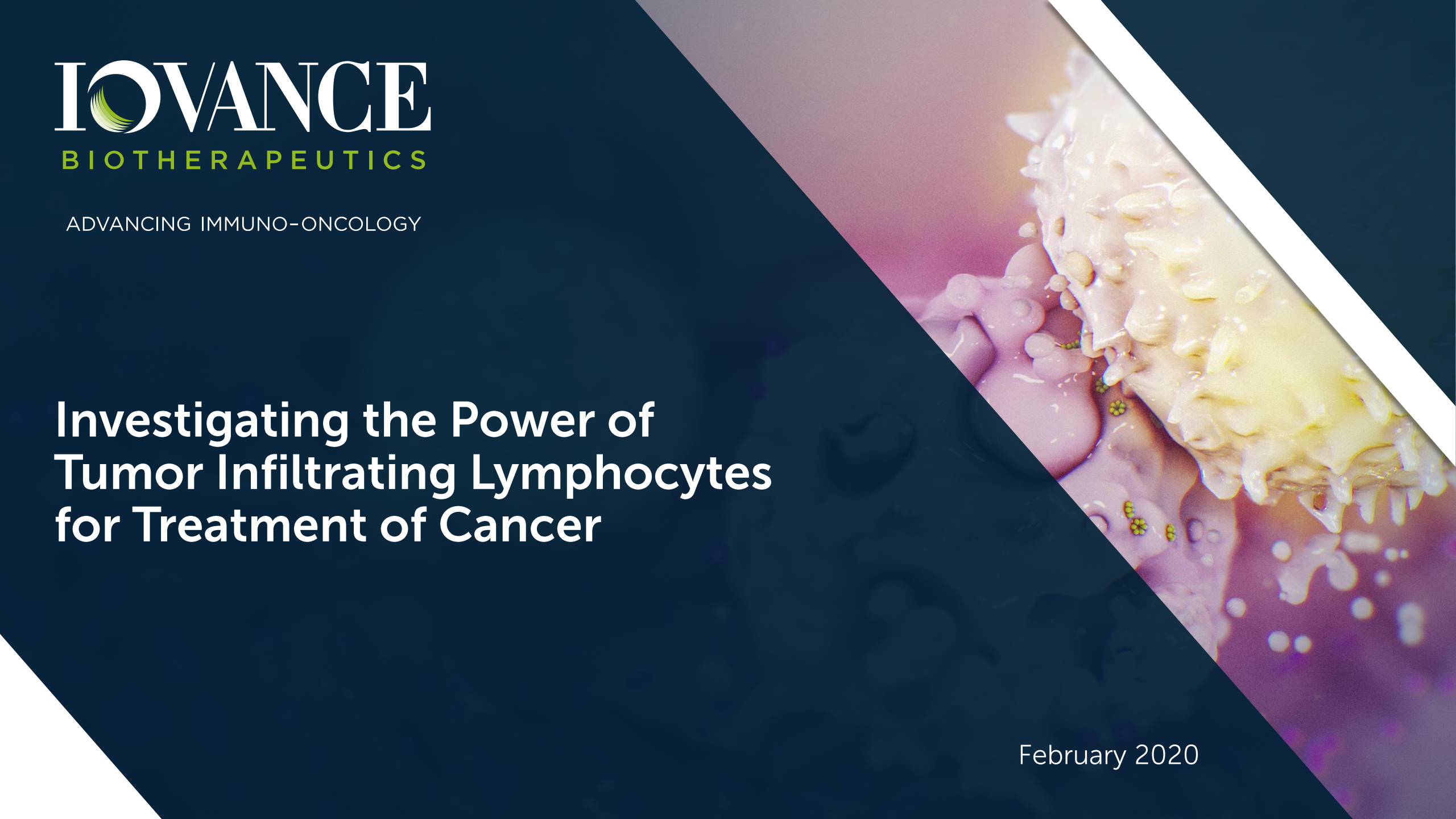
IOVANCE BIOTHERAPEUTICS

ADVANCING IMMUNO-ONCOLOGY

Investigating the Power of Tumor Infiltrating Lymphocytes for Treatment of Cancer



February 2020

Forward Looking Statements

This presentation contains "forward-looking statements" of Iovance Biotherapeutics, Inc. (hereinafter referred to as the "Company," "we," "us," or "our"). We may, in some cases, use terms such as "predicts," "believes," "potential," "continue," "estimates," "anticipates," "expects," "plans," "intends," "may," "could," "might," "will," "should" or other words that convey uncertainty of future events or outcomes to identify these forward-looking statements. The forward-looking statements include, but are not limited to, risks and uncertainties relating to the success, timing, projected enrollment, manufacturing capabilities, and cost of our ongoing clinical trials and anticipated clinical trials for our current product candidates (including both Company-sponsored and collaborator-sponsored trials in the U.S. and Europe), such as statements regarding the timing of initiation and completion of these trials or cohorts within these trials; the timing of, and our ability to, obtain and maintain U.S. Food and Drug Administration ("FDA") or other regulatory authority approvals of, or other action with respect to, our product candidates, including those product candidates that have been granted breakthrough therapy designation ("BTD") or regenerative medicine advanced therapy designation ("RMAT") by the FDA; the strength of our product pipeline; the successful implementation of our research and development programs and collaborations, including our licensed products; the success of our manufacturing, license or development agreements; the acceptance by the market of the our product candidates, if approved; our ability to obtain tax incentives and credits; and other factors, including general economic conditions and regulatory developments, not within the our control. The factors discussed herein could cause actual results and developments to be materially different from those expressed in or implied by such statements. Actual results may differ from those set forth in this presentation due to the risks and uncertainties inherent in our business, including, without limitation: the FDA may not agree with our interpretation of the results of our clinical trials; later developments with the FDA may be inconsistent with already completed FDA interactions; preliminary clinical results, including efficacy and safety results, from ongoing clinical trials may not be reflected in the final analyses of these trials, including new cohorts within these trials; the results obtained in our ongoing clinical trials, such as the studies and trials referred to in this presentation, may not be indicative of results obtained in future clinical trials or supportive of product approval; regulatory authorities may potentially delay the timing of FDA or other regulatory authority approval of, or other action with respect to, our product candidates (specifically, our description of FDA interactions are subject to FDA's interpretation, as well as FDA's authority to request new or additional information); our ability to address FDA or other regulatory authority requirements relating to its clinical programs and registrational plans, such requirements including, but not limited to, clinical and safety requirements as well as manufacturing and control requirements; risks related to our accelerated FDA review designations, including BTD and RMAT and our ability to benefit from such designations; our ability to obtain and maintain intellectual property rights relating to its product pipeline; our ability to progress preclinical candidates into the clinic; and the potential reimbursement of our product candidates by payors, if approved.

For more detailed information about the risks and uncertainties that could cause actual results to differ materially from those implied by, or anticipated in, these forward-looking statements, please refer to the Risk Factors section of the Company's Annual Report on Form 10-K and subsequent updates that may be contained in the Company's Quarterly Reports on Form 10-Q and Current Reports on Form 8-K on file with the SEC. Forward-looking statements speak only as to the date they are made. Except as required by law, we do not undertake to update forward-looking statements to reflect circumstances or events that occur after the date the forward looking statements are made. This presentation does not constitute an offer to sell or buy securities, and no offer or sale will be made in any state or jurisdiction in which such offer or sale would be unlawful prior to registration or qualification under the securities laws of any such state or jurisdiction.

Recent Updates

IOV-3001: Developing an expectedly better IL-2 analog

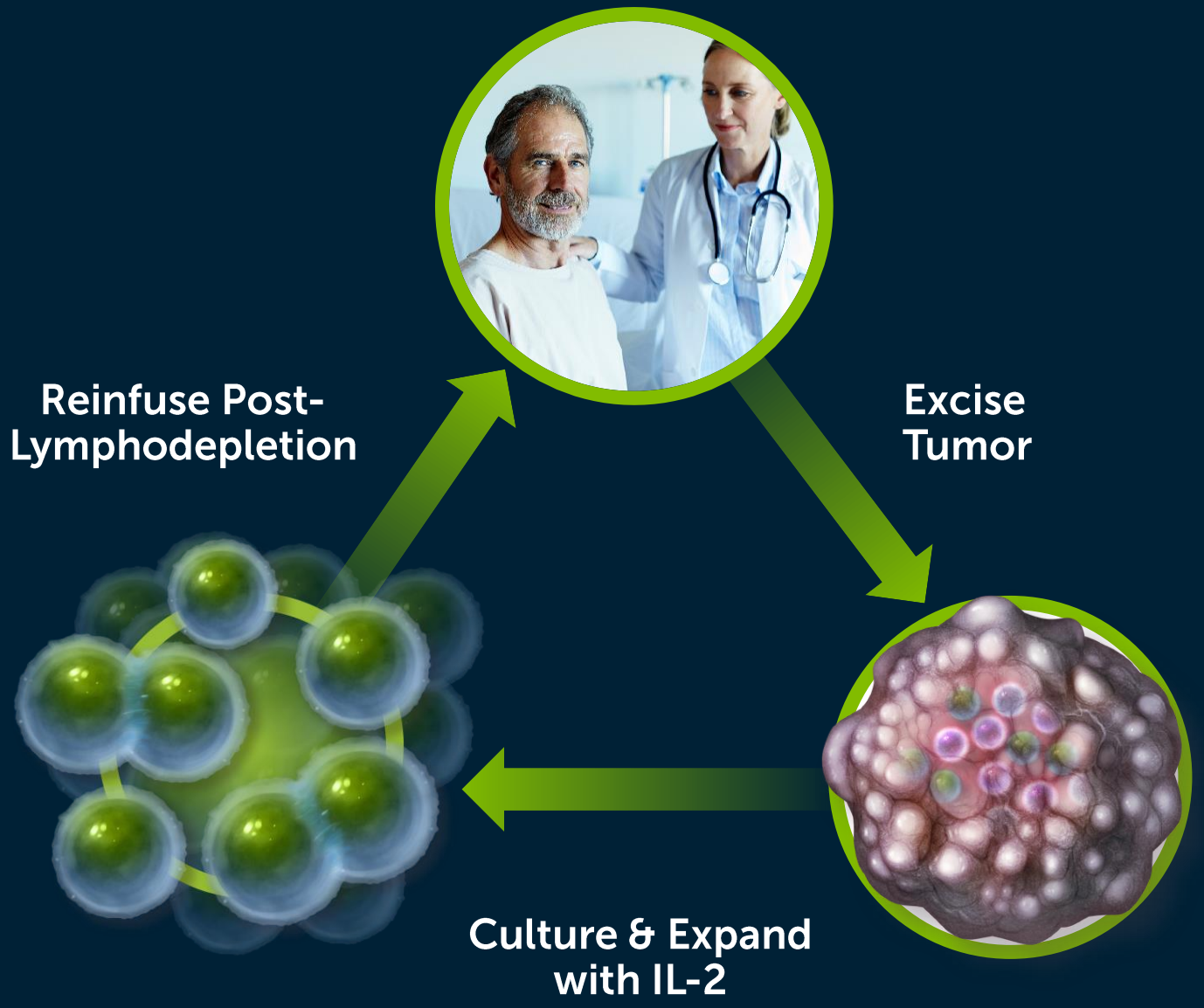
Cellectis Research Agreement: Enabling genetic modification of TIL through an exclusive world wide license:

- Access to genetic modification tool, paired with
- Platform of TIL polyclonal cells

Last patient dosed in Cohort 4 pivotal melanoma program: supporting a BLA in melanoma in 2020

