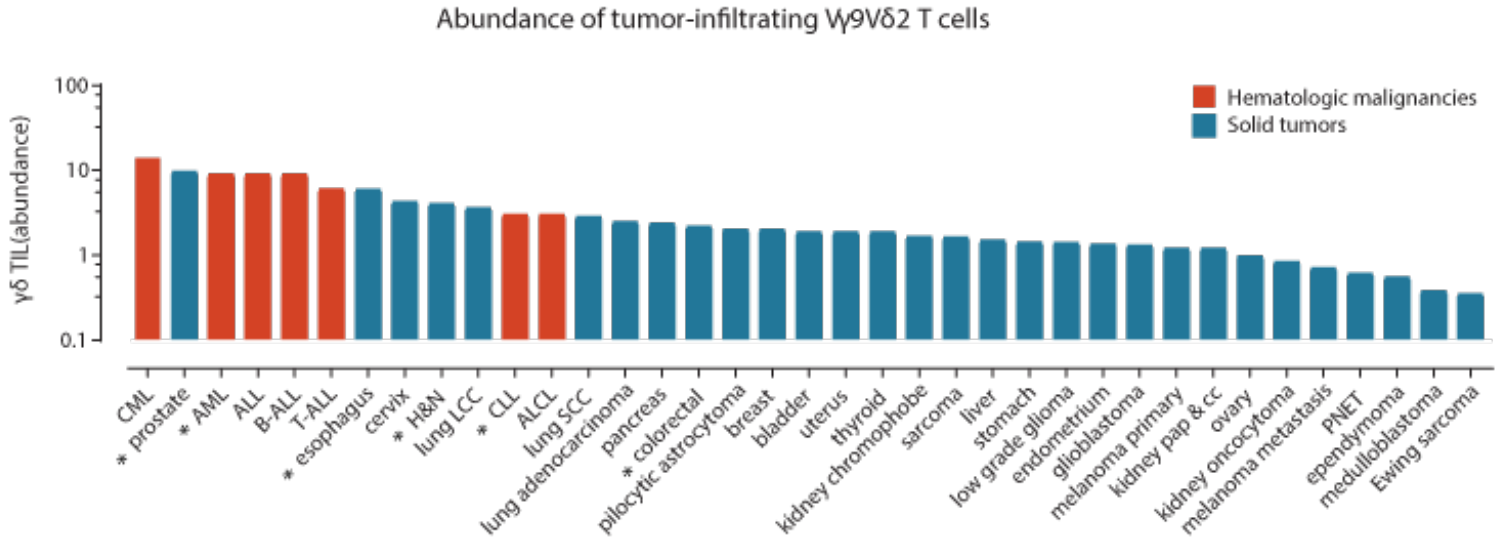
- Important immunosurveillance function
- Most prevalent gamma-delta T cell clonotype in blood
- Natural ability to recognize and kill tumor cells
- Homogeneous, highly cytotoxic effector T cell population
- Infiltrate tumors independent of mutational load
- Bridge innate and adaptive immune responses
- Have antigen presenting capability, potentially triggering deep and durable responses

Vγ9Vδ2 T cells belong to the first line of defense against cancer, with potential to elicit potent and durable responses in the clinic

Presence of Vγ9Vδ2 T cells in tumor tissue shown to correlate with a favorable prognosis for cancer patients



Adapted from Gentles A. et al, Nature Medicine 2015; 21: 938-945



**: in vitro/ex vivo* data generated using LAVA's γδ-bsTCEs

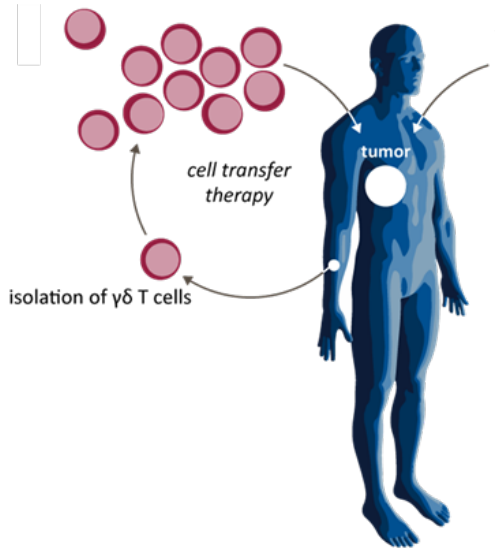
Adapted from Tosolini M et al. Oncoimmunology 2017, vol 6, e128472

Gamma-delta T cells most strongly correlated with favorable outcome of leukocyte subsets analyzed

Vγ9Vδ2 T cells exist as tumor-infiltrating lymphocytes (TILs) in both hematologic malignancies and solid tumors

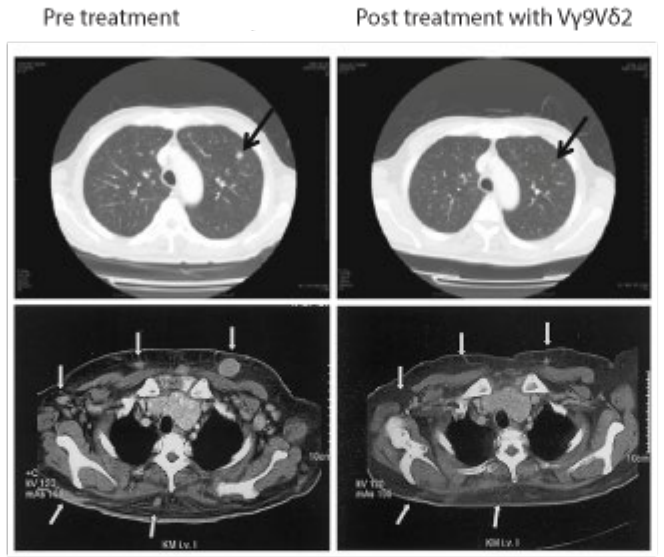
Clinical evidence with Vγ9Vδ2 T cell-based immunotherapy approaches demonstrate therapeutic potential and safety

***ex vivo* activation**



***in vivo* activation**

- Systemic activation and proliferation via treatment with Vγ9Vδ2 T cell ligand (aminobisphosphonate +/-IL-2)



Kobayashi H, et al. Cancer Immunol Immunother 2011; 60:1075-1084
Wilhelm M, et al. Blood 2003;102:200-206

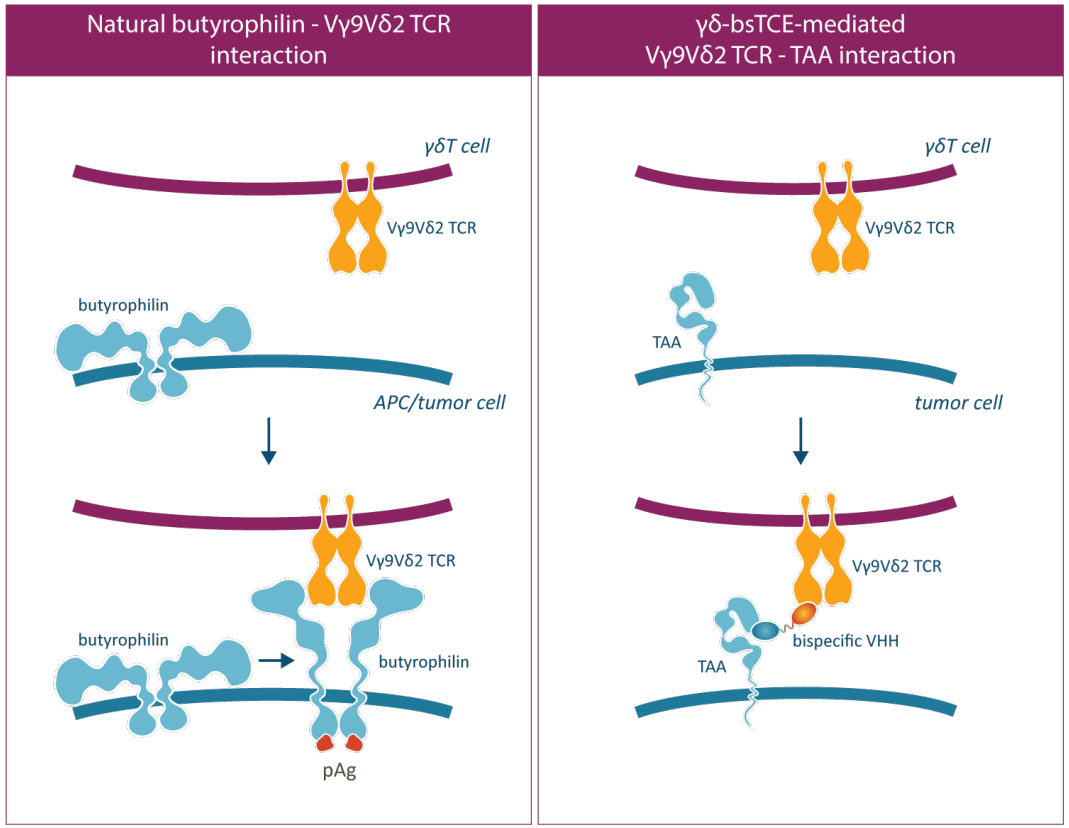
- Clinical trials performed with *in/ex vivo* activation protocols showed promising objective responses and safety
- No signs of cytokine release syndrome (CRS) as a result of Vγ9Vδ2 T cell activation

Inherent potential of Vγ9Vδ2 T cell-based therapy in cancer demonstrated, with need for stronger and more consistent anti-tumor responses

Gamma-Delta bsTCEs

LAVA's gamma-delta bsTCEs aim to realize the therapeutic potential of gamma-delta T cells

Proprietary bispecific antibody platform engages Vγ9Vδ2 T cells in a targeted manner for treatment of cancer



