IOVANCE BIOTHERAPEUTICS

40th Annual J.P. Morgan Healthcare Conference

Fred Vogt
Interim CEO, President and General Counsel

ADVANCING IMMUNO-ONCOLOGY

Forward-Looking Statements

Certain matters discussed in this presentation are “forward-looking statements” of Iovance Biotherapeutics, Inc, Inc. (hereinafter referred to as the “Company,” “we,” “us,” or “our”) within the meaning of the Private Securities Litigation Reform Act of 1995 (the “PSLRA”). All such written or oral statements made in this presentation, other than statements of historical fact, are forward-looking statements and are intended to be covered by the safe harbor for forward-looking statements provided by the PSLRA. Without limiting the foregoing, we may, in some cases, use terms such as “predicts,” “believes,” “potential,” “continue,” “estimates,” “anticipates,” “expects,” “plans,” “intends,” “forecast,” “guidance,” “outlook,” “may,” “could,” “might,” “will,” “should” or other words that convey uncertainty of future events or outcomes and are intended to identify forward-looking statements. Forward-looking statements are based on assumptions and assessments made in light of management’s experience and perception of historical trends, current conditions, expected future developments and other factors believed to be appropriate. Forward-looking statements in this press release are made as of the date of this press release, and we undertake no duty to update or revise any such statements, whether as a result of new information, future events or otherwise. Forward-looking statements are not guarantees of future performance and are subject to risks, uncertainties and other factors, many of which are outside of our control, that may cause actual results, levels of activity, performance, achievements and developments to be materially different from those expressed in or implied by these forward-looking statements. Important factors that could cause actual results, developments and business decisions to differ materially from forward-looking statements are described in the sections titled “Risk Factors“ in our filings with the Securities and Exchange Commission, including our most recent Annual Report on Form 10-K and Quarterly Reports on Form 10-Q, and include, but are not limited to, the following substantial known and unknown risks and uncertainties inherent in our business: the effects of the COVID-19 pandemic; risks related to the timing of and our ability to successfully develop, submit, obtain and maintain U.S. Food and Drug Administration (“FDA”) or other regulatory authority approval of, or other action with respect to, our product candidates, and our ability to successfully commercialize any product candidates for which we obtain FDA approval; preliminary and interim clinical results, which may include efficacy and safety results, from ongoing clinical trials may not be reflected in the final analyses of our ongoing clinical trials or subgroups within these trials; the risk that enrollment may need to be adjusted for our trials and cohorts within those trials based on FDA and other regulatory agency input; the new version of the protocol which further defines the patient population to include more advanced patients in our cervical cancer trial may have an adverse effect on the results reported to date; the risk that we may be required to conduct additional clinical trials or modify ongoing or future clinical trials based on feedback from the FDA or other regulatory authorities; the risk that our interpretation of the results of our clinical trials or communications with the FDA may differ from the interpretation of such results or communications by the FDA; the acceptance by the market of our product candidates and their potential reimbursement by payors, if approved; our ability or inability to manufacture our therapies using third party manufacturers or our own facility may adversely affect our potential commercial launch; the results of clinical trials with collaborators using different manufacturing processes may not be reflected in our sponsored trials; the risk that unanticipated expenses may decrease our estimated cash balances and increase our estimated capital requirements; and other factors, including general economic conditions and regulatory developments, not within our control.

Global Leadership in Innovating, Developing and Delivering TIL Cell Therapy for Patients with Cancer

Platform

500+
Patients Treated with Iovance TIL

90%+
Manufacturing Success Rate

22-day
Proprietary Manufacturing Process

Pipeline

6 Active Clinical Trials

4 Solid Tumor Indications in Clinic

1 BTD **1** RMAT

3 Fast Track Designations

Assets

$661M
Cash as of 9/30/21

30+
US and International Patents

325+
Employees

4+
Avg years cell therapy experience

Partners & Collaborators

NIH NATIONAL CANCER INSTITUTE

The University of Texas MD Anderson Cancer Center

MOFFITT CANCER CENTER

Yale CANCER CENTER

cellectis EDITING LIFE

BTD: Breakthrough Therapy Designation; RMAT: Regenerative Medicine Advanced Therapy Designation