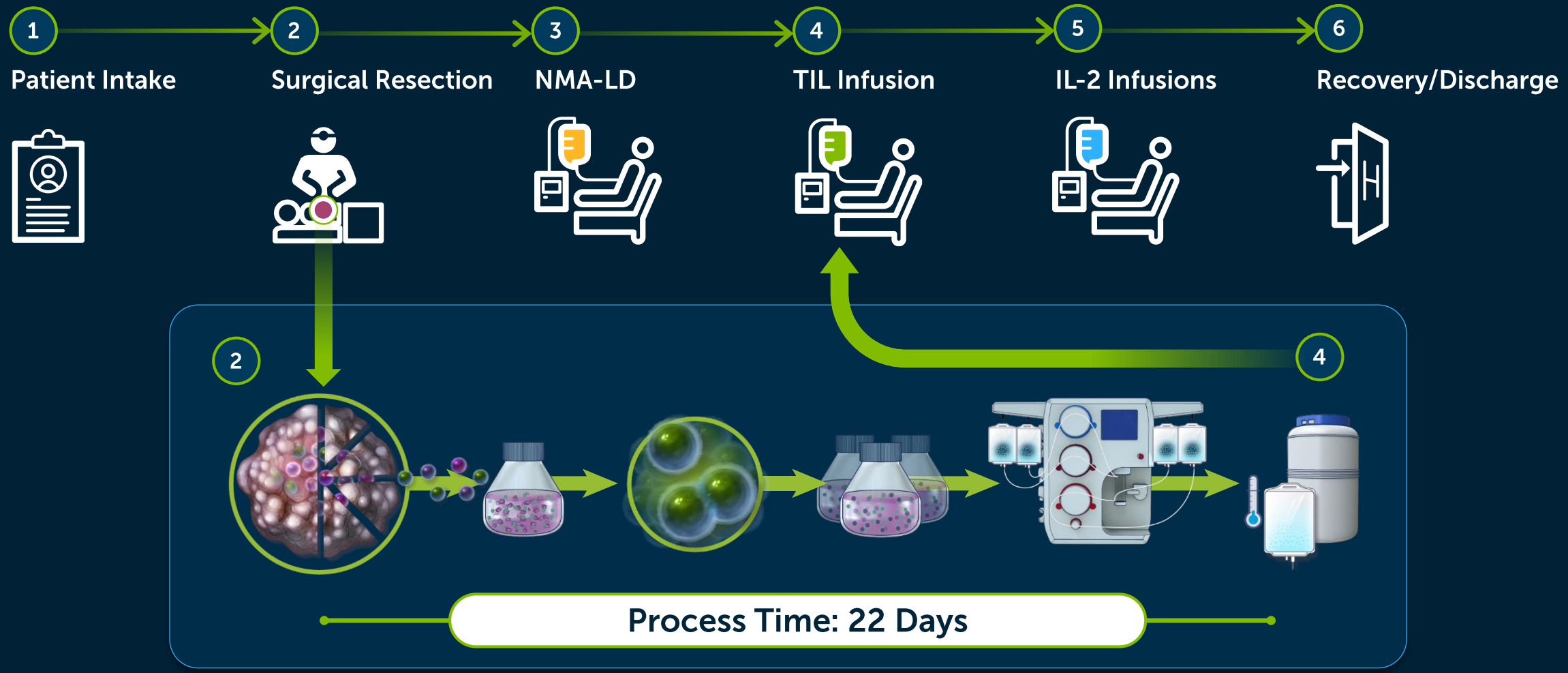
Tumor-Infiltrating Lymphocytes (TIL) – Unique Mechanism in Immuno-oncology

- Highly personalized therapy
- Our own immune system amplified and rejuvenated

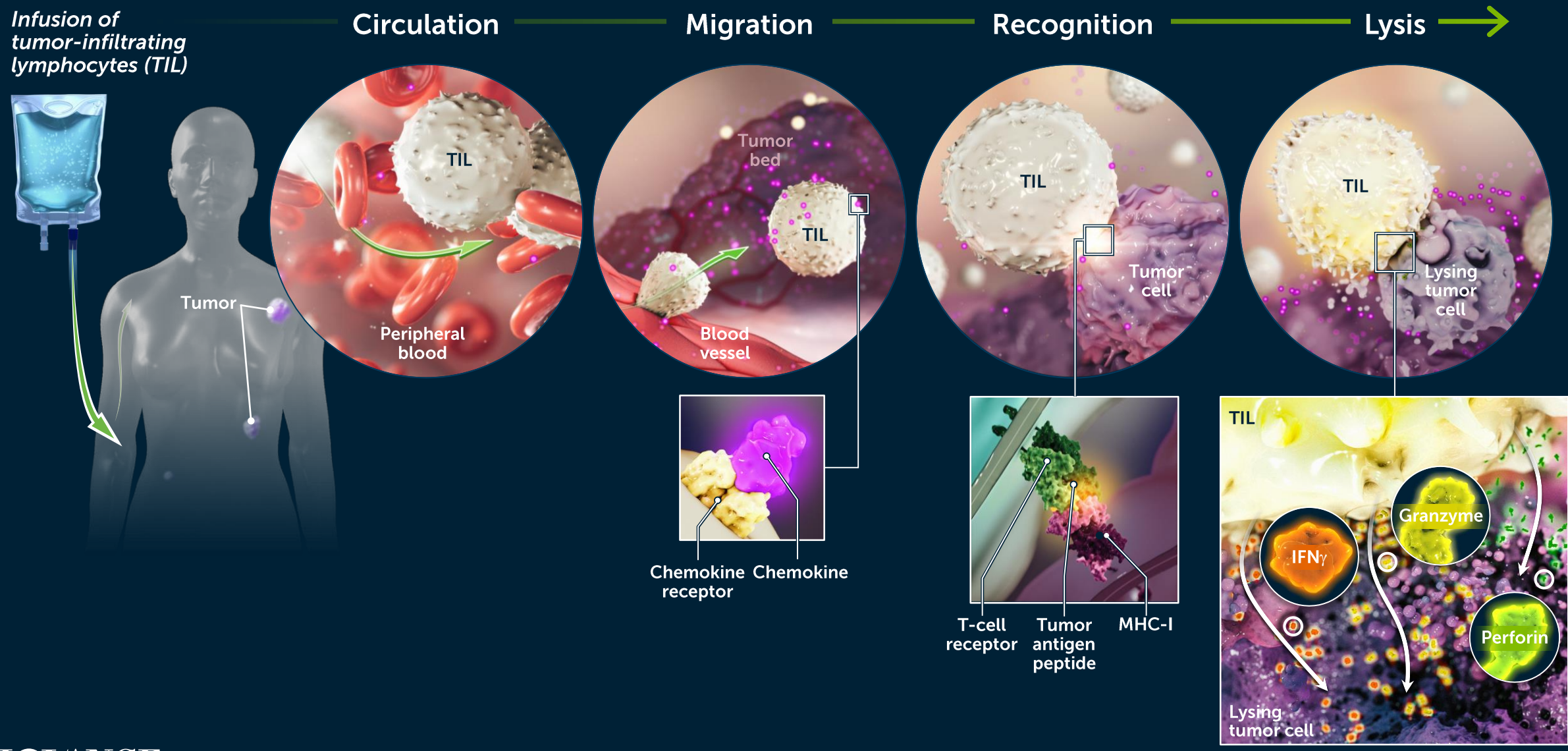


IOVANCE

Iovance Proprietary Centralized, Scalable, and Efficient GMP Manufacturing



TIL Mechanism of Action



Leveraging Tumor Infiltrating Lymphocyte (TIL) to Address Unmet Need

Discovery | **Manufacturing Development, Clinical Program Establishment** | **Pre-Commercialization**

2011

TIL therapy conducted by Steven Rosenberg/NCI published results showing: **56% ORR**[1] and **24% CR** rate in melanoma patients, with durable CRs as an early line therapy[2]

2015

FDA Orphan Drug Designation for lifileucel in malignant melanoma

2016

First patient dosed for Gen 1 lifileucel in melanoma

Gen 2 manufacturing developed and transferred to CMOs

2017

Efficacy data from **Gen 2 proprietary, centralized and commercial process** presented

Head & Neck and Cervical studies began

FDA Fast Track designation for lifileucel in melanoma received

Partnership with MD Anderson on multiple solid tumors

Partnership with Ohio State University for PBL in **hematological malignancies**

2018

European sites activated for Melanoma & Cervical

FDA RMAT designation for lifileucel in advanced melanoma received

FDA EOP2 meeting for lifileucel held

Lifileucel Cohort 2 clinical data showed **38% ORR in 47 patients**, patients with average 3.3 prior lines of therapy

Two rounds of financing conducted: **over $425 mil raised**

2019

First patient dosed for melanoma registrational trial

FDA Fast Track, BTD in cervical

Interim data **for melanoma showed 36.4% ORR** and **cervical 44% ORR**

Groundbreaking on **commercial production** facility in Philadelphia

FDA EOP 2 held for LN-145 for cervical

File IND for PBL in chronic lymphocytic leukemia (CLL), IND cleared

Clinical IRC **data from Cohort 2 of melanoma at SITC shows 35% ORR**

2020

Dose last patient in Cohort 4 pivotal melanoma program

Complete enrollment for registrational Cohort 1 in cervical

Hold pre-BLA meeting with FDA

Submit BLA for lifileucel for melanoma

Plan for **BLA submission** for LN-145 for cervical

[1] Rosenberg, S. A., et al. *Clinical Cancer Research*, 2011, 17, 4550
[2] Goff, S. L. et al. *Journal of Clinical Oncology*, 2016, 34(20), 2389-2397

IOVANCE

Key Highlights

2019: Melanoma Data update at SITC (8 Nov 2019)[1]

Melanoma Cohort 2 showed

36.4% ORR

by investigator and

34.8% ORR

as read by independent review committee (IRC) (N=66)

2020: Updated Melanoma Data cut (2 Jan 2020)

› **Median DOR not reached at 15.5 months of median study follow up**

(investigator assessed)

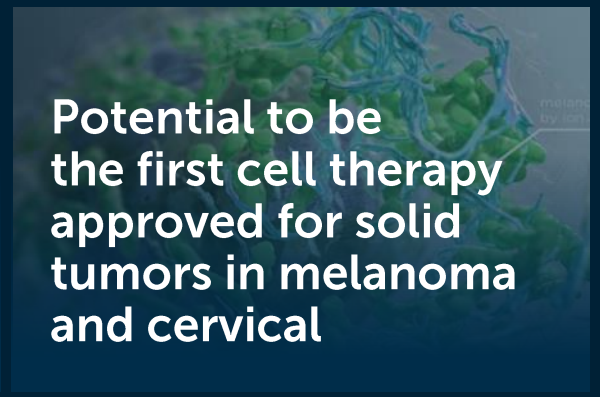
(1) Sarnaik et al., SITC 2019, P865

Investment Highlights

Leading cell therapy company focused on treatment of solid tumors

Large market opportunity and strong unmet need

- Initial focus in post-checkpoint solid tumors
- Expansion into combinations and earlier lines of therapy
- Five company-sponsored programs in melanoma, cervical, head & neck, non-small cell lung cancer (NSCLC), and CLL indications



Potential to be the first cell therapy approved for solid tumors in melanoma and cervical

- Accelerated path to approval in melanoma and cervical cancer
- Last patient dosed in pivotal trial for melanoma and BLA filing expected 2H 2020
- Melanoma: RMAT, Orphan Drug, and Fast Track
- Cervical: BTD, Orphan Drug and Fast Track

Efficient and scalable proprietary manufacturing

- U.S. and E.U. capacity with contract manufacturers
- Building Iovance 136,000 sq. ft. manufacturing facility in Philadelphia
- Rapid 22-day Gen 2 manufacturing with >90% success rate
- **300+ patients treated with Iovance proprietary process**