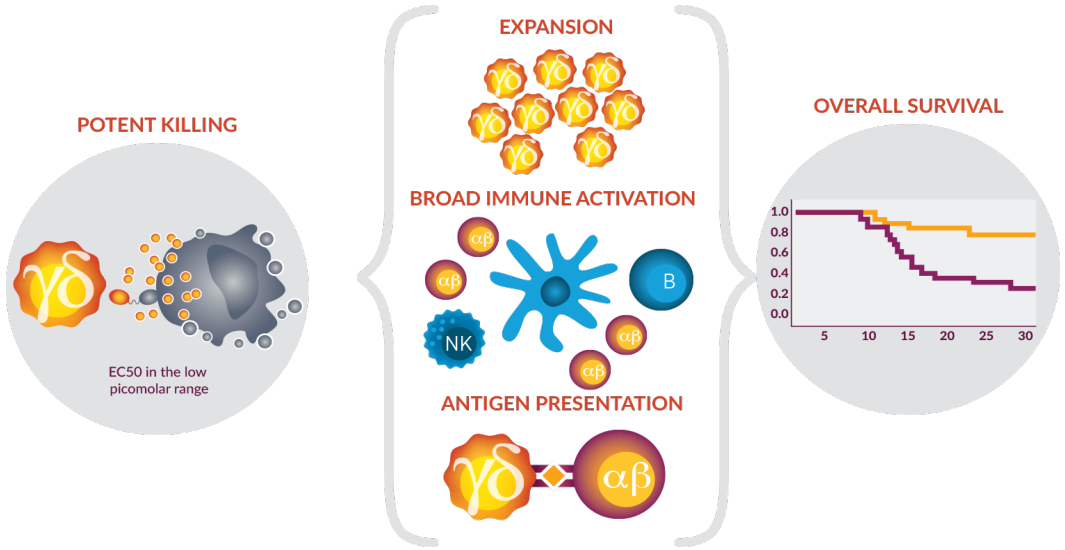
Key Activity Characteristics

- **Conditional activation:** only activates Vγ9Vδ2 T cells upon bridging with tumor cell
- **Does not block recognition** of butyrophilin receptors by Vγ9Vδ2-T cells
- Infiltration of Vγ9Vδ2-T cells is **independent and not correlated with tumor mutational burden**

Platform Flexibility

- Gamma-delta bsTCEs are **fully modular**, allowing for usage of Fc and existing antibodies
- **"Off-the-shelf"** therapeutic with a well-established, standardized manufacturing process for antibodies

The high tumor selectivity and potency of our gamma-delta bsTCEs, and low risk of CRS may provide a broad therapeutic window



Gamma-delta bsTCE Efficacy Characteristics:

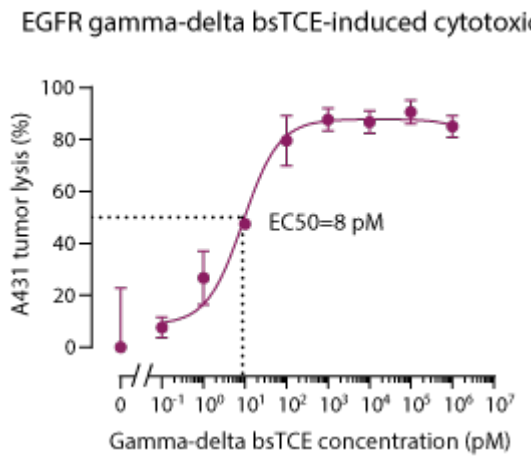
- ✓ Potent killing of cancer cells (EC50s in the low picomolar range)
- ✓ No co-activation of immune-suppressive Tregs which dampen antitumor efficacy of cytotoxic T cells
- ✓ Antigen presenting capability and cytokine release drive innate and adaptive immune responses, potentially resulting in potent and durable responses
- ✓ Potential activity in hematologic malignancies and solid tumors, including immunologically “cold” tumors
- ✓ Induction of Vγ9Vδ2 T cell activation can result in an increased number of anti-tumor Vγ9Vδ2 T cells

Gamma-delta bsTCE Safety Characteristics:

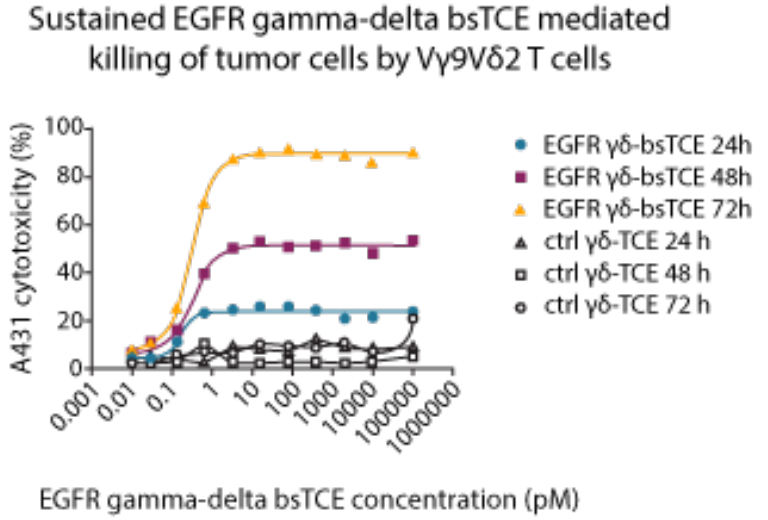
- ✓ Conditional activation with high precision
- ✓ Greatly reduced potential for cytokine release syndrome (CRS); No evidence of CRS in NHP studies

LAVA's gamma-delta bsTCEs demonstrated potent killing of cancer cells in preclinical models

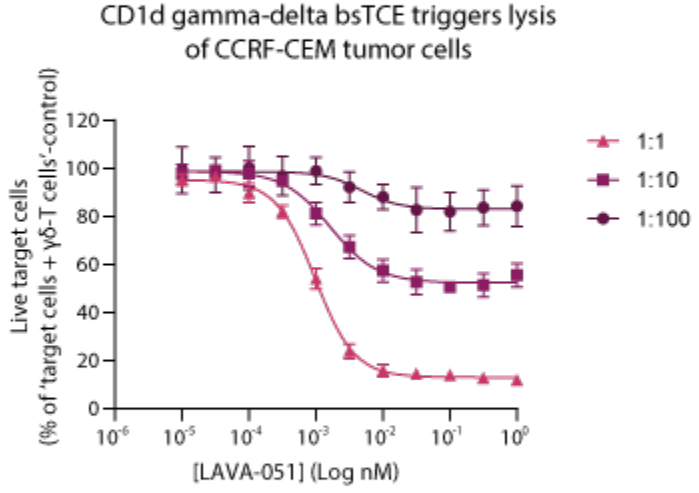
Highly Potent Gamma-Delta bsTCEs



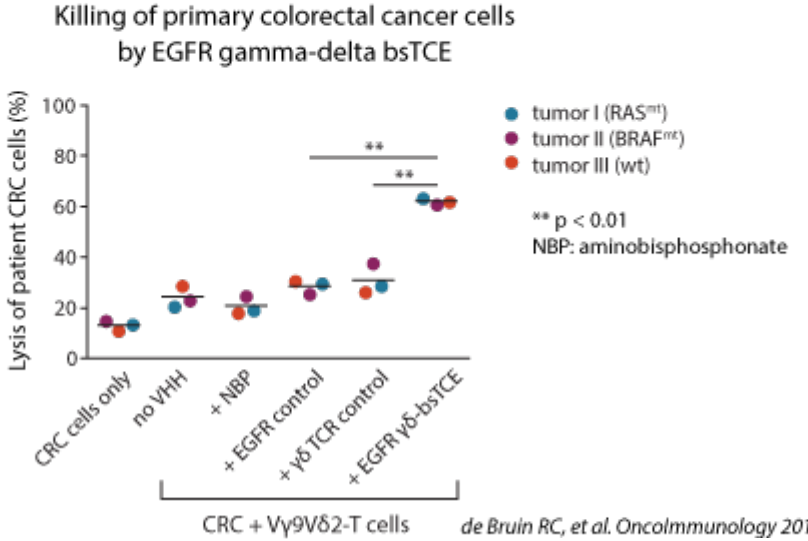
Sustained Tumor Cell Killing Over Time



Serial Killing Capacity



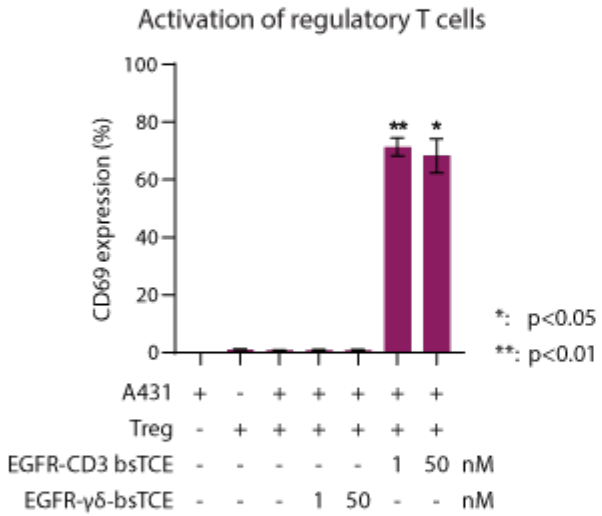
Both Vγ9Vδ2 T cells and Tumor Cells Must be Engaged for Killing

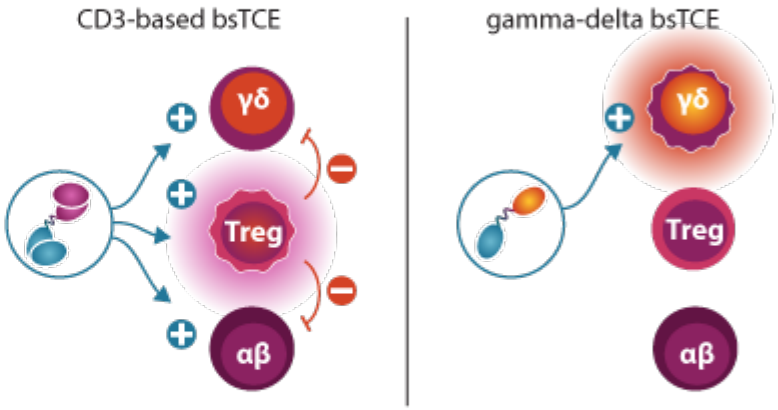


de Bruin RC, et al. Oncolmmunology 2017; 7(1):e1375641

LAVA's gamma-delta bsTCEs have characteristics that amplify efficacy

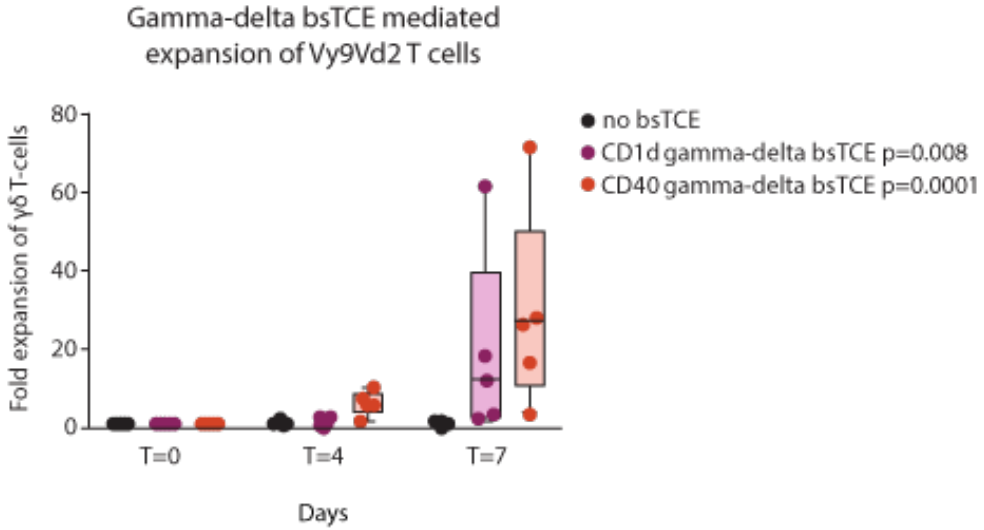
No Activation of Regulatory T cells





- Activation of immunosuppressive Treg cells abrogates potency of CD3-based TCEs
- In clinical studies of patients treated with blinatumomab (CD19 CD3-based TCE), antitumor efficacy was reported to be limited by co-activation of suppressive T cell subsets (e.g., Tregs)[1]
- Our candidates specifically target gamma-delta T cells; do not induce co-activation of immunosuppressive Treg cells