Iovance Immuno-Oncology Pipeline

	PRODUCT CANDIDATE	INDICATION(S)	IND-ENABLING	PHASE 1	PHASE 2	PIVOTAL
TIL	Lifileucel/LN-144	Melanoma (post-anti-PD-1)			C-144-01 Study, Cohorts 2 & 4	FDA RMAT designation
	Lifileucel	Cervical cancer (post-chemo; post-chemo & post-anti-PD-1)			C-145-04 Study, Cohorts 1 & 2	FDA BTD
	LN-145	NSCLC (2L post-chemo & post-anti-PD-1)			IOV-LUN-202 Study, Cohorts 1 & 2	
	LN-145	NSCLC (2-4L incl. post-anti-PD-1)			IOV-COM-202 Study, Cohort 3B	
	LN-145	HNSCC (post-anti-PD-1)			C-145-03 Study, Cohort 2	
TIL Combinations	Lifileucel + pembro	Melanoma (anti-PD-1 naïve)			IOV-COM-202 Study, Cohort 1A	
	Lifileucel + pembro	Cervical cancer (1L, chemo & anti-PD-1 naïve)			C-145-04 Study, Cohort 3	
	LN-145 + pembro	NSCLC (anti-PD-1 naïve)			IOV-COM-202 Study, Cohort 3A	
	LN-145 + ipi/nivo	NSCLC (post-anti-PD-1)			IOV-COM-202 Study, Cohort 3C	
	LN-145 + pembro	HNSCC (anti-PD-1 naive)			IOV-COM-202 Study, Cohort 2A	
PD-1 Selected TIL	LN-145-S1	Melanoma (post-anti-PD-1)			IOV-COM-202 Study, Cohort 1B	
	LN-145-S1	HNSCC (post-anti-PD-1)			C-145-03 Study, Cohort 4	
Third-Generation (Gen 3) TIL 16-day manufacturing	LN-145 Gen 3 + core biopsy	NSCLC (2L post-chemo & post-anti-PD-1)			IOV-LUN-202 Study, Cohort 3	
	LN-144 Gen 3	Melanoma (post-anti-PD-1)			IOV-COM-202 Study, Cohort 1C	
	LN-145 Gen 3	HNSCC (post-anti-PD-1)			C-145-03 Study, Cohort 3	
PBL Therapy	IOV-2001	CLL/SLL (post-BTKi)			IOV-CLL-01 Study	
PD-1 Inactivated TIL	IOV-4001	Multiple				
IL-2 Analog	IOV-3001	Multiple				

Abbreviations: BTD=breakthrough therapy designation; BTKi=Bruton's tyrosine kinase inhibitor; CLL/SLL=chronic lymphocytic leukemia and small lymphocytic lymphoma; HNSCC=head and neck squamous cell carcinoma; IL-2=interleukin 2; ipi/nivo=ipilimumab/nivolumab; NSCLC=non-small cell lung cancer; PBL=peripheral blood lymphocytes; RMAT=Regenerative Medicines Advanced Therapy; TIL=tumor infiltrating lymphocytes