Broad platform and wide applications explored through partnerships

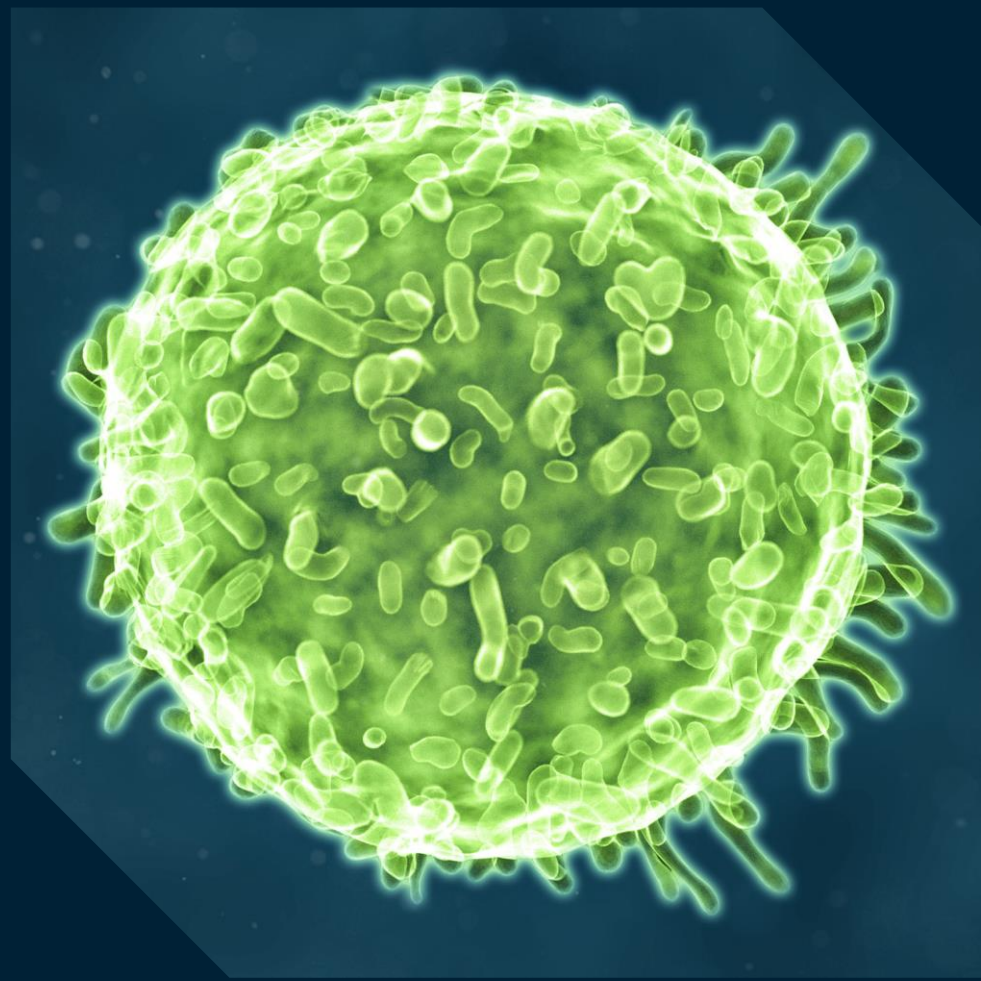
- Investigator-led programs to evaluate additional solid tumors or new combinations
- Touch points with institutions including NIH/NCI, Moffitt Cancer Center, MD Anderson, Yale, and University of Montreal (CHUM)

IOVANCE

Highly Individualized, Specific, and Potent Attack Against Cancer

Leverages and enhances the body's natural defense against cancer using a patient's own Tumor Infiltrating Lymphocytes, or TIL

- **Polyclonal**: Can recognize multiple neoantigens:
  - Effective in solid tumors which are heterogeneous
  - Available data in melanoma, cervical, head & neck, and lung cancers
- **Individualized**: TIL of each patient is specific and private with almost no overlap of uCDR3 between patients[1]
- **Persistence**: 100% of patients had TIL persisting at Day 42[1]
- **Immunological memory**: Potentially no additional maintenance therapy after infusion:
  - Responses seen in both treatment naïve and refractory melanoma patients, including checkpoint refractory
  - Complete responses observed in cervical cancer patients, maintained at 53 and 67 months[2]



[1] Gontcharova, et al., Persistence of cryopreserved tumor-infiltrating lymphocyte product lifileucel (LN-144) in C-144-01 study of advanced metastatic melanoma, AACR 2019, Abstract #LB-069
[2] Stevanovic, et al., Treatment of Metastatic Human Papiliomavirus-Associated Epithelial Cancers with Adoptive Transfer of Tumor-Infiltrating T Cells, ASCO 2018, Abstract #3004

IOVANCE

Competitive Advantages of TIL in Solid Tumors

Checkpoints	TCR	CAR-T (Liquid tumors)	TIL (Solid tumors)
Target multiple tumor antigens	Target only single tumor antigen	Mainly target only single/ surface tumor antigen	**Target multiple tumor antigens**
Long maintenance period	One-time treatment	One-time treatment	**One-time treatment**
Utility in several solid tumors	Few solid tumors treated so far	No examples of successful utility in solid tumors	**Available data in: melanoma, cervical, head & neck, and lung cancers**
Potential long-term irreversible toxicities	Potential on-target, off-tissue effects	Potentially immunogenic: cytokine release syndrome	**No unexpected off-tissue effects found to date**
Off-the-shelf	Autologous	Autologous	**Autologous**

TIL target a diverse array of cancer antigens; we believe this approach represents a **highly differentiated, customized, and targeted immunotherapy**

IOVANCE

Broad, Iovance-Owned IP Around TIL Therapy

Manufacturing

Nine granted or allowed U.S. patents for compositions and methods of treatment in a broad range of cancers relating to Gen 2 manufacturing process including combinations with PD-1 antibodies:

- US Patent No. 10,130,659
- US Patent No. 10,166,257
- US Patent No. 10,272,113
- US Patent No. 10,363,273
- US Patent No. 10,398,734
- US Patent No. 10,420,799
- US Patent No. 10,463,697

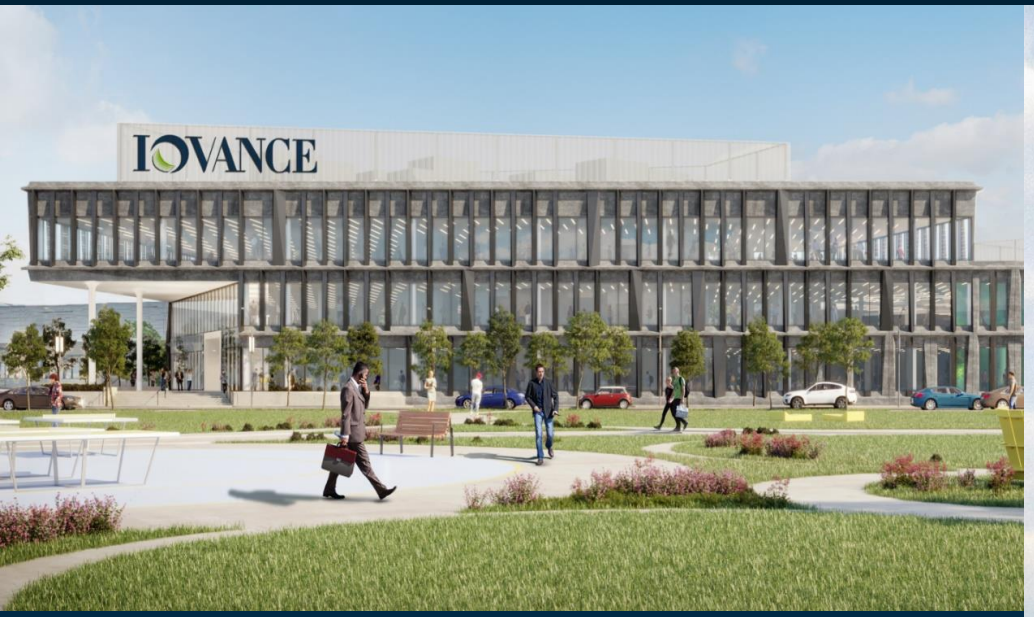
Advanced Technologies

Patent applications filed for a wide range of TIL technologies including:

- Marrow infiltrating (MIL) and peripheral blood lymphocyte therapies (PBL)
- Novel manufacturing processes including selected TIL process
- Use of costimulatory molecules in TIL therapy
- Stable and transient genetically-modified TIL therapies
- Patient subpopulations for TIL therapies

IOVANCE

Iovance Commercial Manufacturing Facility



- Build-to-suit custom facility located in the Navy Yard, Philadelphia, PA
- ~136,000 sq. feet, $85 mil investment
- Commercial GMP production is expected to commence in 2022
- Significant reduction in COGS expected

Significant Market Potential in Solid Tumors

90%
of all cancer cases are solid tumors

1.6M
New cases of solid tumors in the U.S.[1]

Move into earlier line of therapy

Expand into other indications

Solid Tumor Indication	Deaths[1]	New Cases[1]
Melanoma	7,230	96,480
Cervix Uteri	4,250	13,170
Oral Cavity, Pharynx & Larynx	10,860	53,000
Lung & Bronchus	142,670	228,150
Bladder	17,670	80,470
Breast	41,760	268,600
Pancreatic	45,750	56,770
Brain & Other Nervous System	17,760	23,820
	Potential to address unmet need in late lines of treatment	**Potential market for early lines in combo with standard of care**

[1] https://seer.cancer.gov

IOVANCE

Current Clinical Pipeline and Select Collaboration Studies

	Regimen	Trial	Indication	N	Partner	Phase 1	Phase 2	Pivotal
Company sponsored studies	**Lifileucel**	C-144-01	Melanoma	178	—			
	LN-145	C-145-04	Cervical cancer	138	—			
	LN-145/ LN-145-S1	C-145-03	Head & neck cancer	55	—			
	Lifileucel + pembrolizumab **LN-145 + pembrolizumab** **LN-145 + pembrolizumab** **LN-145**	IOV-COM-202	Melanoma Head & neck Non-small cell lung Non-small cell lung	48	—			
	IOV-2001	IOV-CLL-01	Chronic lymphocytic leukemia	~70	—			
Select investigator sponsored proof-of-concept studies	**MDA TIL**	NCT03610490	Ovarian, colorectal, pancreatic	~54	MD Anderson Cancer Network™			
	LN-145	NCT03449108	Ovarian, sarcomas	~54	MD Anderson Cancer Network™			

For the studies listed in our collaboration pipeline table, the partner listed above is the sponsor of the clinical trial. Such partner may not use our Gen 2 manufacturing process and/or the therapeutic dosing may differ from our clinical trials. As a result, such partner data may not be representative of our data.

IOVANCE

IOVANCE BIOTHERAPEUTICS

ADVANCING IMMUNO-ONCOLOGY

Metastatic Melanoma

Potential Market for Metastatic Melanoma

- **Estimated 7,230**[1] U.S. patients deaths due to melanoma
- Limited options after progression on checkpoint and BRAF/MEK inhibitors

> *"Nature has selected TIL to recognize features unique to the tumor not present on normal tissues, which helps make a TIL therapy approach effective compared to other cell therapy strategies for solid tumors. Iovance TIL treatment has a novel mechanism of action, completely separate from those of other treatment options, and has resulted in highly durable responses in patients that have progressed on prior FDA-approved treatment for their metastatic melanoma."*

— Dr. Amod Sarnaik
Department of Cutaneous Oncology, the Immunology Program and the Melanoma Center of Excellence at Moffitt Cancer Center

Metastatic Melanoma Facts

309k **New Cases WW** each year[3]

62k **Deaths WW** each year[3]

96k **Diagnoses in U.S.** each year[1]

7k **Deaths in U.S.** each year[1]

Available care:
Immuno -therapy
as first line option

BRAF positive
patients treated with BRAF/MEK inhibitors

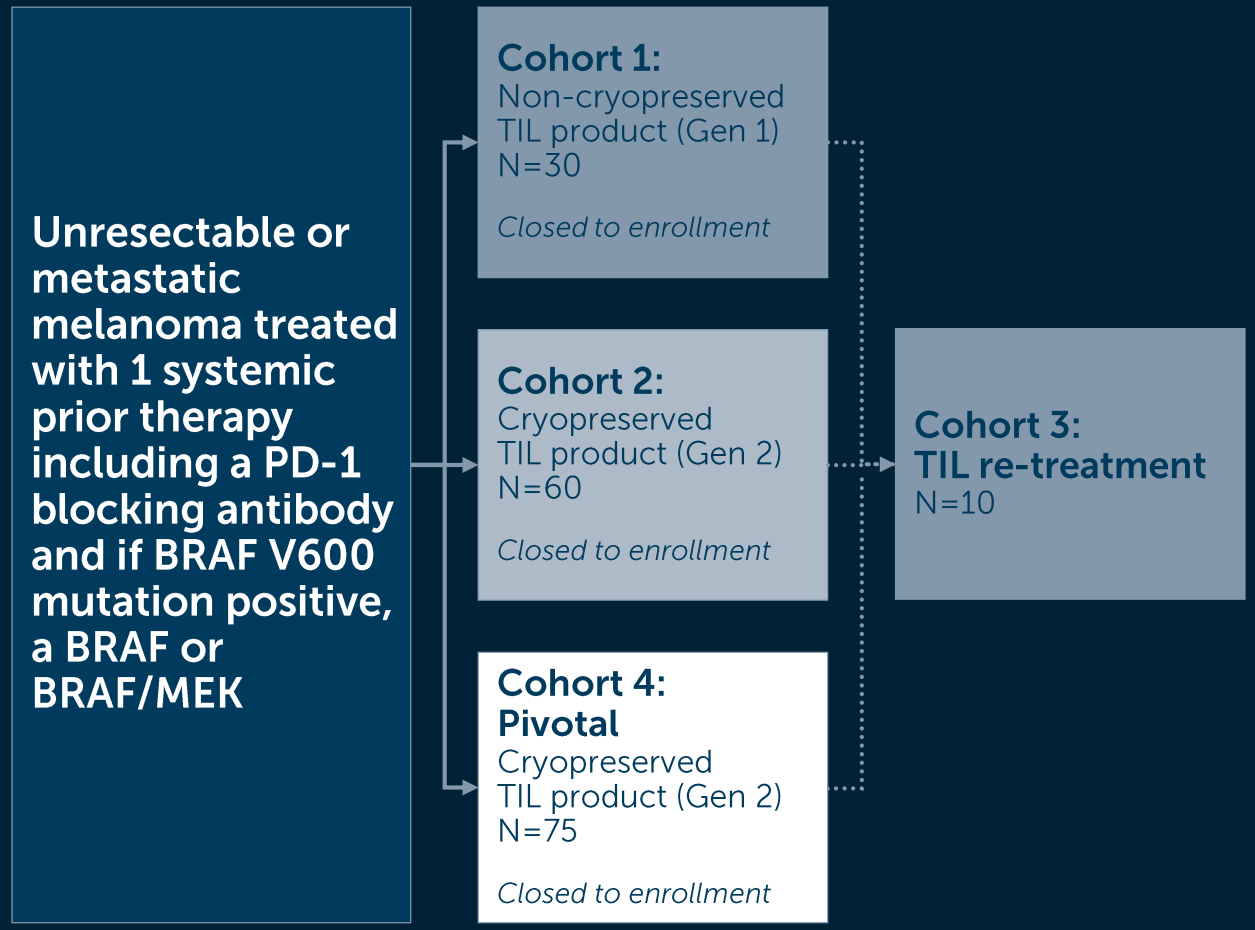
ORR 4-10% [2]
OS ~7-8 mons [4]
Retreatment with checkpoint inhibitors or chemotherapy post progression on anti-PD1 and BRAF/MEK[2]