Expansion of Activated Vγ9Vδ2 T cells

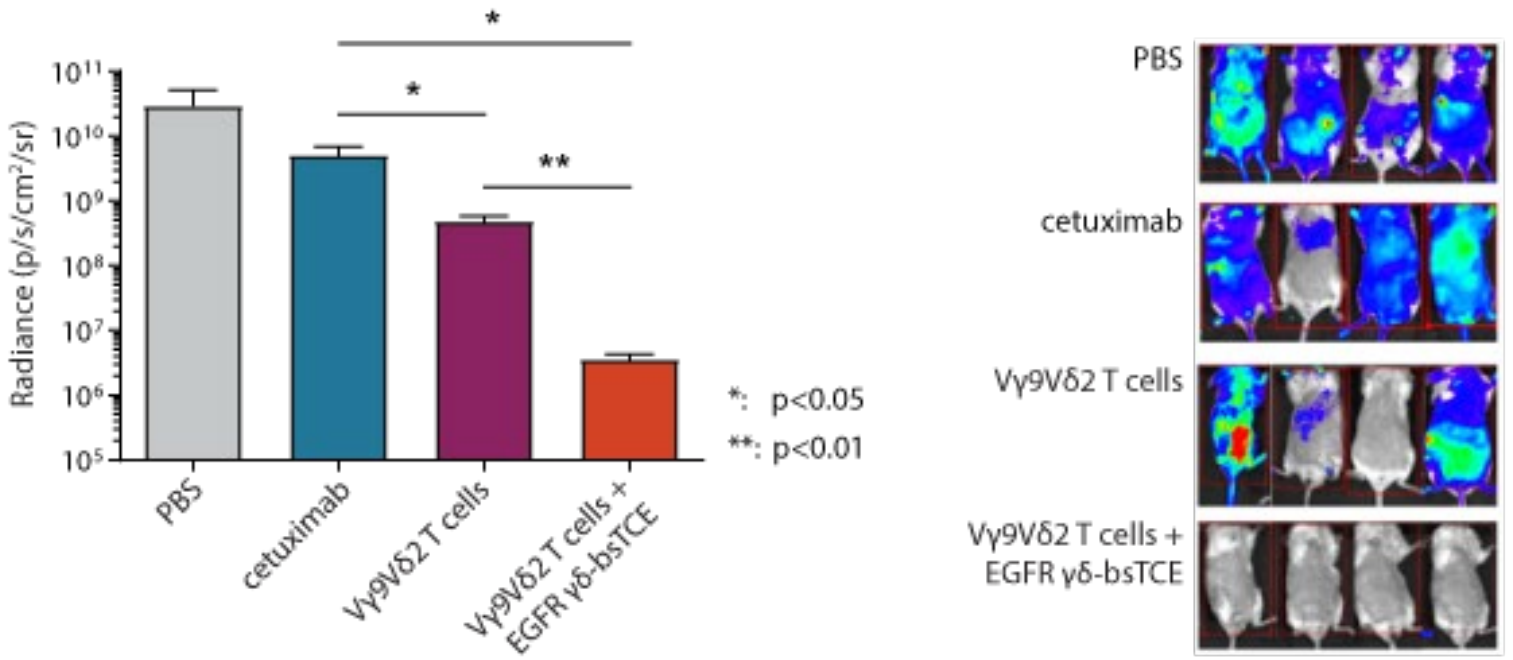


- γδ-bsTCE induces 10-70 fold expansion of Vγ9Vδ2 T cells in PBMCs in the presence of target-expressing tumor cells
  - Increase from 2%[2] to 17-59% of all T cells being a Vγ9Vδ2-T cell observed

[1] Duell J, et al. Leukemia 2017;31:2181
[2] 2% frequency is used as an example here

EGFR gamma-delta bsTCE drove more tumor inhibition than cetuximab or Vγ9Vδ2 T cells alone in mouse models

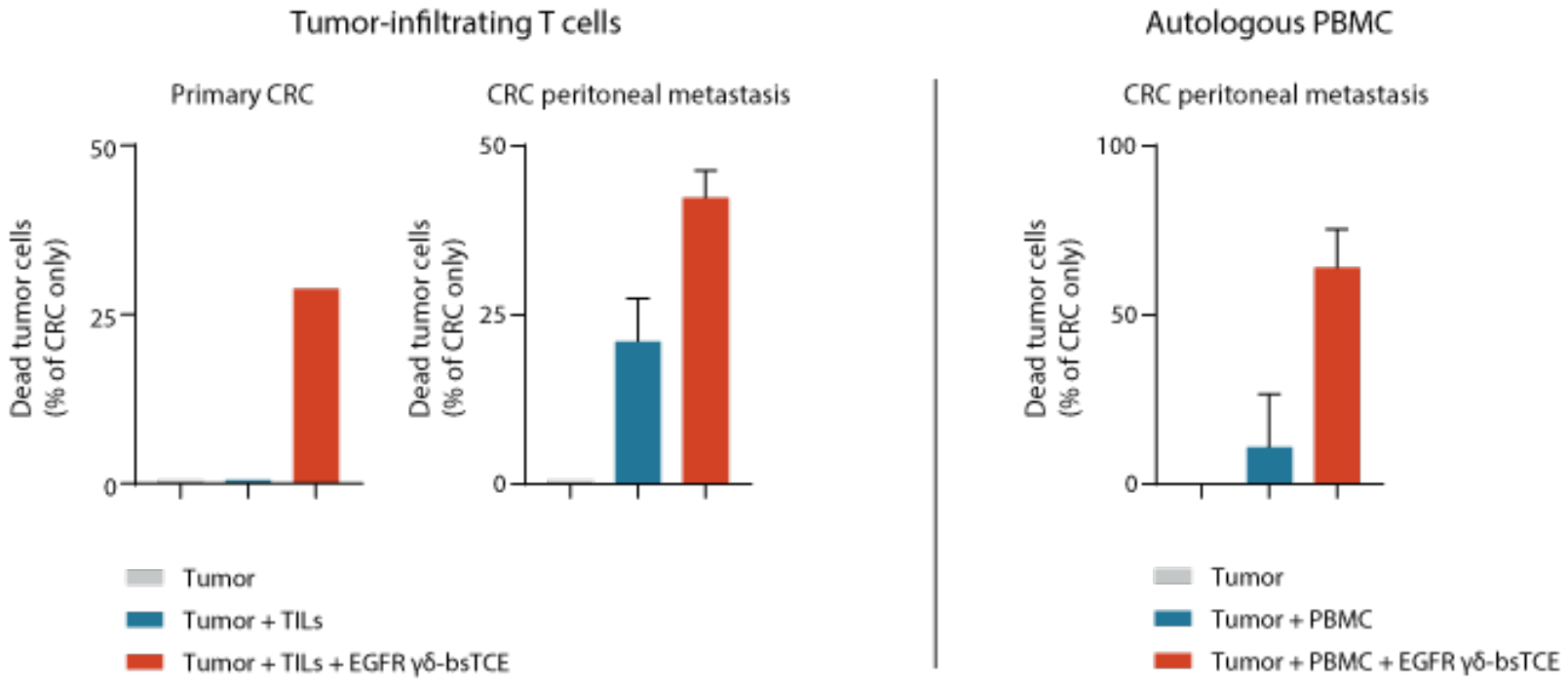
EGFR gamma-delta bsTCE induces anti-tumor activity of expanded Vγ9Vδ2 T cells against RAS-mutant colorectal cancer in immunodeficient mice



de Bruin RC, et al. Oncolmmunology 2018; 7(1):e1375641

LAVA's EGFR gamma-delta bsTCE has demonstrated tumor killing in RAS^{mutant} CRC, RAS^{WT} CRC, BRAF^{mutant} CRC, esophageal cancer, and head and neck cancer preclinical models

Potent efficacy demonstrated with patient-derived material using both autologous PBMC and tumor infiltrating lymphocytes