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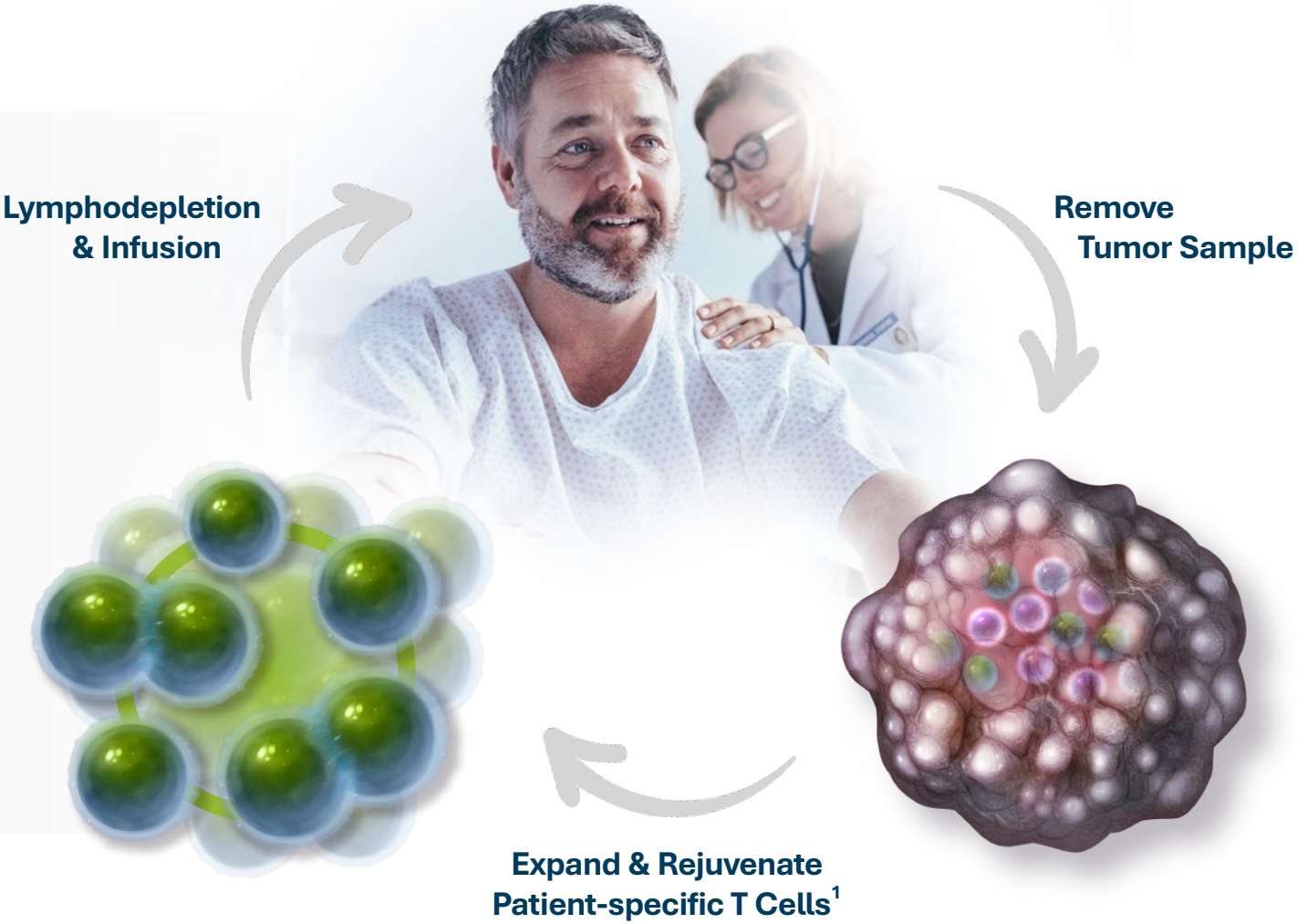
Tumor Infiltrating Lymphocytes (TIL): Leading Platform for Treatment of Solid Tumors