[1] in 2019, https://seer.cancer.gov;
[2] CheckMate-37 Trial Results (ICC 10%), Keytruda label (4%);
[3] *JAMA Oncol*. 2019; 5(12):1749-1768. doi:10.1001/jamaoncol.2019.2996
[4] *Eur J Cancer*. 2016; 65:182-184. *J Clin Oncol*. 2018; 36 (suppl: abstr e21588)

IOVANCE

C-144-01: Phase 2 Study Design

Phase 2, multicenter study to assess the efficacy and safety of autologous Tumor Infiltrating Lymphocytes (lifileucel) for treatment of patients with metastatic melanoma (NCT02360579)



Endpoints

- Primary: Efficacy defined as IRC ORR
- Secondary: Safety and efficacy

Study Updates

- June 2019: Full Cohort 2 data on 66 patients presented at ASCO
- November 2019: IRC read of Cohort 2 data presented at SITC confirms prior response
- November 2019: Investigator read of Cohort 2 sub-analysis for primary refractory to PD-1 presented
- March 2019: Cohort 4 (pivotal trial) first patient dosed, Jan 2020 last patient dosed

IOVANCE

C-144-01: Cohort 2 Update at ASCO 2019

Key Inclusion Criteria

- Progression on at least one prior line of systemic therapy including immune checkpoint inhibitor and a BRAF or BRAF/MEK if indicated
- Age ≥ 18
- ECOG PS 0-1

Endpoints

- Primary: efficacy defined as ORR by investigator per RECIST 1.1
- Secondary: safety and efficacy

Baseline Demographics	N=66 (%)
Prior therapies	
Mean # prior therapies	3.3
Anti-PD-1	66 (100)
Anti-CTLA-4	53 (80)
BRAF/MEK	15 (23)
Progressive Disease (PD) for at least 1 prior therapy	
Anti-CTLA-4	41 (77)
Anti-PD-1	65 (99)
Target lesions sum of diameter (mm)	
Mean (SD)	106 (71)
Min, Max	11, 343
Baseline LDH (U/L)	
Median	244
1-2 times ULN	19 (29)
> 2 times ULN	8 (12)

IOVANCE

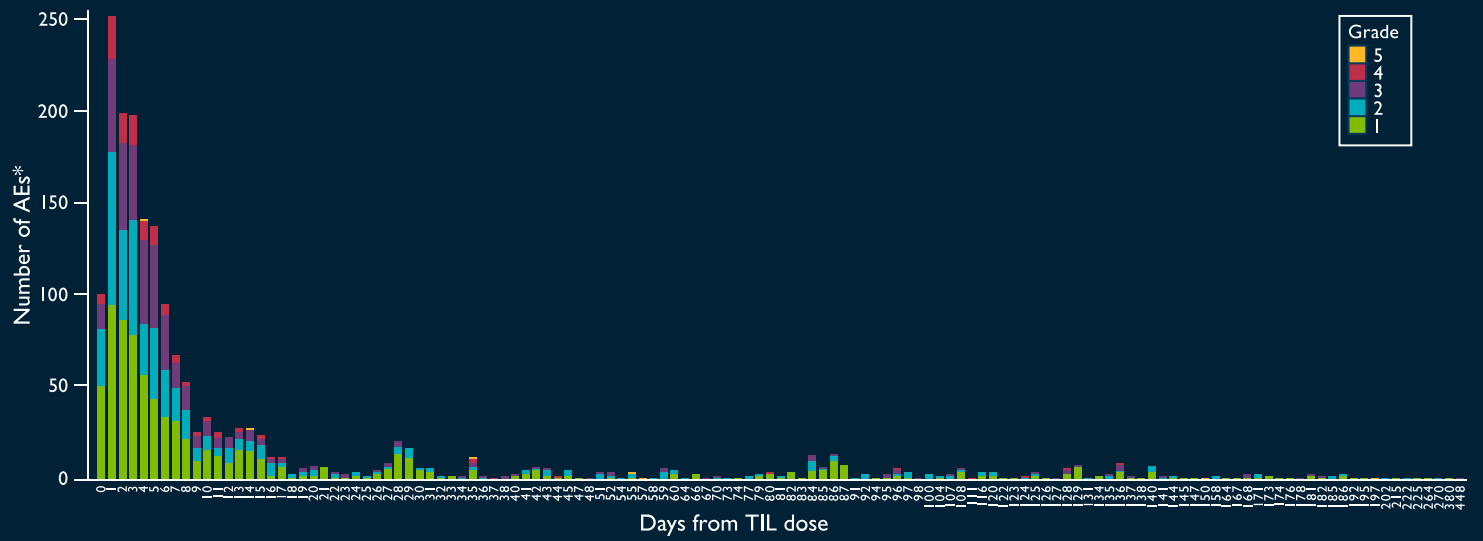
Adverse Events Tend to be Expected, Early and Transient

Frequency of AEs over time is reflective of potential benefit of one-time treatment with lifileucel

Lifileucel Treatment-Emergent Adverse Events (≥ 30%)

Preferred term	Cohort 2, N=66		
	Any Grade, n (%)	Grade 3/4, n (%)	Grade 5, n (%)
Number of patients reporting at least one Treatment-Emergent AE**	65 (98.5)	63 (95.5)	2 (3.0)
Thrombocytopenia	59 (89.4)	53 (80.3)	0
Chills	52 (78.8)	4 (6.1)	0
Anemia	44 (66.7)	36 (54.5)	0
Pyrexia	39 (59.1)	11 (16.7)	0
Febrile neutropenia	36 (54.5)	35 (53.0)	0
Neutropenia	36 (54.5)	25 (37.9)	0
Hypophosphatemia	29 (43.9)	22 (33.3)	0
Fatigue	27 (40.9)	1 (1.5)	0
Leukopenia	27 (40.9)	22 (33.3)	0
Hypotension	23 (34.8)	7 (10.6)	0
Tachycardia	22 (33.3)	1 (1.5)	0
Lymphopenia	21 (31.8)	19 (28.8)	0

Adverse Events Over Time



**Treatment-Emergent Adverse Events refer to all AEs starting on or after the first dose date of TIL up to 30 days. Patients with multiple events for a given preferred term are counted only once using the maximum grade under each preferred term. Safety terms which describe the same medical condition were combined. *The number of AEs is cumulative and represent the total number of patients dosed

IOVANCE

Potentially Efficacious Treatment for Patients with Limited Options

In heavily pretreated metastatic melanoma patients (3.3 mean prior therapies)

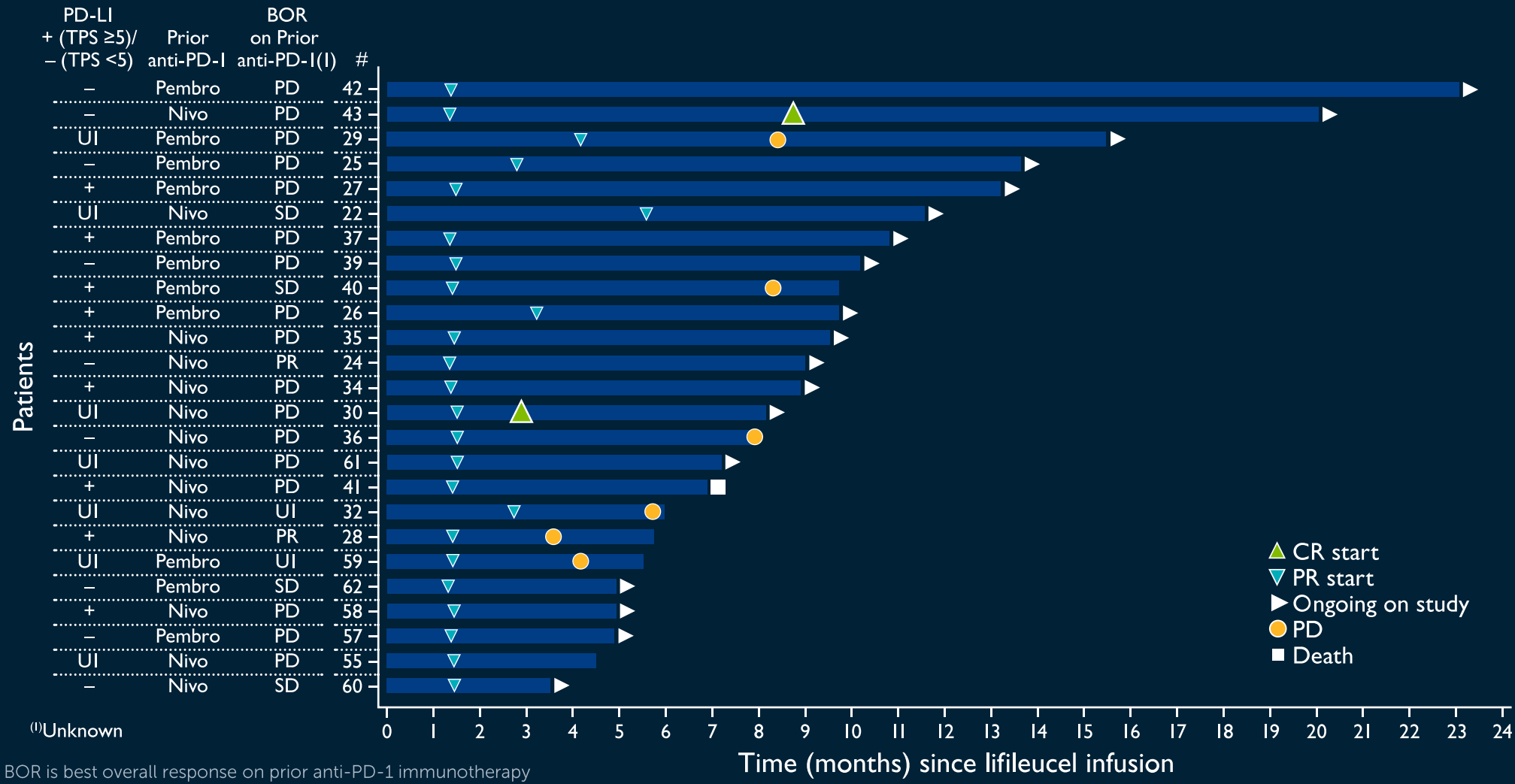
- **ORR 36%**
- **DCR 80%**
- ***Median DOR has not been reached***
  - ***Median study follow-up 15.5 months (as of 2 Jan 2020)- data update***
- Patients with PD-L1 negative status (TPS<5%) were among responders
- Mean TIL cells infused: 27.3 x 10^9
- Median number of IL-2 doses: 5.5