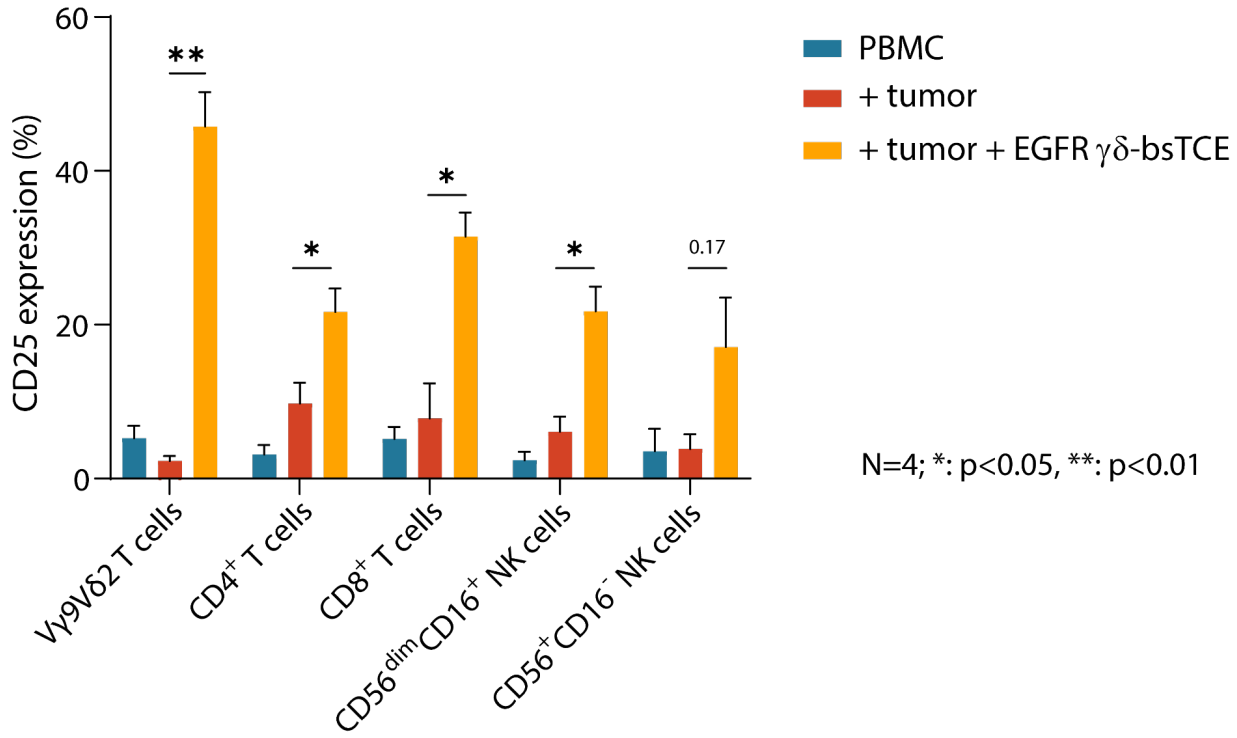


Colorectal cancer cells, derived from the primary tumor or from metastases in the peritoneum, were cultured with tumor infiltrating lymphocytes (TILs; one TIL per tumor cell) or with autologous PBMC (10 PBMCs per tumor cell), in the presence or absence of EGFR gamma-delta bsTCE. Killing of tumor cells was determined after over-night culture.

Within a <24-hour timeframe, gamma-delta bsTCEs can induce potent killing of autologous cancer cells using patient derived gamma-delta T cells

Gamma-delta bsTCEs trigger a cascade response

EGFR gamma-delta bsTCE triggers downstream activation of immune cells in co-cultures of patient PBMC and metastatic colorectal cancer cells

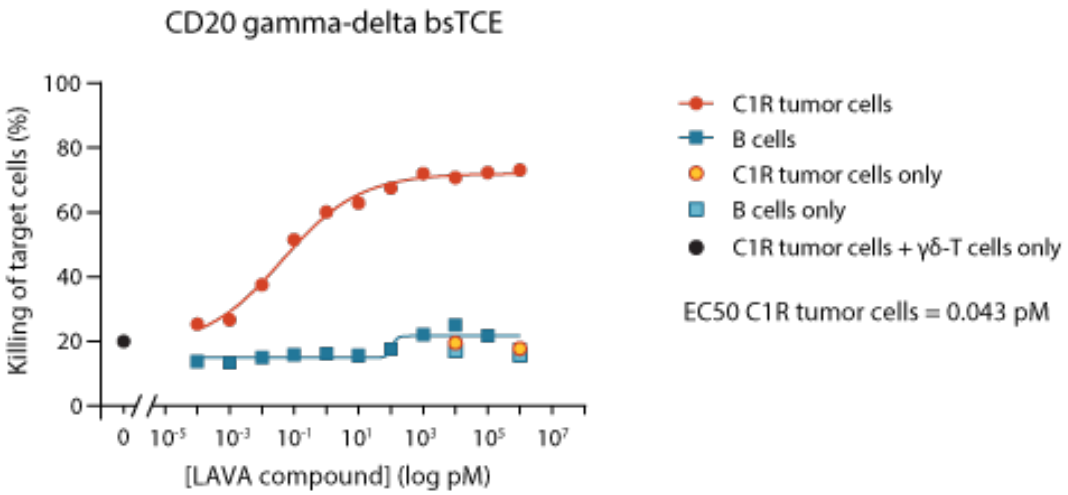


N=4; *: p<0.05, **: p<0.01

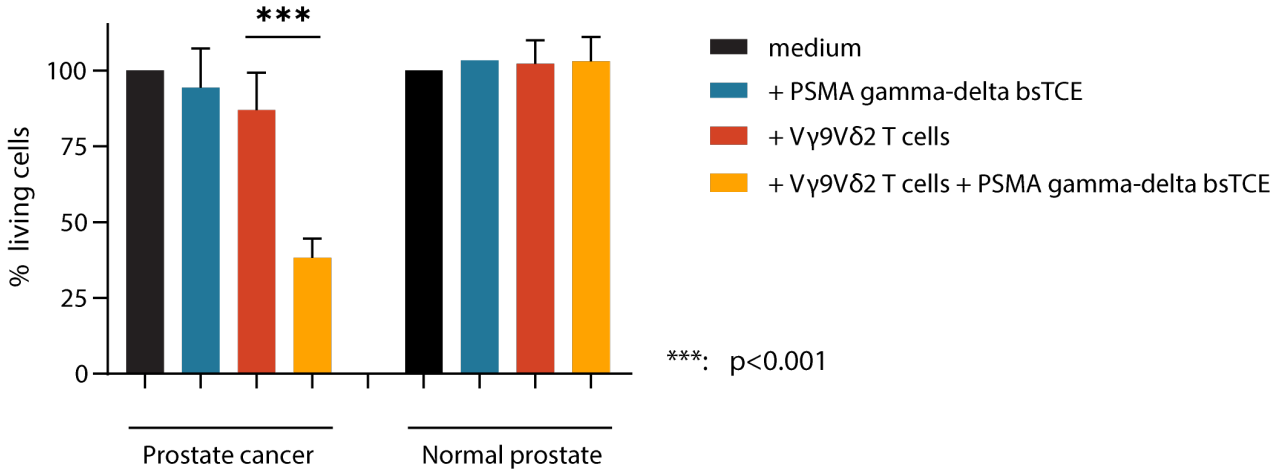
Cancer cells, derived from peritoneal metastases of patients with metastatic colorectal cancer, were cultured with autologous peripheral blood mononuclear cells, PBMC, with or without EGFR gamma-delta bsTCE. After 7 days the activation of Vγ9Vδ2 T cells, $CD4^+$ and $CD8^+$ T cells and NK cells was determined by measuring expression of the activation marker CD25.

Gamma-delta bsTCEs can selectively kill cancer cells while sparing healthy cells in hematologic malignancy and solid tumor models

CD20 Gamma-Delta bsTCE Mediated Killing



PSMA Gamma-Delta bsTCE Mediated Killing



- 2:1 ratio (γδ T cells : Target cells)
- Similar CD20 expression levels on CR1 neo and B-cells

Preferential killing of cancer versus healthy cells demonstrated *in vitro* and *ex vivo*; may allow for targeting of broadly expressed tumor associated antigens

Platform safety supported by non-human primate studies of CD1d, CD20, and EGFR gamma-delta bsTCEs

Dosing Schedules

CD1d and CD20

- Surrogate CD1d and CD20 gamma-delta bsTCE dosed up to 10 mg/kg (4 hr infusion, 4 doses, every 2 days) and biweekly at 1 mg/kg for 1 month

EGFR

- Surrogate EGFR gamma-delta bsTCE dosed up to 10 mg/kg (4 hr infusion, 4 doses, every 2 days)

- Mild to no clinical signs of toxicity; low cytokine spike
- No clinical chemistry abnormalities
- No histopathological abnormalities
- Gamma-delta bsTCEs detectable on PB and LN gamma-delta T cells
- Dose dependent B cell depletion (CD20 gamma-delta bsTCE)

PB = peripheral blood
LN = lymph node

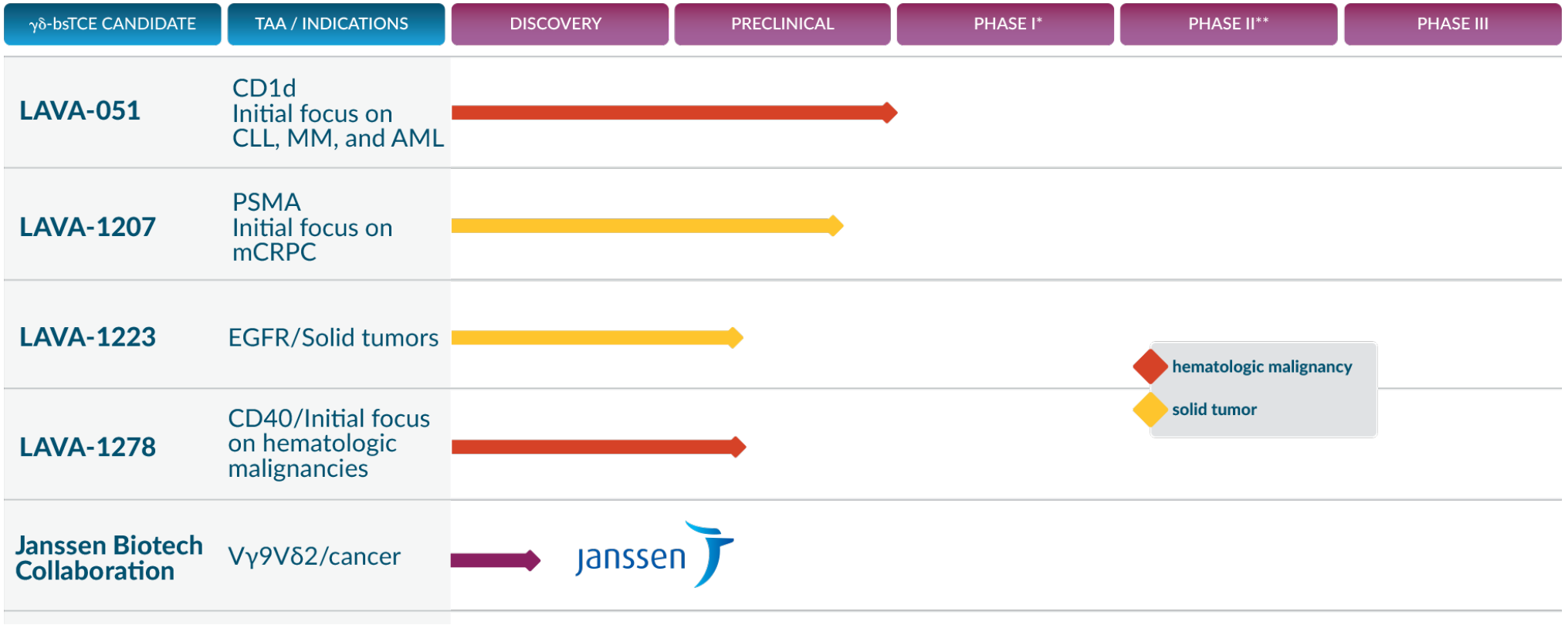
NHP data support the benign safety profile of LAVA's gamma-delta bsTCEs *in vivo*

bsTCEs designed to maximize the therapeutic potential of gamma-delta T cells

	CD3 Bispecifics	LAVA gamma-delta bsTCEs
Risk of On-Target/ Off-Tumor Toxicities	High	✓✓ Low
Risk of Activating Tregs	High	✓✓ Low
Risk of CRS	High	✓✓ Low
Number of TAAs Effectively Targeted	Low	✓✓ High
Therapeutic Index	Variable	✓✓ High