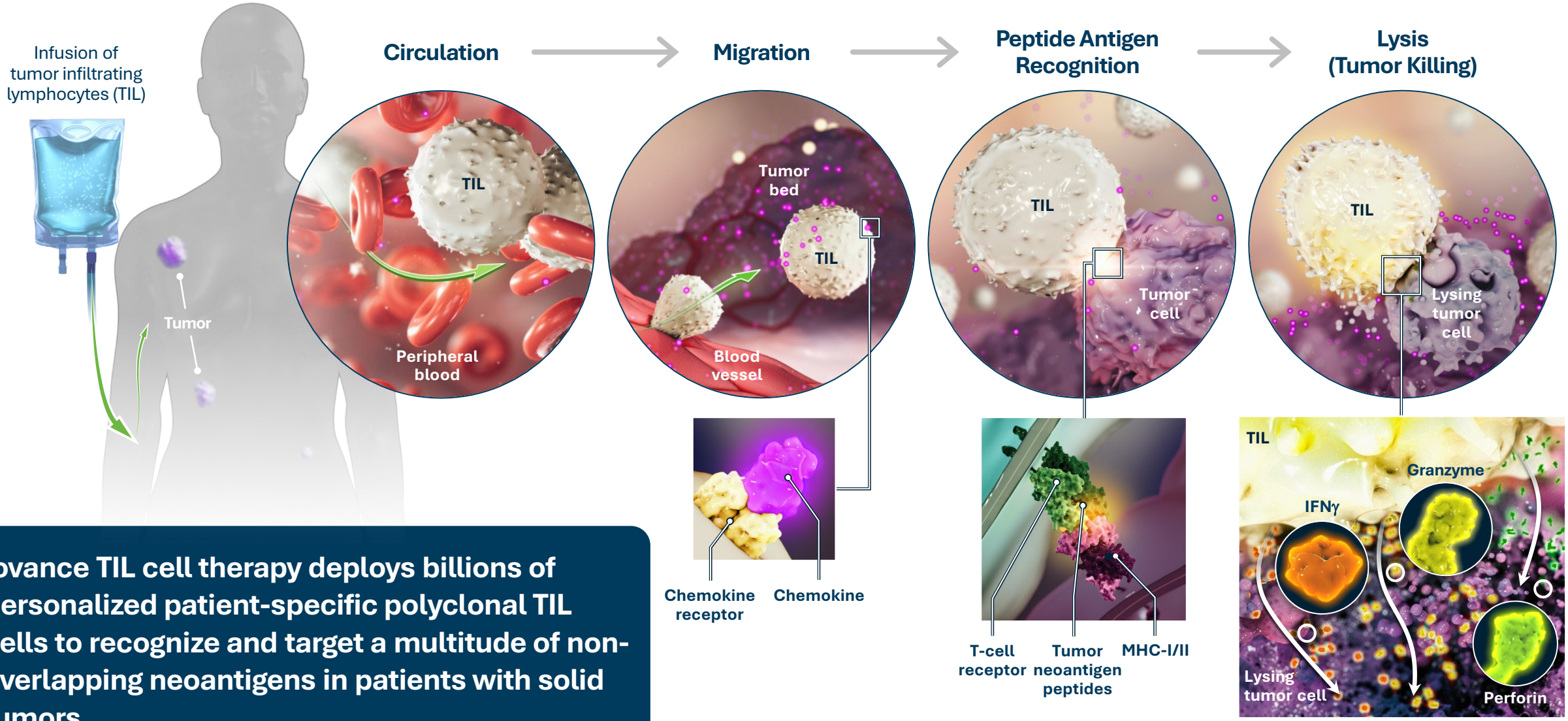
TIL – Unique Mechanism of Action

- Highly personalized
- One-time therapy
- Patient's own immune system amplified and rejuvenated



1. Simpson-Abelson et al., ESMO 2020

TIL Mechanism of Action



Iovance TIL cell therapy deploys billions of personalized patient-specific polyclonal TIL cells to recognize and target a multitude of non-overlapping neoantigens in patients with solid tumors