Responses	N=66 (%)
Objective Response Rate	**24 (36.4%)**
Complete Response	2 (3%)
Partial Response	22 (33.3%)
Stable Disease	29 (43.9%)
Progressive Disease	9 (13.6%)
Non-Evaluable	4 (6.1%)
Disease Control Rate	53 (80.3%)

IOVANCE

Responders Previously Progressed on Checkpoint Inhibitors

Lifileucel time to response and current duration of response for evaluable patients (partial response or better)

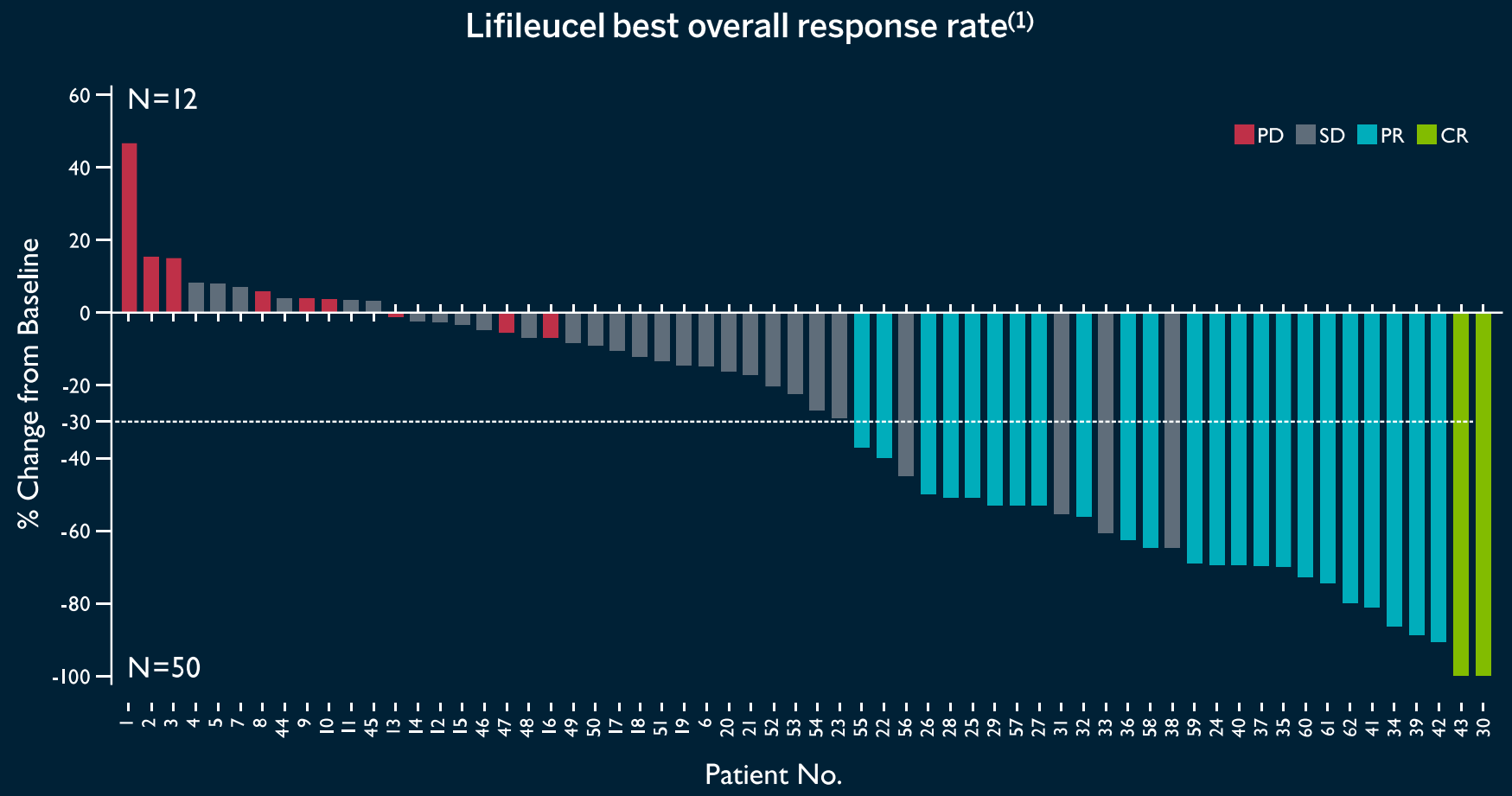


BOR is best overall response on prior anti-PD-1 immunotherapy
ASCO 2019: One patient subsequently was downgraded in response from PR to SD

IOVANCE

TIL Therapy Provides Deep Responses

- 81% of patients had a reduction in tumor burden
- Mean time to response 1.9 months (range 1.3-5.6)
- All assessments are by RECIST 1.1
- Responses are deep – nearly all responders are greater than 30%



(1)Three subjects had no post TIL disease assessment due to early death; one subject had no post-TIL disease assessment due to new cancer therapy.
For subject #30, 100% change from baseline is displayed for the CR visit involved lymph nodes.
ASCO 2019: One patient subsequently was downgraded in response from PR to SD

IOVANCE

IOVANCE BIOTHERAPEUTICS

ADVANCING IMMUNO-ONCOLOGY

SMR Annual Meeting | November 20-23, 2019 | Salt Lake City, UT, USA

Lifileucel, a Potential Therapy for Metastatic Melanoma Patients who are Primary Refractory to Prior Anti-PD1 Therapy

ClinicalTrials.gov identifier: NCT02360579

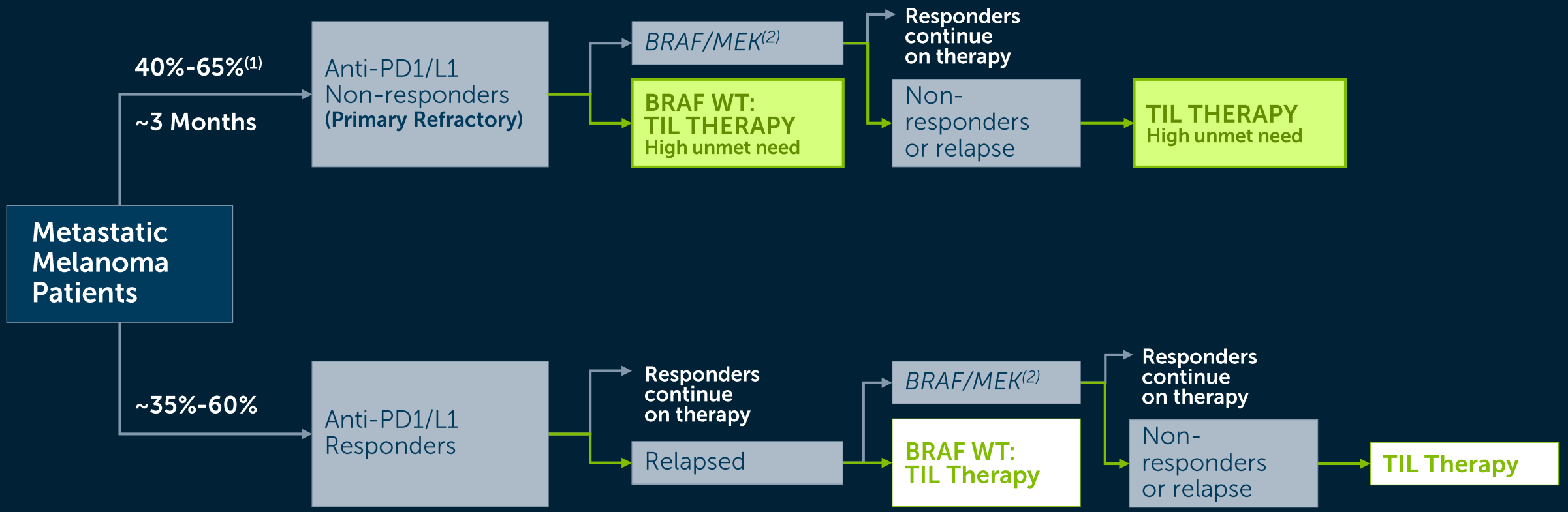
Metastatic Melanoma Patients who are Primary Refractory to Anti-PD1/L1

- High unmet medical need for patients with advanced melanoma who have a BOR of PD to checkpoint therapy, known as primary refractory or primary resistance
- 40-65% of all metastatic melanoma patients are primary refractory to initial immune Anti-PD1/L1 therapy[(1)]
- TIL therapy offers a potential therapeutic option in primary refractory metastatic melanoma patients
- A subset analysis of data from Cohort 2 of C-144-01 study focused on primary refractory patients was presented at Society for Melanoma Research (SMR) 2019 conference

[(1)] Gide T.N., et al. Primary and Acquired Resistance to Immune Checkpoint Inhibitors in Metastatic Melanoma. *Clin. Cancer Res.* 2018;24:1260–1270

Subset Analysis of Metastatic Melanoma Cohort 2 C-144-01 Patients Primary Refractory to Anti-PD1/L1

A subset analysis of data from Cohort 2 of C-144-01 study focused on primary refractory patients was presented at SMR 2019 conference



(1) Gide T.N., et al. Primary and Acquired Resistance to Immune Checkpoint Inhibitors in Metastatic Melanoma. *Clin. Cancer Res.* 2018;24:1260–1270. (2) Patients with BRAF V600E

C-144-01: Cohort 2 Update at SMR 2019

Characteristic	Cohort 2, n=42 (%)
Gender, n (%)	
Male	26 (62)
Female	16 (38)
Age	
Median	56
Min, Max	20, 77
Prior therapies, n (%)	
Mean # prior therapies	3.3
Anti-CTLA-4	33 (79)
Anti-PD-1	42 (100)
BRAF/MEK	9 (21)
Progressive Disease (PD) for at least 1 prior therapy	
Anti-CTLA-4	29 (88)*
Anti-PD-1	42 (100)
Baseline ECOG score, n (%)	
0	25 (60)
1	17 (40)

*% is calculated based on number of patients received prior anti-CTLA4.

Characteristic	Cohort 2, n=42 (%)
BRAF Status, n (%)	
Mutated V600	11 (26)
Wild Type	29 (69)
Unknown	2 (5)
Baseline LDH (U/L)	
Median	259
1-2 times ULN	10 (24)
> 2 times ULN	5 (12)
Target Lesion Sum of Diameter (mm)	
Mean (SD)	114 (78)
Min, Max	17, 343
Number of Target & Non-Target Lesions (at Baseline)	
>3	35 (83)
Mean	6
Patients with Baseline Liver and/or Brain Lesions	21 (50)

- In n=42 patients primary refractory to anti-PD-1/L1, defined as BOR of PD to the earliest anti-PD-1/L1 treatment:
  - Mean duration on first anti-PD-1/L1 was 3.1 months
  - 57% PD-L1 High/Positive (TPS ≥ 1%)

IOVANCE

Treatment Emergent Adverse Events (≥30%) Subset Analysis[1]

Patients Primary Refractory to Anti-PD1/L1

AEs are consistent with prior reports on the full Cohort 2 analysis set

Cohort 2 Patients Primary Refractory to Anti-PD1/PDL1, (N=42)

Preferred Term	Any Grade, n (%)	Grade ≥3, n (%)	Grade 5, n (%)
Number of subjects reporting at least one TEAE	42 (100)	41 (97.6)	2 (4.8)
Thrombocytopenia	38 (90.5)	33 (78.6)	0
Chills	32 (76.2)	3 (7.1)	0
Anemia	30 (71.4)	25 (59.5)	0
Pyrexia	25 (59.5)	7 (16.7)	0
Febrile neutropenia	23 (54.8)	23 (54.8)	0
Neutropenia	21 (50.0)	15 (35.7)	0
Hypophosphatemia	19 (45.2)	12 (28.6)	0
Leukopenia	18 (42.9)	15 (35.7)	0
Fatigue	18 (42.9)	1 (2.4)	0
Lymphopenia	15 (35.7)	13 (31.0)	0
Hypotension	14 (33.3)	5 (11.9)	0
Hypocalcemia	14 (33.3)	3 (7.1)	0
Aspartate aminotransferase increased	13 (31.0)	0	0
Diarrhea	13 (31.0)	1 (2.4)	0
Tachycardia	13 (31.0)	1 (2.4)	0

- Patients with multiple events for a given preferred term are counted only once using the maximum grade under each preferred term
- Treatment-Emergent Adverse Events refer to all AEs starting on or after the first dose date of TIL up to 30 days

Potentially Efficacious Treatment for Metastatic Melanoma[1]