LAVA’s Pipeline

Pipeline across both hematologic and solid malignancies



TAA: Tumor Associated Antigen

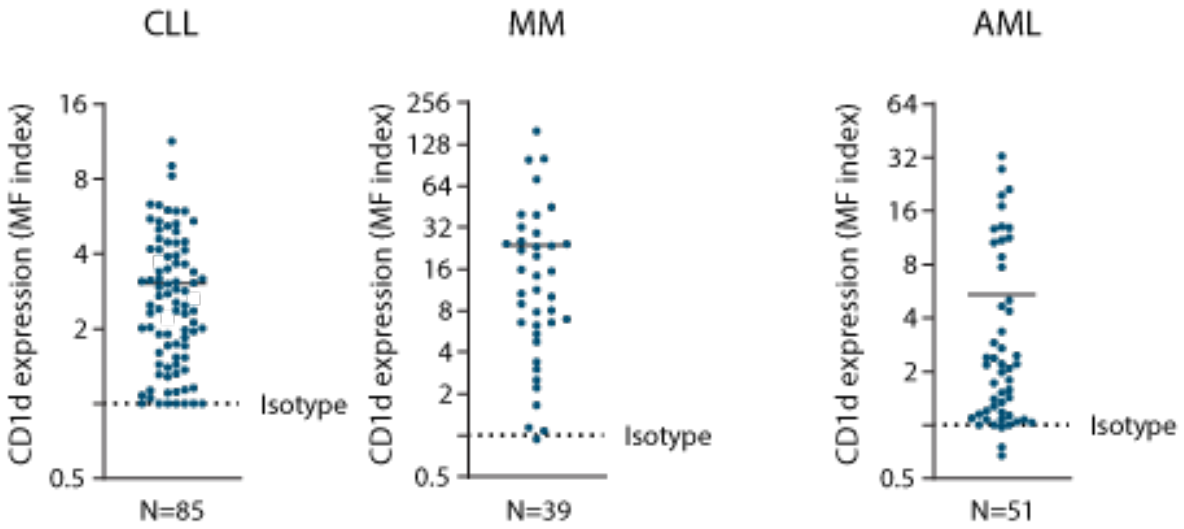
*the primary focus of Phase 1 programs is to test for safety and preliminary efficacy

**pending data, Phase 2 programs might be subject to accelerated approval

LAVA will consider seeking accelerated development strategies in patient populations with high unmet need

LAVA-051 targets tumor associated antigen CD1d

CD1d expression on CLL, MM, and AML patient cells



CD1d is a MHC class I-related glycoprotein expressed on the surface of various human antigen presenting cells including dendritic cells and B-cells

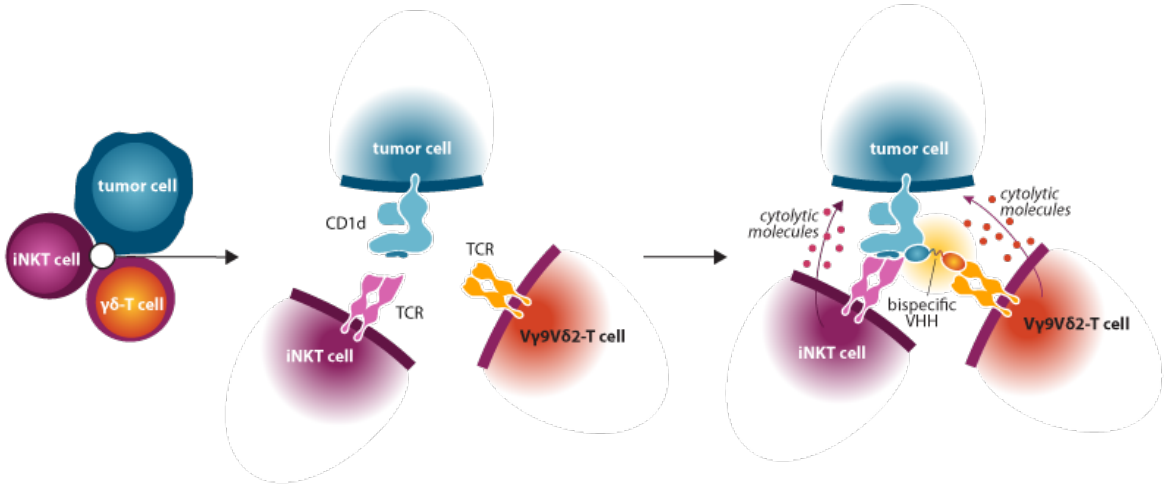
LAVA-051

- **LAVA-051 is a humanized gamma-delta bsTCE**
- **Targets CD1d and the Vδ2 domain of the TCR**
- **First known antibody-based compound targeting CD1d to activate both Vγ9Vδ2 and iNKT cells**

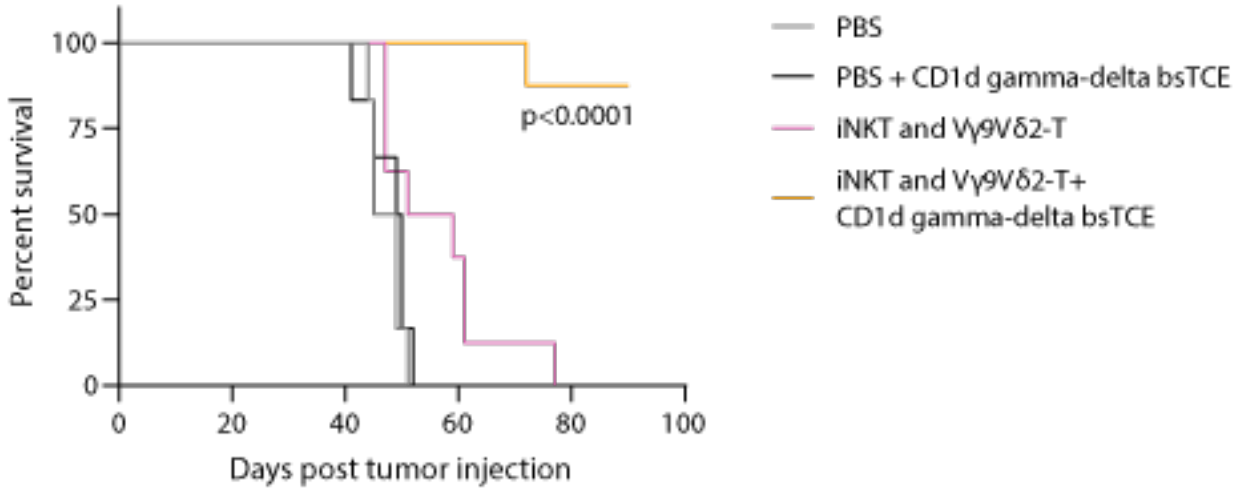
We believe LAVA-051 is a first-in-class therapy

CD1d gamma-delta bsTCE has shown anti-tumor activity via activation of both iNKT cells and Vγ9Vδ2 T cells in preclinical models

Figure illustrating LAVA-051 triggering activation and cytolytic activity of both iNKT cells and Vγ9Vδ2 T cells



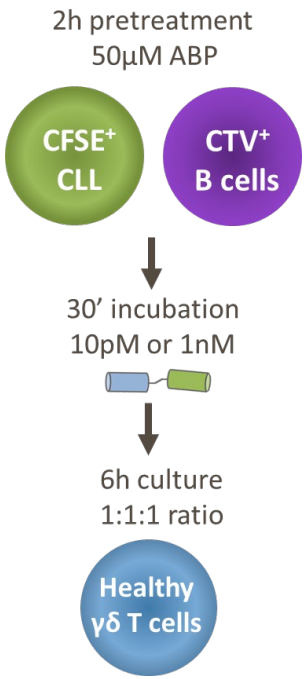
CD1d gamma-delta bsTCE induced anti-tumor activity of iNKT cells and Vγ9Vδ2 T cells in CD1d-expressing MM murine model



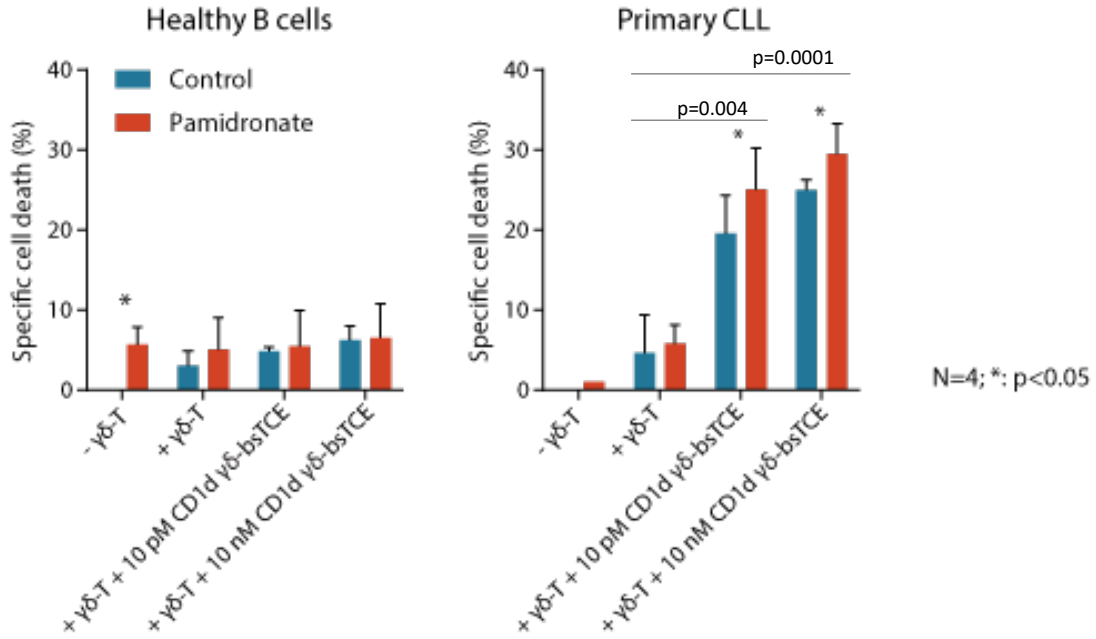
- CD1d can present glycolipid antigens to iNKT cells
- CD1d-iNKT axis-directed therapies demonstrated a favorable safety profile