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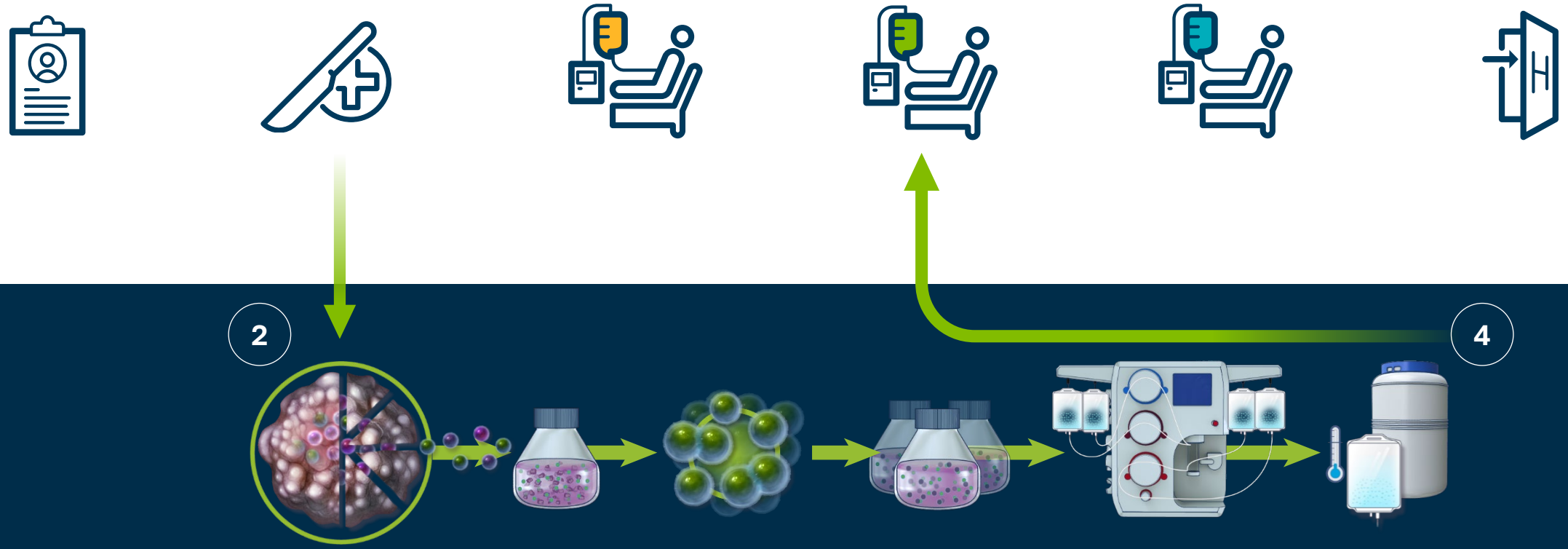
Iovance Streamlined 22-Day GMP Manufacturing Process

1. Patient Intake
2. Tumor Sample Procurement
3. NMA-LD
4. TIL Infusion
5. IL-2 Infusions
6. Recovery/Discharge



Iovance Cell Therapy Center: *i*CTC

Built-to-suit custom facility in Navy Yard Philadelphia

136,000 ft^2, $85M investment

LEED gold certification for core and shell building

First set of clean rooms occupied

Clinical supply initiated 3Q21

Commercial manufacturing expected with BLA approval

Significant reduction in COGS anticipated

Leading Cell Therapy Manufacturing Facility

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CELL THERAPY CENTER

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

	Deaths[1]	New Cases[1]
Melanoma	7,180	106,110
Cervical	4,290	14,480
Lung & Bronchus	131,880	235,760
Oral Cavity, Pharynx & Larynx	14,620	66,630
Breast	43,600	281,550
Pancreatic	48,220	60,430
Brain & Other Nervous System	18,600	24,530
	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 accessed October 2021

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Clinical Data Highlights

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Potential Market for Metastatic Melanoma

Unmet Needs to Increase Response Rates in Early Line and Post-Immune Checkpoint Inhibitors

> For patients who progress on anti-PD-1 therapy, there is an unfulfilled need for efficacious and durable treatment options. The latest results with lifileucel suggest that early intervention with lifileucel TIL therapy, immediately upon progression on anti-PD-1 therapy, may offer better outcomes and longer duration of response."