Patients Primary Refractory to Anti-PD1/L1

	Cohort 2	
Response (Recist v1.1)	**Full analysis set, N=66 (%)**	**Patients Primary Refractory to Anti-PD1/L1, n=42 (%)**
Objective Response Rate (ORR)	**24 (36.4)**	**17 (40.5)**
Complete Response (CR)	2 (3.0)	2 (4.8)
Partial Response (PR)	22 (33.3)	15 (35.7)
Stable Disease (SD)	29 (43.9)	17 (40.5)
Progressive Disease (PD)	9 (13.6)	5 (11.9)
Non-Evaluable	4 (6.1)	3 (7.1)
Disease Control Rate (DCR)	53 (80.3)	34 (81.0)
Median Duration of Response (DOR)	**Not Reached**	**Not Reached**
Min, Max	2.2, 21.2+	2.8+, 21.2+

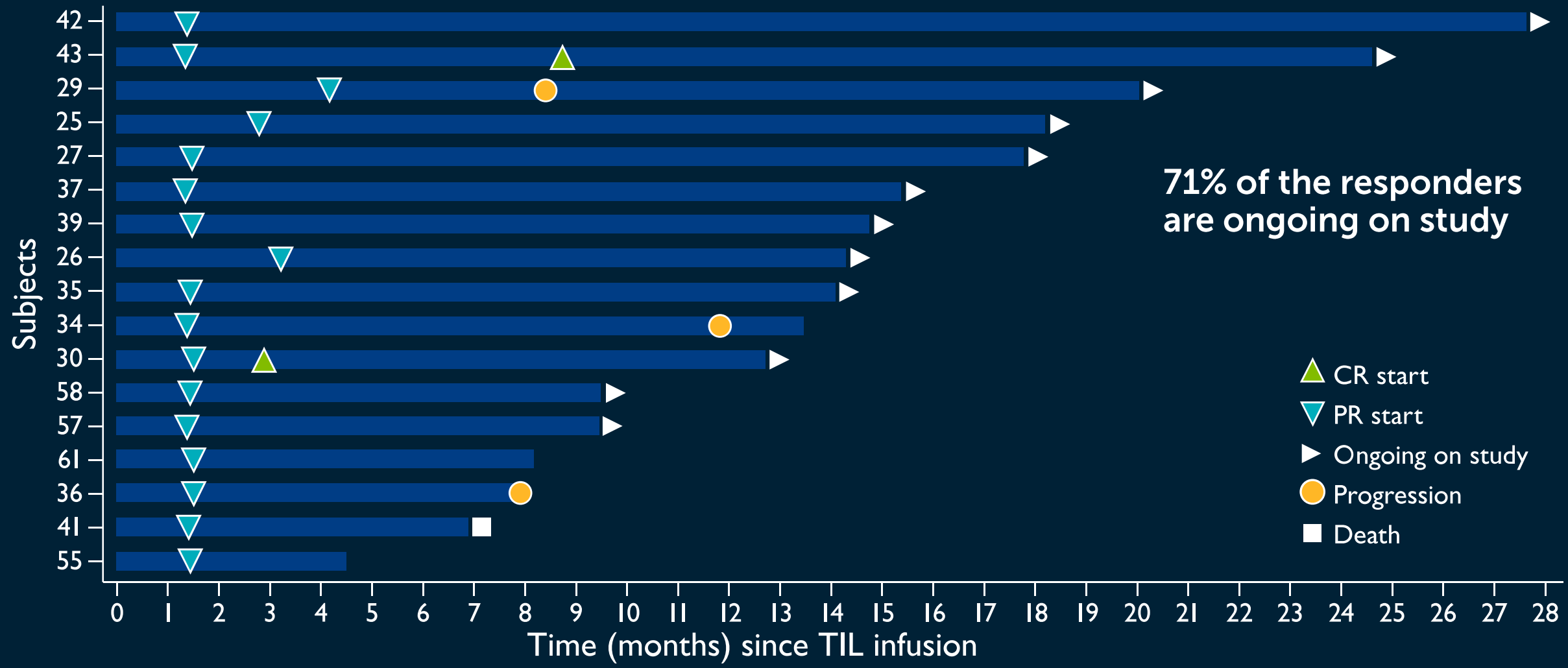
In 42 patients primary refractory to anti-PD1/L1:

- Median DOR has not been reached at median 12.0 months study follow up
- ORR was notable in this sub-group at 40.5%

IOVANCE

Time to Response for Evaluable Patients with PR or Better[1]

Patients Primary Refractory to Anti-PD1/L1



Lifileucel in Metastatic Melanoma Primary Refractory to Anti-PD1/L1

40-65% of all metastatic melanoma patients are primary refractory to initial ICI therapy(1)

Lifileucel offers a highly efficacious therapy in patients who were primary refractory to prior anti-PD1/L1 ICI therapy(2)

- 40.5% ORR in patients who were primary refractory to anti-PD1/L1, which is a better response than Cohort 2
- 71% of responders who were primary refractory to anti-PD1/L1 remain on study
- At 12 months of study follow up, median DOR has not been reached for primary refractory subset

(1) Gide T.N., et al. Primary and Acquired Resistance to Immune Checkpoint Inhibitors in Metastatic Melanoma. *Clin. Cancer Res.* 2018;24:1260–1270
(2) Sarnaik, et al SMR 2019

Cohort 4 is a Pivotal Single-Arm Registrational Trial

Key Inclusion Criteria

- Measurable metastatic melanoma and ≥ 1 lesion resectable for TIL generation
- Progression on at least one prior line of systemic therapy including immune checkpoint inhibitor and if BRAF V600 mutation positive, BRAF or BRAF/MEK targeted therapy

Endpoints

- Primary: efficacy defined as ORR by IRC
- Secondary: safety and efficacy

Study Updates

- Confirmed with FDA that a randomized Phase 3 study is not feasible in advanced melanoma post-CPI
- Jan 2020: Last patient dosed

Cohort 4 (Pivotal):
Cryopreserved TIL product (Gen 2)
N=75

Per FDA interaction

IOVANCE

Late Stage (2L/3L) Melanoma Treatment Development Efforts

2L/3L melanoma treatment has no current standard of care

	Agent	ORR % (N)	Current Development Status	Prior Lines of Tx	Patient Characteristics
Combination with Anti-PD-1	**Checkpoints**				
	LAG-3 + nivo (BMS)	12% (N=61)[1]	Multiple 1L studies	1+	All comers, ECOG ≤2 • LAG-3 expression ≥1% (N=33) ORR=18%; • LAG-3 expression <1% (N=22) ORR=5%
	TLR9 agonists, HDAC				
	IMO-2125 (Idera) + ipi	18% (N=49)[2]	Phase 3, post-PD-1 melanoma ILLUMINATE 204	1-3	ECOG ≤1, intratumoral injection
	CMP-001 (CheckMate) + pembro	25% (N=82)[3]	Phase 1b	1+	ECOG ≤1, intratumoral injection
	SD-101 (Dynavax) + pembro	19% (N=31) 13% (N=30)[4]	Phase 1b/2 (abandoned)[8]	1+	2mg, 1-4 lesions, 8 mg 1 lesion ECOG ≤1 intratumoral injection
	Entinostat (Syndax) + pembro	19% (N=53)[5]	ENCORE 601	1+	ECOG ≤1
Single Agent	**Checkpoints**				
	TIGIT, TIM-3	Unknown	Phase 1/2		
	Cytokines				
	HD IL-2	8% (N=9)[6]		1+	HD IL-2 post anti-PD1
	Other				
	TIL	**36.4% (N=66)[7]**	**Phase 2, continuing to enroll pivotal trial**	**3.3**	**All post anti-PD1**

[1] Ascierto P et al., ESMO 2017; [2] Idera Pharmaceuticals 8-K Aug 29, 2019; [3] Milhem M et al., SITC 2019; [4] Amin et al., ASCO 2019, Abstract 9555; [5] Ramalingam et al., AACR 2019; [6] Buchbinder EI et al., JCO 2017; [7] Sarnaik et al., SITC 2019; [8] DVAX press release May 23, 2019

IOVANCE

IOVANCE BIOTHERAPEUTICS

ADVANCING IMMUNO-ONCOLOGY

Cervical Cancer

Potential Market for Cervical Cancer

> *"TIL immunotherapy with LN-145 is literally redefining what is treatable and potentially curable in advanced metastatic chemo-refractory cervical cancer. Patients who only two years ago would be facing hospice as their only alternative now have access to this potentially life extending new treatment. This is the most exciting news in this field in decades."*

— Amir Jazaeri, M.D.
Director of the Gynecologic Cancer Immunotherapy Program in the Department of Gynecologic Oncology and Reproductive Medicine at MD Anderson

Cervical Cancer Facts

601k **New Cases WW** each year[1]

260k **Deaths WW** each year[1]

13k **Diagnoses in U.S.** each year[2]

4k **Deaths in U.S.** each year[2]

Available care:
Chemo -therapy
as first line option

For PD-L1 + patients, post-chemo receiving Keytruda[3]
ORR 14.3%

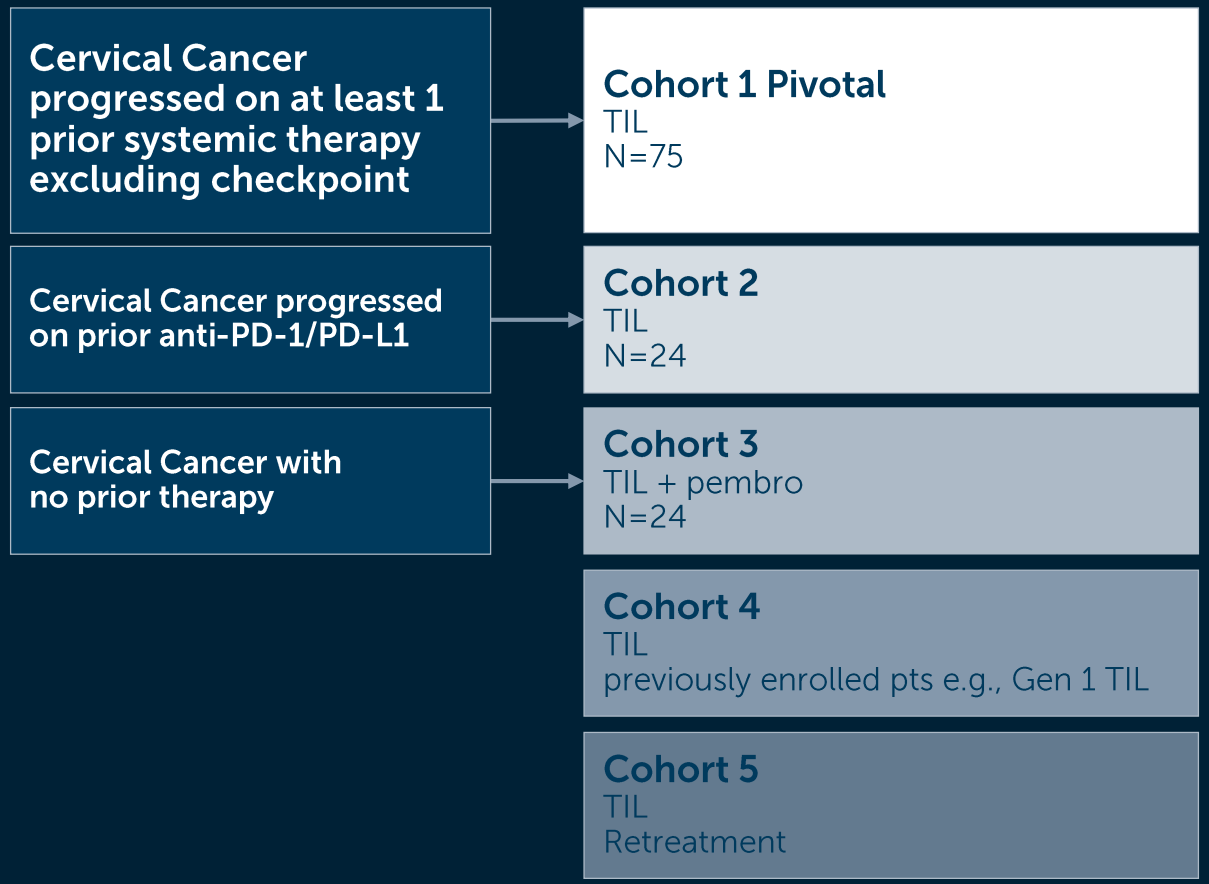
Available Care
for chemotherapy in 2L metastatic cervical patients
4.5-13%[4][5]