- CD1d gamma-delta bsTCEs triggered iNKT and Vγ9Vδ2 T cell activity to control CD1d+ MM tumor cell growth, resulting in substantial improvement of survival

CD1d gamma-delta bsTCEs can selectively kill cancer cells while sparing healthy cells



CD1d Gamma-Delta bsTCE Demonstrated Potent Killing of *ex vivo* CLL Patient Cells While Sparing Healthy Volunteer B Cells

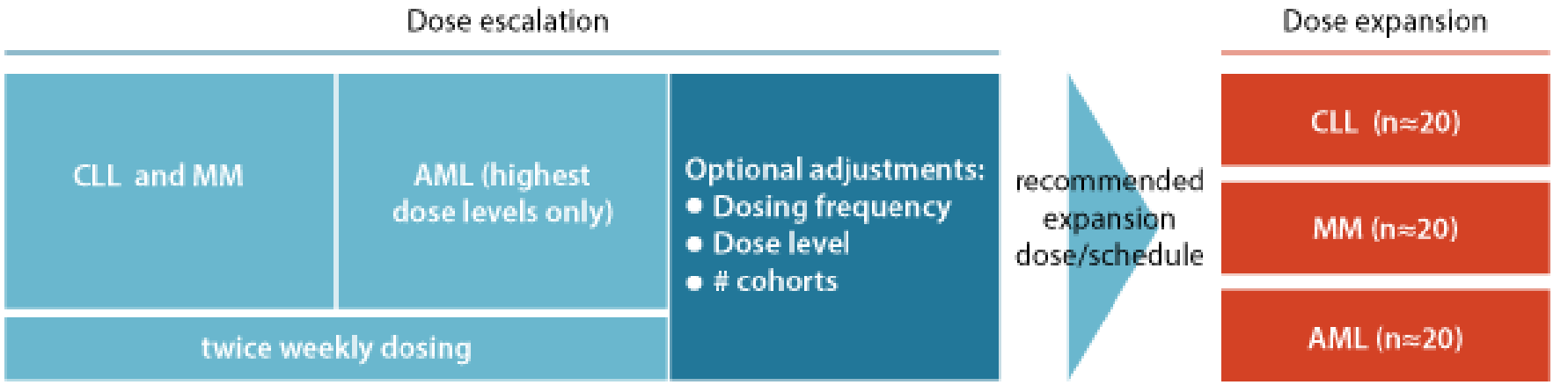


N=4; *: p<0.05

de Weerdt I et al. Clin Cancer Res 2021; doi: 10.1158/1078-0432.CCR-20-4576

Preferential killing of cancer versus healthy cells demonstrated *in vitro* and *ex vivo*; which may allow for targeting of broadly expressed tumor associated antigens

LAVA-051 Phase I/IIa anticipated to begin in 1H21 in hematologic malignancies



Goal: determine recommended dose and schedule based on MTD or optimal biological dose

Goal: determine preliminary level of activity per disease

n: estimated number of patients per indication

Will pursue accelerated approval pathway in the US if possible

LAVA-051 is pursuing several indications in which drugs have received accelerated approval by the FDA

Multiple Myeloma

PEPAXTO (Oncopeptides) – Feb 2021

Indication: failed ≥4 lines of therapy, triple-class refractory disease

BLENREP (GSK)- May 2020

Indication: failed ≥4 lines of therapy, triple- class refractory disease

XPOVIO (Karyopharm) – Mar 2019

Indication: penta-refractory patients

CLL

VENCLEXTA (Abbvie/Roche) – Nov 2016

Indication: CLL patients with 17P deletion, who have received at least one prior therapy

IMBRUVICA (J&J/Abbvie) – Dec 2014

Indication: CLL patients who have received at least one prior therapy

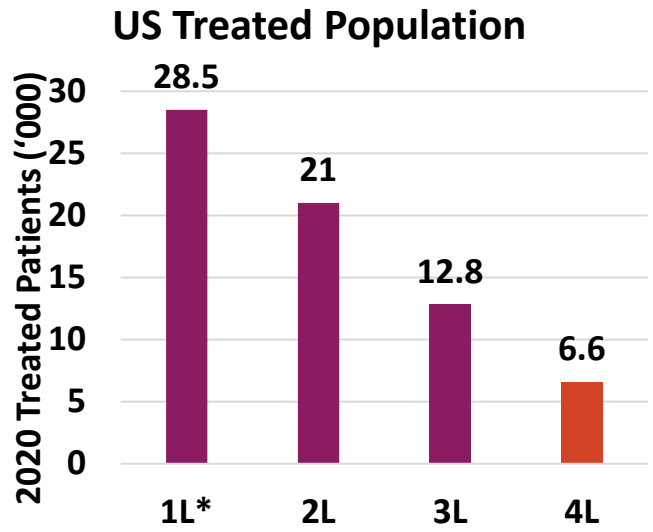
AML

VENCLEXTA (Abbvie/Roche) – Nov 2018

Indication: 1L AML patients who are >75yo or ineligible for intensive induction therapy

Substantial opportunity remains within the relapsed/refractory populations of MM, CLL, and AML

Multiple Myeloma[1]

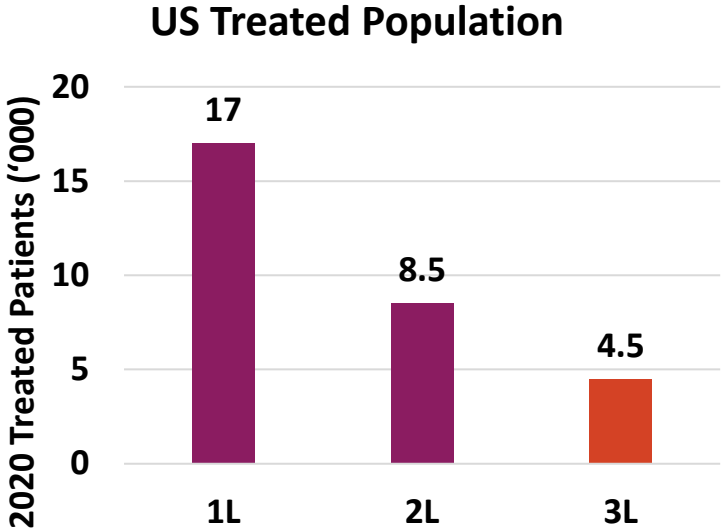


* = transplant-eligible AND transplant ineligible

4L Efficacy, Current Standard of Care[3,4,5]

- PFS = 3-4 mo

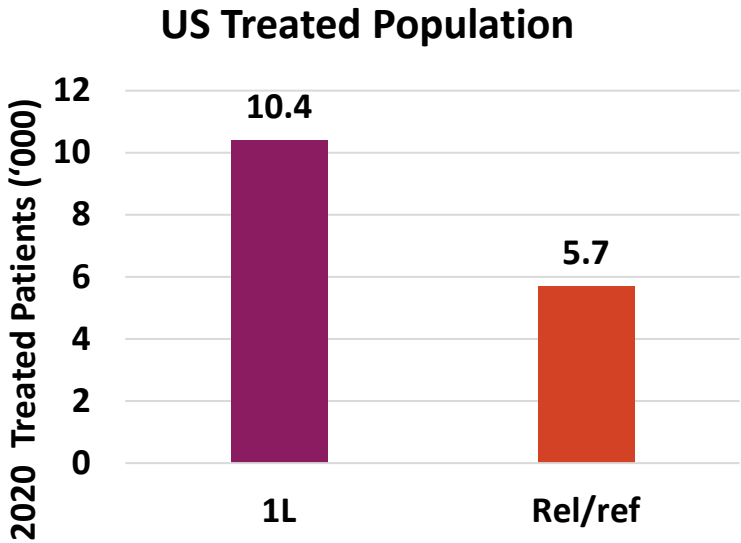
CLL[1]



3L Efficacy, Current Standard of Care[3,4]

- ORR = 30-50%
- CR = 10-20%
- PFS = 6-12 mo

AML[2]



Rel/ref Efficacy, Current Standard of Care[3,4]

- PFS = 4 mo

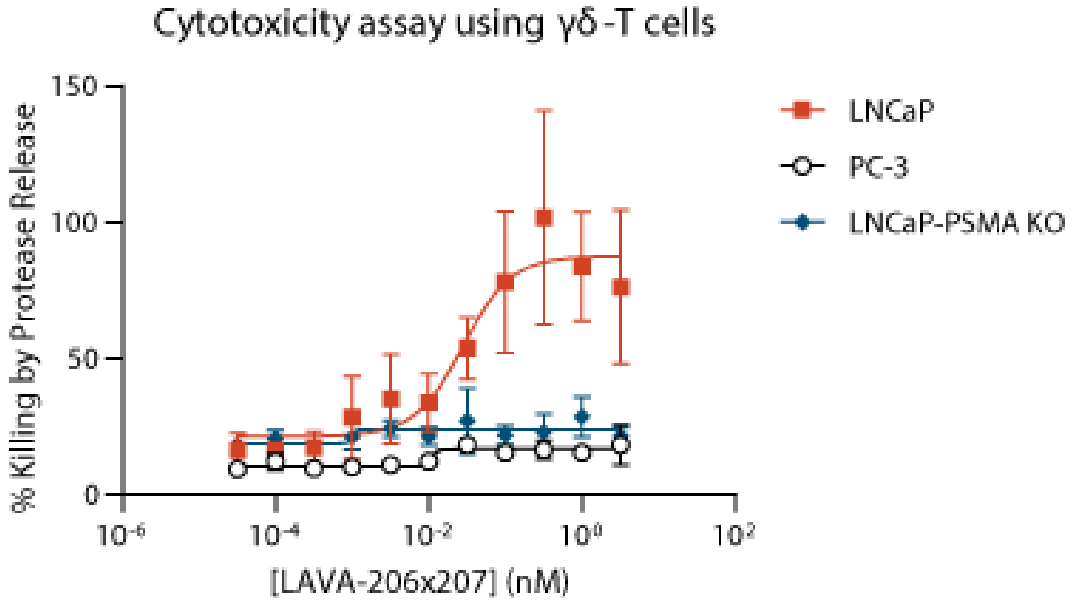
[1] Decision Resources Group; Datamonitor Healthcare; Roche Investor Presentation, 2019
[2] Decision Resources Group
[3] LAVA HCP market research
[4] Product PIs
[5] July 2019 Putnam market sizing study