Omid Hamid, MD
Chief of Research/Immuno-Oncology
The Angeles Clinic & Research Institute

309k New cases WW each year[1]

62k Deaths WW each year[1]

106k Diagnoses in U.S. each year[2]

7k Deaths in U.S. each year[2]

Available Care:

1st line:
Anti-PD-1 Immunotherapy
21%-33% ORR[3]

BRAF/MEK inhibitors for BRAF positive

2nd line:
Chemotherapy
ORR 4-10%[4]
OS ~7-8 months[5]

Limited options after progression on checkpoint and BRAF/MEK inhibitors

1. Global Burden of Disease Cancer Collaboration, JAMA Oncol 2019
2. https://seer.cancer.gov accessed October 2021
3. Keytruda USPI accessed Mar 2021
4. Keytruda USPI accessed Mar 2021 (4%) and Weber et al., Lancet Oncol 2015 (ICC 10%)
5. Kirchburger et al., Eur J Cancer 2016 and Goldinger et al., J Clin Oncol 2018

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Iovance TIL Clinical Data Highlights in Melanoma

Single-Agent Lifileucel Following Progression on Anti–PD-1 Therapy
(C-144-01 Cohort 2, N=66)[1]

36% ORR

Median DOR not reached

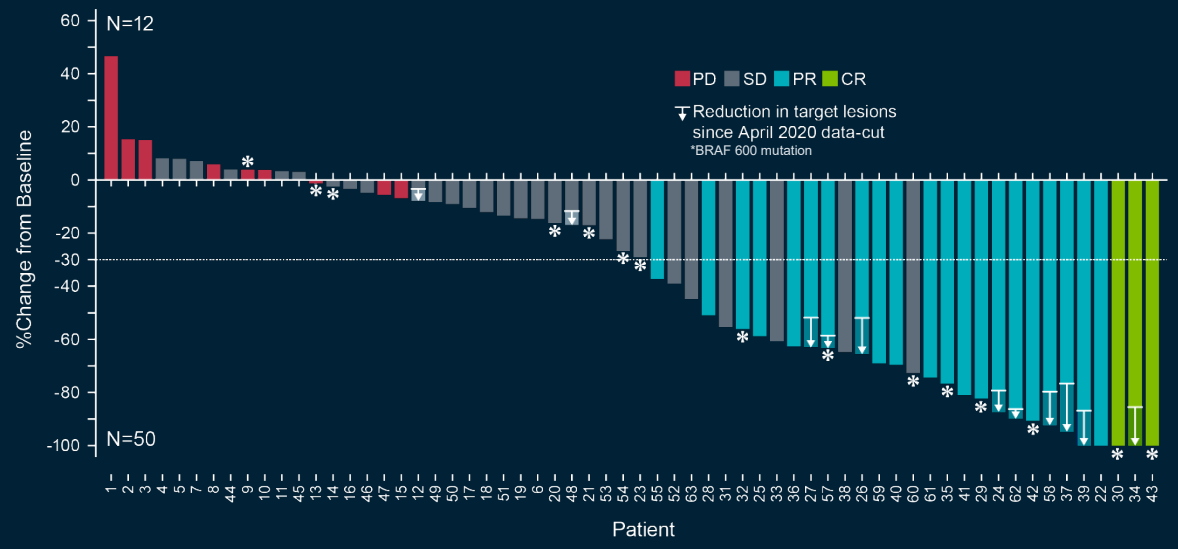
33.1 months

Median study follow up

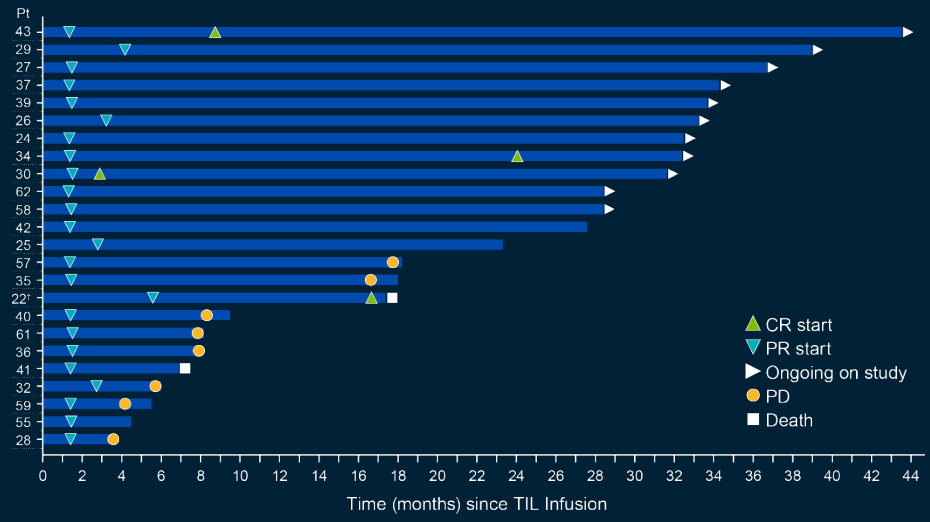
Responses continue to deepen over time:

- 17% of patients had deepening of response
- 1 PR converted to CR 24 months post-lifileucel

Best Overall Response



Time to Response for Evaluable Patients (PR or Better)



1. As assessed by investigator using RECIST 1.1 (data extraction: April 22, 2021). Larkin, et. al. ASCO 2021. Abstract #9505.
Abbreviations: CR, complete response; DOR, duration of response; ORR, overall response rate; PR, partial response; SD, stable disease

Potential Market for Non-Small Cell Lung Cancer (NSCLC)

Addressing a Defined Unmet Need in Second Line NSCLC

"The clinical data for LN-145 in heavily treated patients with metastatic non-small cell lung cancer is exciting. It represents the first experience for TIL monotherapy to show clinical benefit in metastatic non-small cell lung cancer."

Adam J. Schoenfeld, MD
Medical Oncologist
Memorial Sloan Kettering Cancer Center

2.1M New cases WW each year[1]

1.8M Deaths WW each year[1]

236k Diagnoses in U.S. each year[2]

132k Deaths in U.S. each year[2]

Available Care:

Checkpoint Inhibitor + Chemo as 1st line option

9-13% ORR for docetaxel in 2nd line NSCLC following progression on chemo[3]

1. Global Burden of Disease Cancer Collaboration, JAMA Oncol 2019
2. https://seer.cancer.gov accessed October 2021
3. Brahmer et al., NEJM 2015; Borghaei et al., NEJM 2015; Herbst et al., Lancet 2016; Rittmeyer et al., Lancet 2017

Iovance TIL Clinical Data Highlights in NSCLC

Single-Agent LN-145 Following Progression on Anti-PD-1 Therapy (IOV-COM-202 Cohort 3B, N=28)[1]

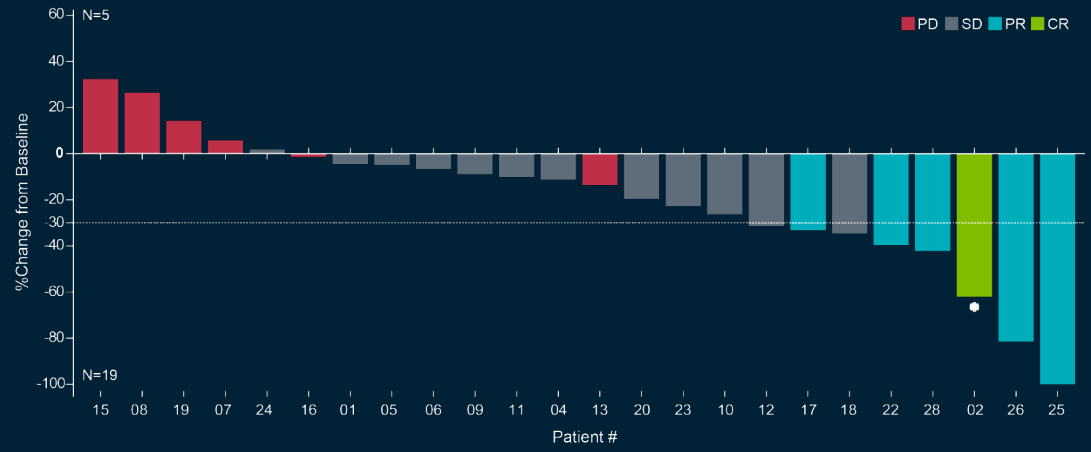
21% ORR **20.7+** months ongoing CR

Heavily Pre-Treated Patient Population

- All received prior anti-PD-1 / anti-PD-L1 therapy
- 24/28 patients (85.7%), including all responders, received ≥2 prior lines of systemic therapy