[1] JAMA Oncol. 2019;5(12):1749-1768. doi:10.1001/jamaoncol.2019.2996;
[2] https://seer.cancer.gov/
[3] https://www.merck.com/product/usa/pi_circulars/k/keytruda/keytruda_pi.pdf
[4] Schilder et al., Gynecologic Oncology 2005;
[5] Weiss, et al., A phase II trial of carboplatin for recurrent or metastatic squamous carcinoma of the uterine cervix: A Southwest Oncology Group Study

IOVANCE

C-145-04: Pivotal Phase 2 Trial in Cervical Cancer

Phase 2, multicenter study to evaluate the efficacy and safety of autologous Tumor Infiltrating Lymphocytes (LN-145) in patients with recurrent, metastatic or persistent cervical carcinoma (NCT03108495)



Endpoints

- Primary: ORR as determined by IRC
- Secondary: safety and efficacy

Study Updates

- March 2019: Fast Track designation
- May 2019: Breakthrough Therapy Designation
- June 2019: ASCO data presentation
- June 2019: FDA EOP2 held-existing study may be sufficient to support registration of LN-145
- July 2019: Study expanded to enroll a total of 75 patients
- November 2019: Additional cohorts added (Cohorts 2-5)

IOVANCE

LN-145 in Cervical Cancer Interim Update at ASCO 2019

Key Inclusion Criteria

- Recurrent, metastatic or persistent cervical carcinoma with at least 1 prior therapy
- Age ≥ 18

Endpoints

- Primary: efficacy defined as ORR by investigator per RECIST 1.1
- Secondary: safety and efficacy

Study Updates

- Protocol amended to increase total to 75 patients
- ORR as determined by IRC
- Fast Track and BTD received
- EOP2 meeting held with FDA

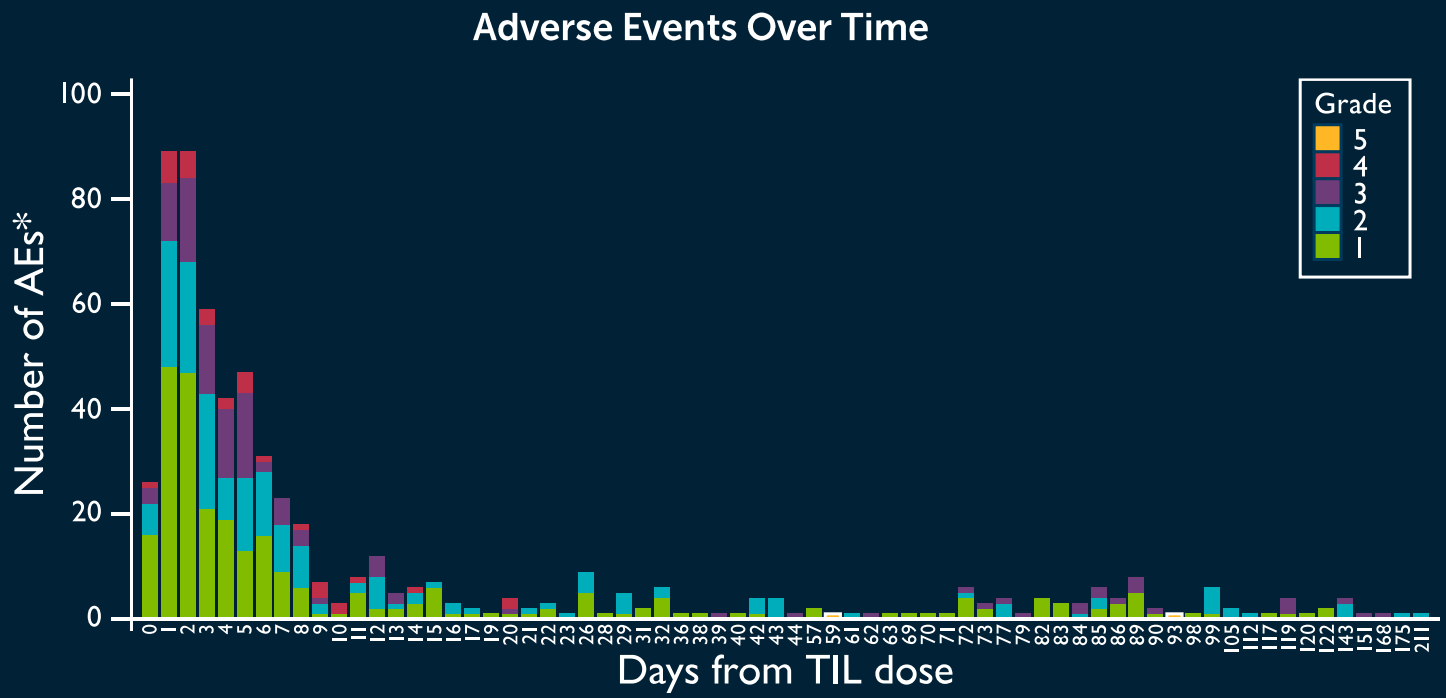
Baseline Demographics	N=27 (%)
Prior therapies	
Mean # prior therapies	2.4
Platinum-based	27 (100)
Taxane	26 (96)
Anti-VEGF	22 (82)
PD-1/PD-L-1	4 (15%)
Target lesions sum of diameter (mm)	
Mean (SD)	61 (38)
Min, Max	10, 165
Histologic Cell Type, n (%)	
Squamous Cell Carcinoma	12 (44)
Adenocarcinoma	12 (44)
Adenosquamous Carcinoma	3 (11)
Number of target & non-target lesions (at baseline)	
>3	17 (63)
Mean (min,max)	4 (1,9)

IOVANCE

Adverse Events Tend to be Early and Transient

Frequency of AEs over time is reflective of potential benefit of one-time treatment with TIL (LN-145)

Preferred Term	N=27 Any Grade, n (%)	Grade 3/4, n (%)	Grade 5, n (%)
Number of patients reporting at least one Treatment-Emergent AE**	**27 (100)**	**26 (96.3)**	**0**
Chills	21 (77.8)	0	0
Anemia	15 (55.6)	15 (55.6)	0
Diarrhea	14 (51.9)	2 (7.4)	0
Pyrexia	14 (51.9)	1 (3.7)	0
Thrombocytopenia	14 (51.9)	12 (44.4)	0
Neutropenia	11 (40.7)	8 (29.6)	0
Vomiting	11 (40.7)	1 (3.7)	0
Hypotension	10 (37.0)	4 (14.8)	0
Dyspnea	9 (33.3)	1 (3.7)	0
Febrile neutropenia	9 (33.3)	8 (29.6)	0
Hypoxia	9 (33.3)	3 (11.1)	0
Leukopenia	9 (33.3)	6 (22.2)	0
Hypomagnesemia	8 (29.6)	0	0
Sinus tachycardia	8 (29.6)	0	0



**Treatment-Emergent Adverse Events refer to all AEs starting on or after the first dose date of TIL up to 30 days. Patients with multiple events for a given preferred term are counted only once using the maximum grade under each preferred term. Safety terms which describe the same medical condition were combined; *The number of AEs is cumulative and represent the total number of patients dosed

IOVANCE

Significant Response Observed in Patients with Limited Options

In heavily pretreated cervical cancer patients (2.4 mean prior therapies)

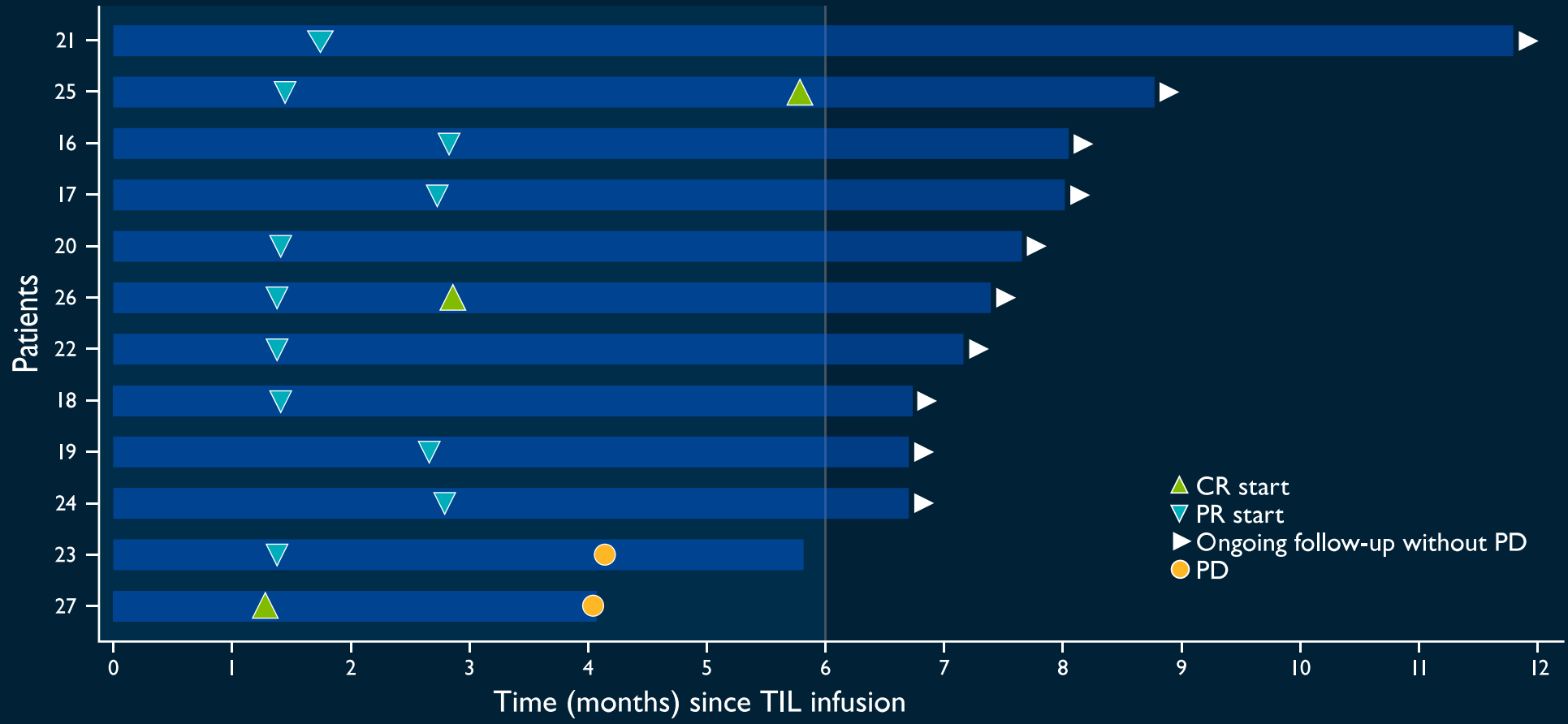
- **CR 11%**
- **ORR 44%**
- **DCR 85%**
- **Median DOR has not been reached**
  - Median follow-up 7.4 months
- Mean TIL cells infused: **28 x 10^9**
- Median number of IL-2 doses: 6.0

Responses	N=27 (%)
Objective Response Rate	**12 (44%)**
Complete Response	3 (11%)
Partial Response	9 (33%)
Stable Disease	11 (41%)
Progressive Disease	4 (15%)
Non-Evaluable	0
Disease Control Rate	23 (85%)