LAVA-1207 is a humanized gamma-delta bsTCE targeting PSMA

Bispecific VHH-Fc

- Targets PSMA and the Vδ2 domain of the TCR
- bsVHH Fc-containing format, Fc domain is silenced to prevent non-specific T cell activation
- Very high heterodimer (bispecific antibody) yield demonstrated in CHO cell production
- LAVA-1207 mediates PSMA-dependent activation of Vγ9Vδ2 T cells resulting in potent killing of PSMA-positive tumor cells

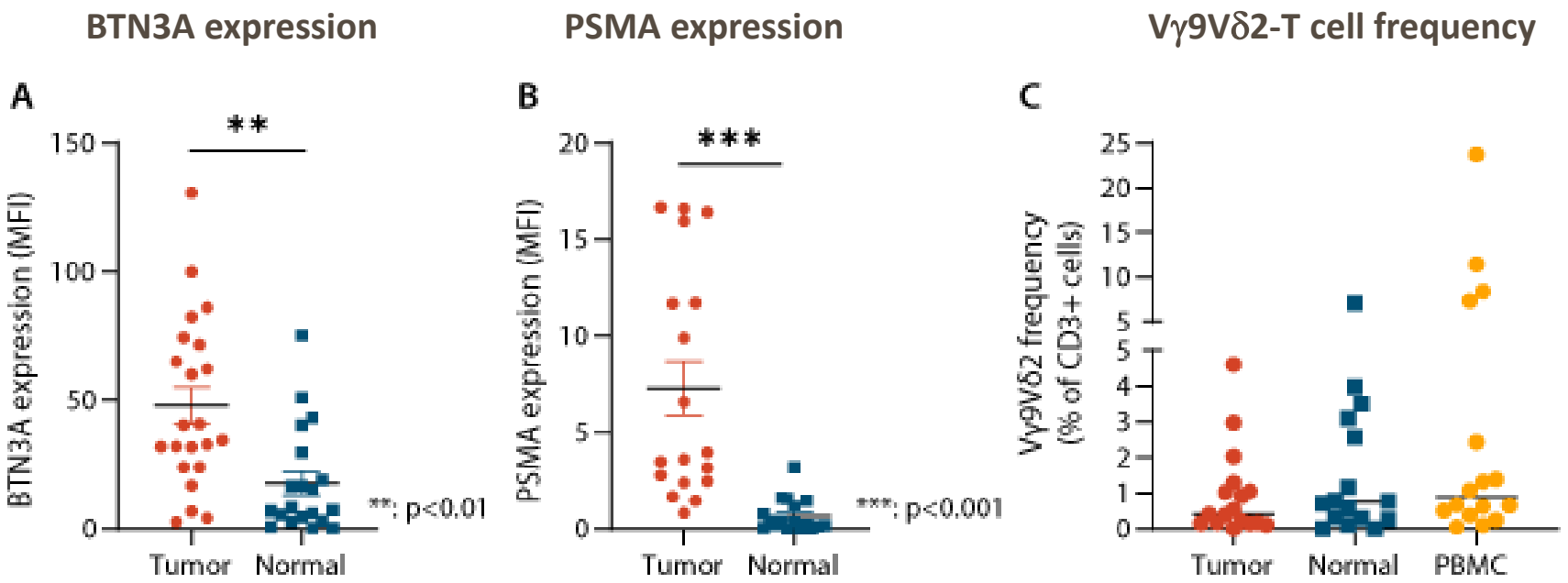
Cell Killing



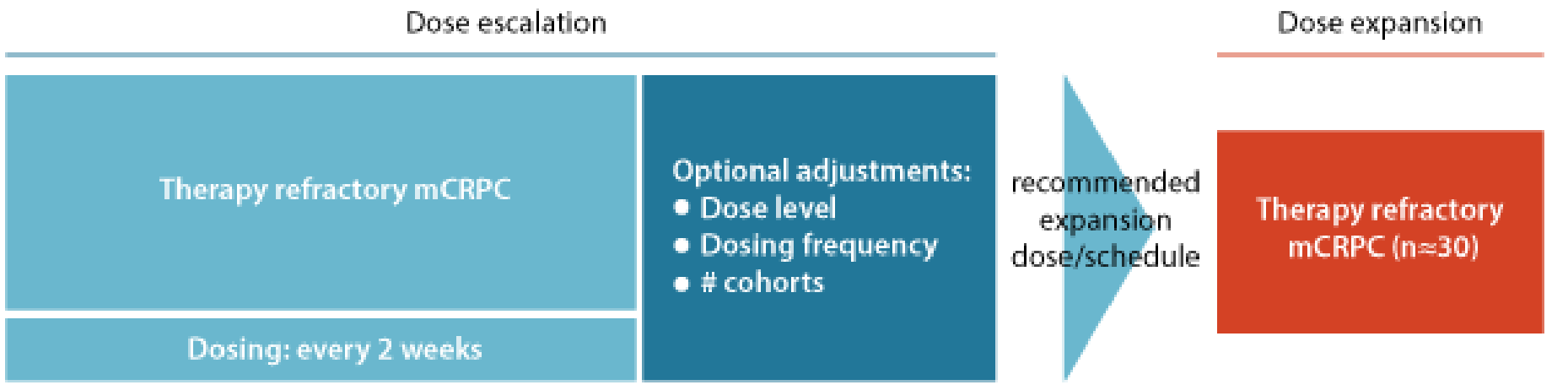
We believe LAVA-1207 is a first-in-class therapy

Patient prostate cancer samples contain Vγ9Vδ2 T cells and express increased levels of PSMA and BTN3A, which LAVA-1207 exploits

Expression of BTN3A and PSMA and Vγ9Vδ2 T cell frequency in samples of prostate cancer patients



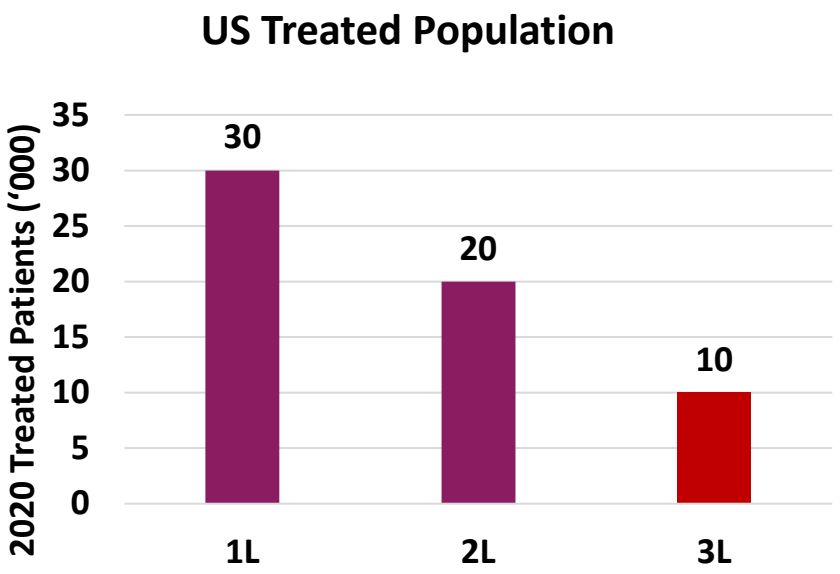
LAVA-1207 Phase I/IIa expected to begin in 2H21 in metastatic castration resistant prostate cancer (mCRPC)



n: estimated number of patients

Unmet need remains in mCRPC: Initial Opportunity in 3L

mCRPC[1,2]



3L Efficacy, Current Standard of Care[3,4]

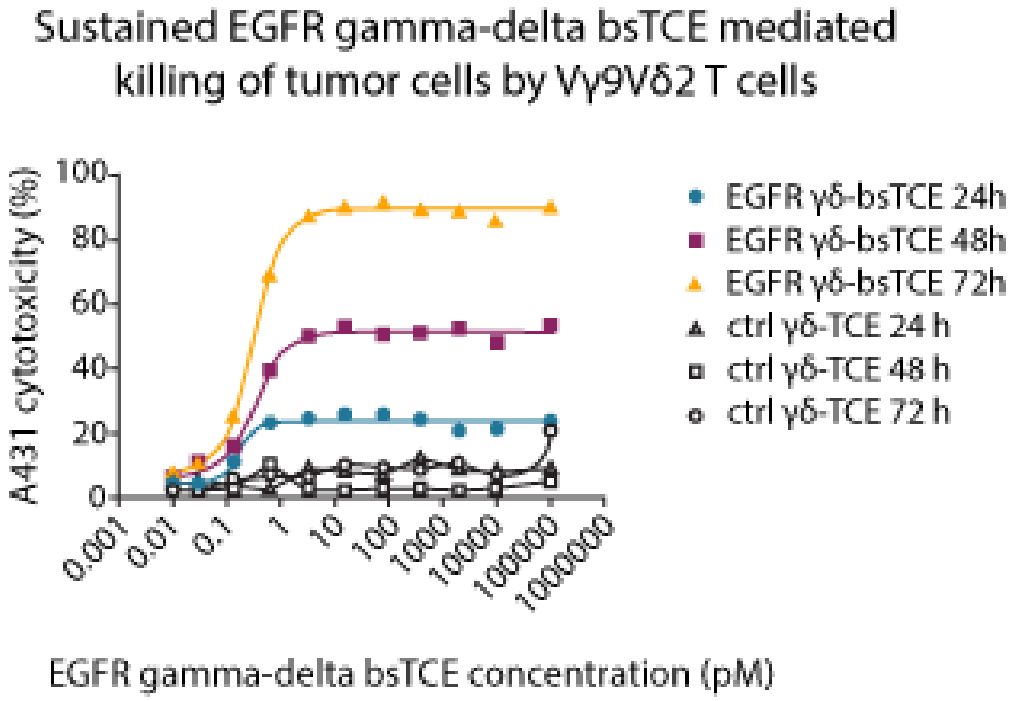
- ORR = 30%
- PFS = 3-6 mo

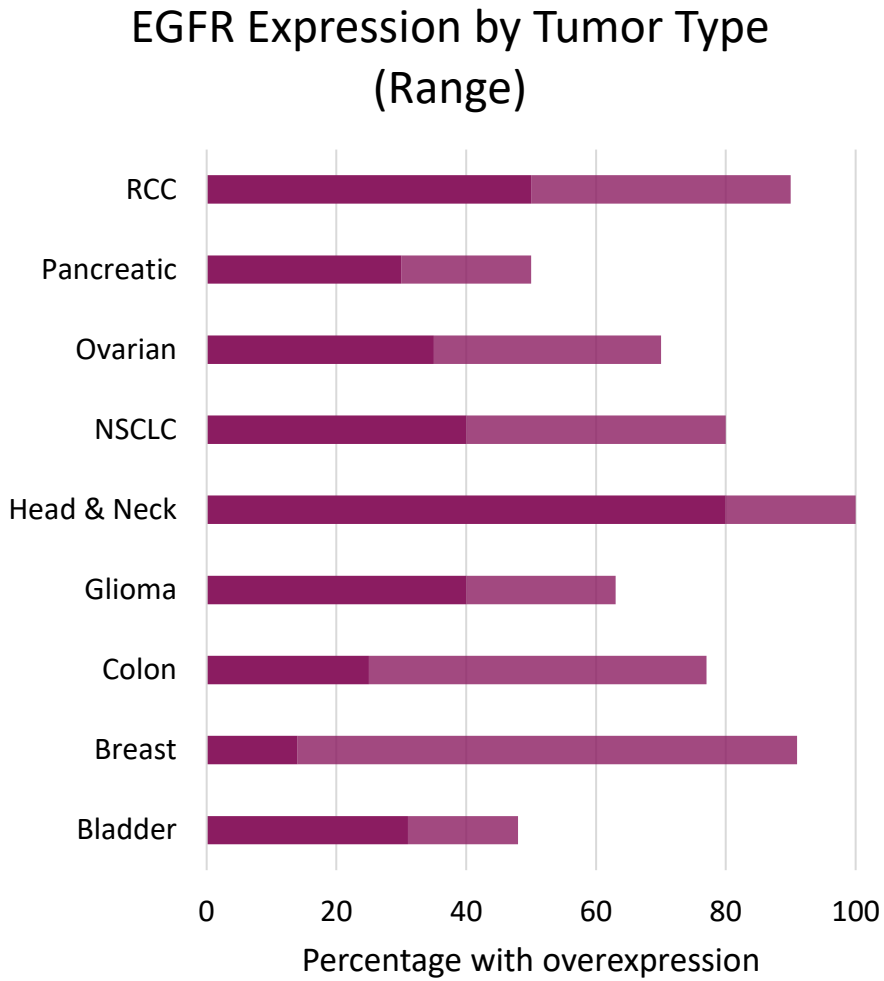
Class	LAVA Potential for Differentiation
TCE	• Does not co-activate Tregs • No CRS • Reduced on-target/off-tumor related toxicities • No immune effector cell-associated neurotoxicity syndrome (ICANS)
CAR-T	• Preconditioning frequently required • No CRS, ICANS • 'Off-the-shelf' approach
Radioligand	• Ease of manufacturing/administration

[1] Decision Resources Group; Datamonitor Healthcare; AstraZeneca, February 14, 2020; SVBLeerink, April 22, 2020
[2] Journal of Clinical Oncology 38, no. 6_suppl (February 20, 2020) 229-229
[3] LAVA HCP market research
[4] Product PIs

Key Preclinical Programs

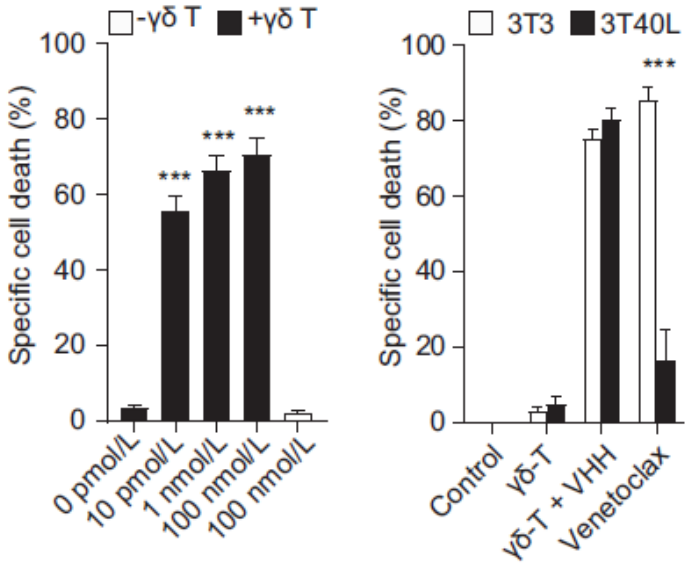
LAVA-1223 (EGFR) may have potential across a number of solid tumors





LAVA-1278 (CD40) may have potential across a number of solid tumors and hematologic malignancies

Specific lysis of primary CLL cells by CD40 gamma-delta bsTCE



***: $p < 0.001$

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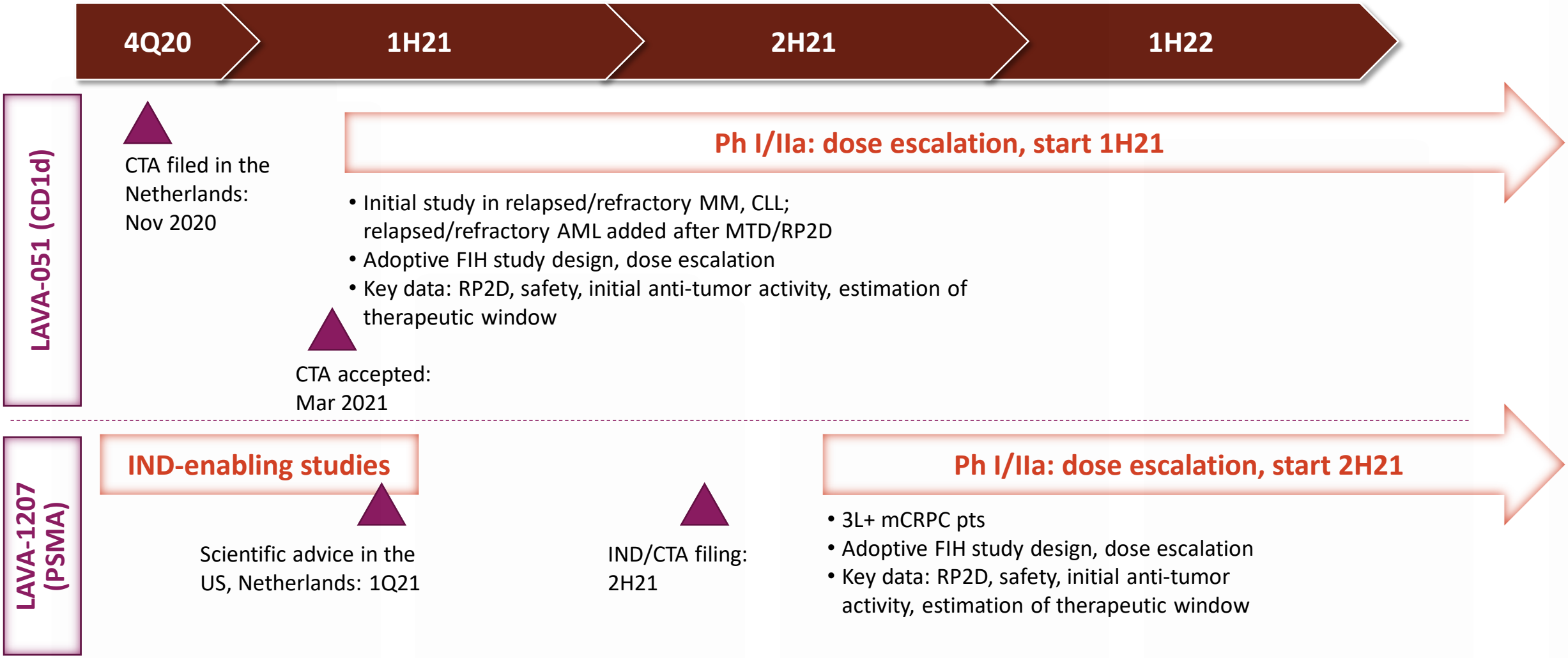
CD40 Overexpression

Hematologic Malignancies	Solid Tumors
• CLL	• Bladder
• DLBCL	• Colon
• MM	• Esophageal
	• Lung
	• Ovarian
	• Melanoma
	• Renal
	• Pancreatic
	• Prostate
	• Thymoma

LAVA’s Timelines

LAVA is poised to become a clinical stage company with two programs planned to enter the clinic in 2021



Optimizing Platform Value to Build a Robust Pipeline

New Targets

- Progress gamma-delta bsTCE against new high-value TAAs to expand pipeline with:
  - Treatment paradigm changing proprietary clinical-stage assets
  - In-licensing/co-development deals with big pharma

Platform Enhancement

- Develop next generation TCEs with competitive advantages in an evolving IO landscape
  - Multivalents
- Explore synergies with other standard of care regimens

Strategy to generate multiple high-value products diversified across a number of criteria

LAVA

Innovation in engaging gamma-delta T cells to potently and precisely fight cancer

- Novel gamma-delta bsTCEs uniquely combine high potency and tumor selectivity in an “off-the-shelf” approach
- Well-differentiated platform with broad applicability across hematologic and solid malignancies
- Gamma-delta bsTCEs demonstrated efficacy in *in vivo* and *ex vivo* models with favorable safety in NHP studies
- Two lead programs expected to enter Phase I/IIa studies in 2021; early-stage pipeline progressing
- Experienced management team rapidly advancing high-quality programs from bench to clinic