IOVANCE

Responses Observed Early On and Consistent with Melanoma

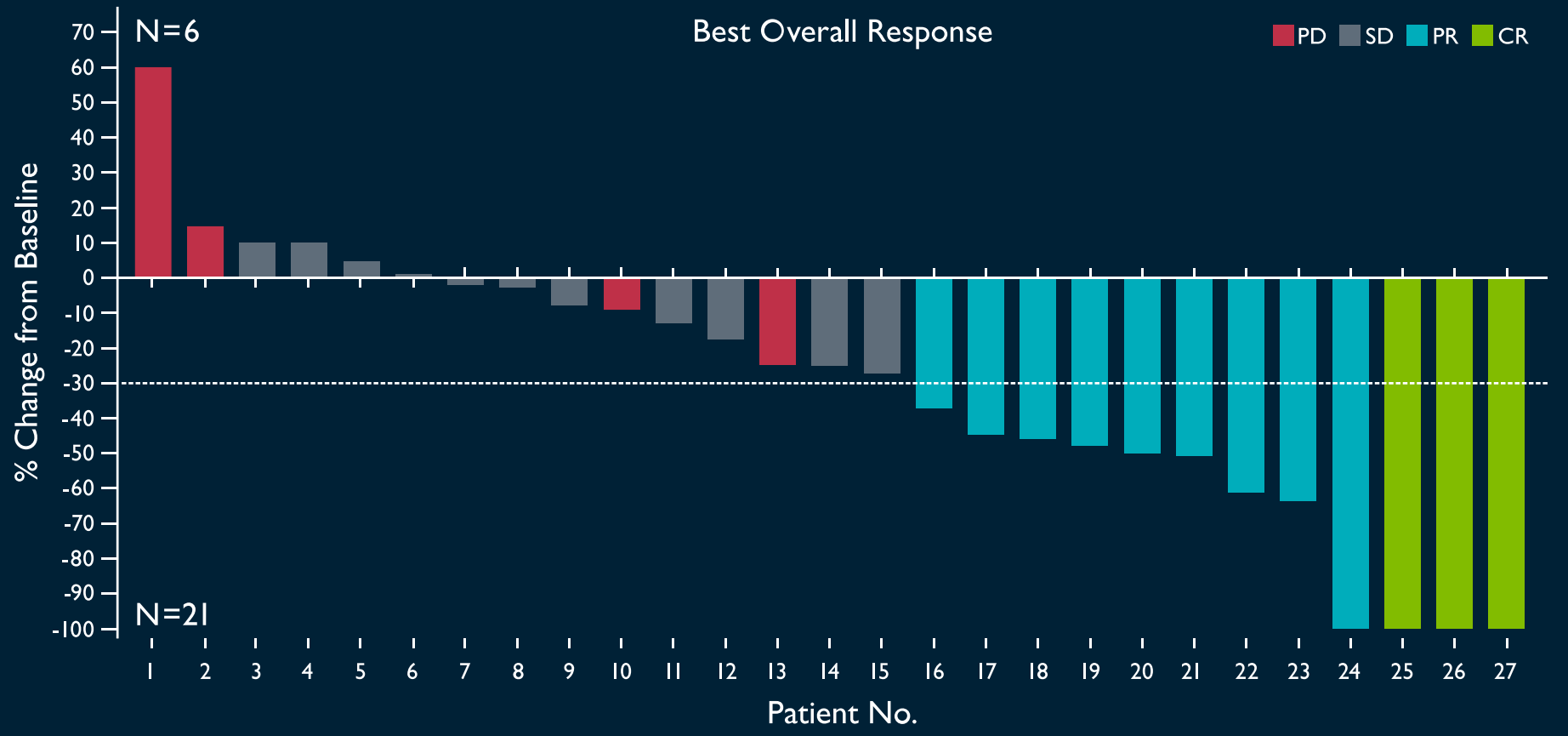
LN-145 time to response and current duration of for evaluable patients (partial response or better)



- Mean time to first response 1.9 months
- Mean time to best response 2.4 months

Three Complete Responses Observed with LN-145

LN-145 best overall response rate



- 78% of patients had a reduction in tumor burden
- Mean time to response 1.9 months
- All assessments are by RECIST 1.1
- Responses are deep with majority of responders are over 30%

IOVANCE

Development Efforts in Recurrent, Metastatic or Persistent Cervical Carcinoma

Recurrent, metastatic, or persistent cervical carcinoma has no current standard of care

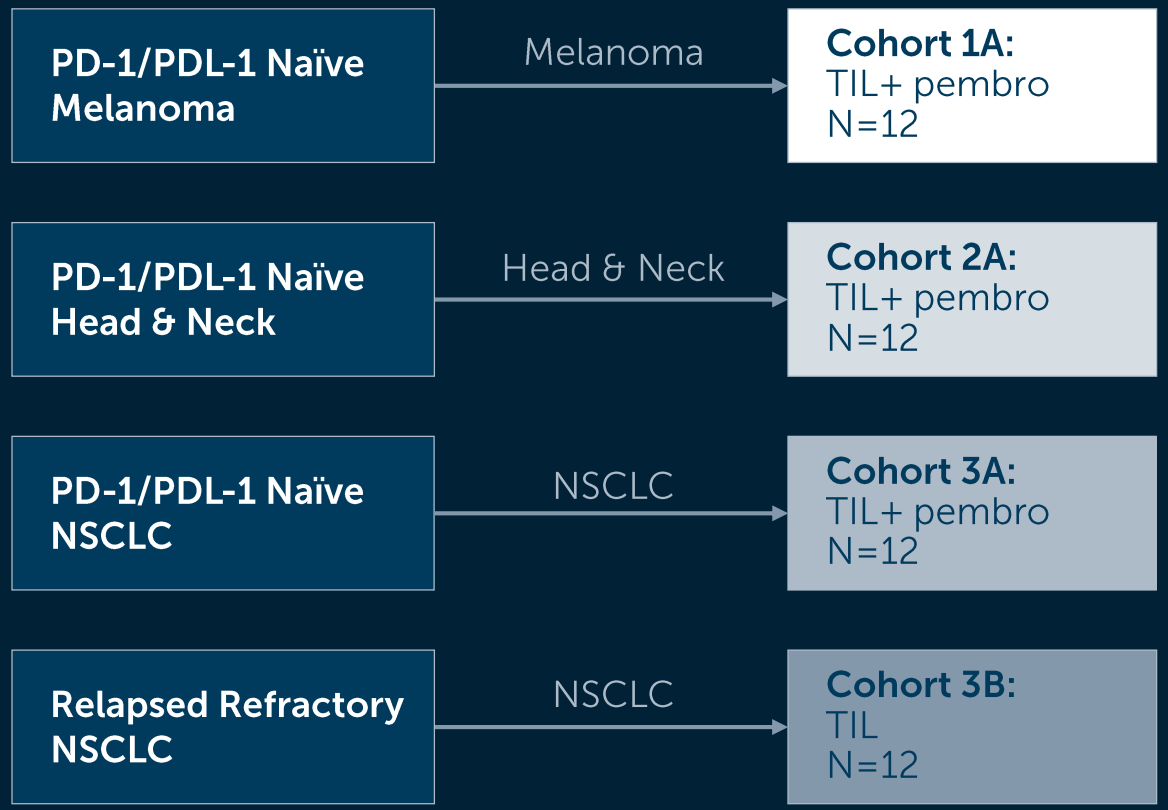
Agent	ORR % (N)	Current Dev Status	Prior Line of Tx	Patient Characteristics
Antibody-drug conjugate				
tisotumab vedotin (TV) (Genmab/Seattle Genetics)	22% (N=55)[1]	Phase 2	1+	Recurrent or metastatic cervical cancer that progressed on standard therapy (most had received at least two prior therapies), median DOR= 6 months
Anti-PD-1				
AGEN2034 (Agenus)	11% (N=9)[2]	Phase 2	1+	Patients must have relapsed after a platinum-containing doublet administered for treatment of advanced disease
cemiplimab (Regeneron)	10% (N=10)[3]	Phase 3	2+	Recurrent or metastatic cervical cancer resistant to, or intolerant of, platinum therapy
TKI				
neratinib (Puma Biotechnology)	27% (N=11)[4]	Phase 2	2	Metastatic HER2-positive cervical cancer (percentage of HER2+ in cervical cancer is ~3.9%)[5]
Cell therapies				
TIL (LN-145)	**44% (N=27)**	**Phase 2**	**2.4 (mean)**	**All patients progressed on or after chemotherapy**

[1] Hong et al., SGO 2019; [2] Drescher, et al. ESMO 2018; [3] Rischin, D. et al. ESMO 2018; [4] D'Souza et al. SGO 2019; [5] Yan, et al. *Cancer Metastasis Rev.* 2015

IOVANCE

TIL in Earlier Lines of Therapy in Combination with SOC

A Phase 2, Multicenter Study of Autologous Tumor Infiltrating Lymphocytes (lifileucel or LN-145) in Patients with Solid Tumors (NCT03645928)



Endpoints

- Primary: ORR and safety
- Secondary: CR rate

Study Updates

- 25+ sites are activated globally
- Sites in the U.S. and additional countries
- **Patient dosing initiated in May 2019**

IOVANCE

IOVANCE BIOTHERAPEUTICS

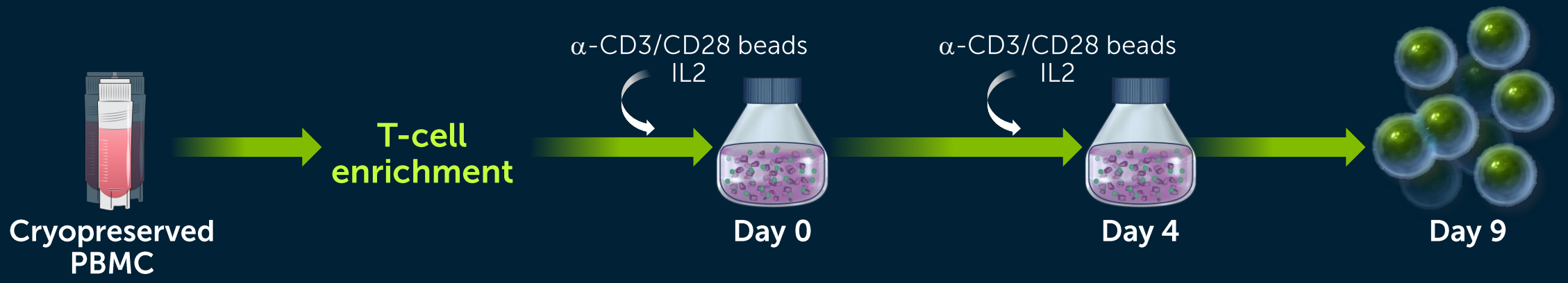
ADVANCING IMMUNO-ONCOLOGY

Hematologic Malignancies

Peripheral Blood Lymphocytes (PBL) for Hematological Indications

Expand the TIL platform into new indications:

- IOV-2001 for post-ibrutinib CLL patients
- IOV-2001 is a non-genetically modified, polyclonal T cell product
- IOV-2001 shows cytotoxicity against autologous tumor cells in leukemia
- Ibrutinib has known to improve proliferative and effector functions of T cells
- Iovance has generated PBL from 50 mL blood of ibrutinib-treated patients with CLL
- A 9-day manufacturing process is optimized and is being transferred to a CMO
- IND cleared, one site activated



Karyapudi et al., EHA 2019, PF 447

IOVANCE

Research Focus into Next Generation TIL

Expand the TIL platform into new indications/regimens

- Triple Negative Breast Cancer (Yale)
- IND for PBL in CLL cleared
- **IOV-3001 IL-2 analog licensed from Novartis**

Select more potent TIL

- PD-1 positive selected TIL by Iovance
- PD-1 positive selected TIL also through collaboration with CHUM

Genetically modify to make a more tumor-reactive TIL

- Cellectis TALEN® collaboration agreement in place to support a clinical program

Process optimization

- Gen 3 process
- Core biopsy

IOVANCE

Iovance Biotherapeutics Global Reach and Scale

Iovance Biotherapeutics has ~150 employees

- Headquartered in San Carlos, CA
- 3 additional offices
- Iovance commercial manufacturing facility in Philadelphia, PA *(under construction)*

Well Capitalized in Pursuit of TIL Commercialization

September 30, 2019	In millions (unaudited)
Common shares outstanding	126
Preferred shares	4[1]
Options	9
Cash, cash equivalents, short-term investments, restricted cash	$367[2]
Debt	**0**

[1] Preferred shares are shown on an as-converted basis
[2] Includes Restricted Cash of $5.5 million

IOVANCE

Achieved Milestones in 2019

- ☑ First patient dosed in Cohort 4 for lifileucel in support of registration
- ☑ Present updated data in Cohort 2 for melanoma at ASCO
- ☑ Present data from Gen 2 of cervical study at ASCO
- ☑ Initiate building Iovance manufacturing facility
- ☑ Define regulatory path for LN-145 in cervical cancer with FDA
- ☑ Explore therapeutic potential of TIL in other indications
- ☑ File new IND for new manufacturing process and/or new indications
- ☑ Present Cohort 2 lifileucel Independent Review Committee results

IOVANCE

Upcoming Milestones 2020

- [x] Last patient dosed in Cohort 4 for lifileucel in support of registration in melanoma
- [ ] Last patient dosed in Cohort 1 of LN-145 for cervical cancer
- [ ] Hold a pre-BLA meeting with FDA
- [ ] Top line data from melanoma
- [ ] Top line data from cervical
- [ ] File BLA

IOVANCE BIOTHERAPEUTICS

ADVANCING IMMUNO-ONCOLOGY

Thank You