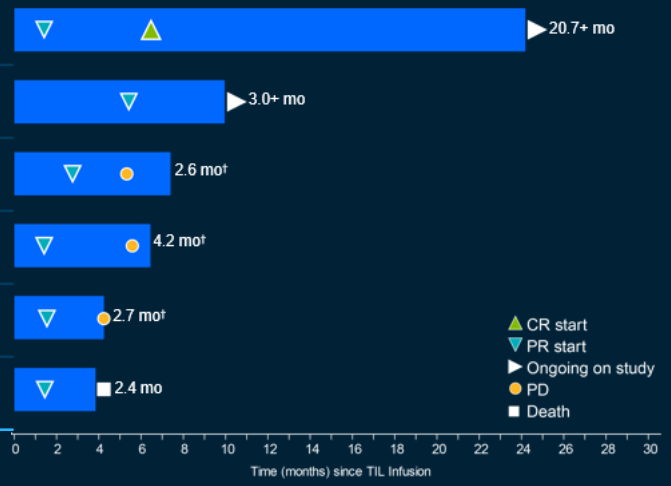
Long-term CRs Observed in Iovance (≥2 prior lines) and Moffitt[2] (post-nivo) TIL Studies in NSCLC

Best Overall Response for Evaluable Patients[1] (N=24)



Time to Response for Confirmed Responders[1] (PR or Better; n=6)

Pt ID	# of Lines of Prior Therapy	BOR to Prior ICI	PD-L1 TPS (%)*	Driver Oncogene Mutations
2	3	PD	<1	Not assessed
17	2	PD	70	*KRAS*^{G12C}
25	3	PD	0	Not assessed
26	3	PR	40	*KRAS*^{G12D}
22	2	PR	5	None detected
28	3	SD	90	None detected



1. As assessed by investigator using RECIST 1.1 (August 24, 2021 data cutoff). Schoenfeld et al, SITC 2021, Abstract 458.
2. Creelan et al., Nat Med 2021

*Patient 2 is reported as a CR based on negative FDG-PET scans by investigator

†Patient 25 had PD due to new lesion; patients 26 and 22 had unequivocal PD of non-target disease

Abbreviations: CR, complete response; PD, progressive disease; PR, partial response; RECIST, Response Evaluation Criteria in Solid Tumors; SD, stable disease; TIL, tumor infiltrating lymphocytes; nivo, nivolumab

TIL for Solid Tumors in Earlier Treatment Settings

Unmet Need to Improve Rate and Depth of Responses with Manageable Long-term Safety

"Immune checkpoint inhibitors are standard-of-care in the treatment of several types of advanced cancer, including cervical cancer, melanoma, and HNSCC. Unmet needs remain to help more patients respond and to enhance the depth and durability of responses."

David M. O'Malley, MD
Professor of Obstetrics and Gynecology at The Ohio State University College of Medicine; Director of the Division of Gynecologic Oncology, The Ohio State University Comprehensive Cancer Center (OSUCCC – James)

Available Care

Front-line standard of care pembrolizumab monotherapy:

- 33% ORR in advanced melanoma[1]
- 17% ORR in HNSCC[2]

2nd line pembrolizumab in cervical cancer patients following standard of care systemic chemotherapy

- 11%-14% ORR[3]

1. Robert C, et al. N Engl J Med 2015; 372:2521-2532
2. Burtness B, et al. Lancet 2019; 394:1915-1928
3. KEYTRUDA (pembrolizumab) USPI

Abbreviations: HNSCC, head and neck squamous cell carcinoma; ORR, objective response rate; TIL, tumor infiltrating lymphocytes

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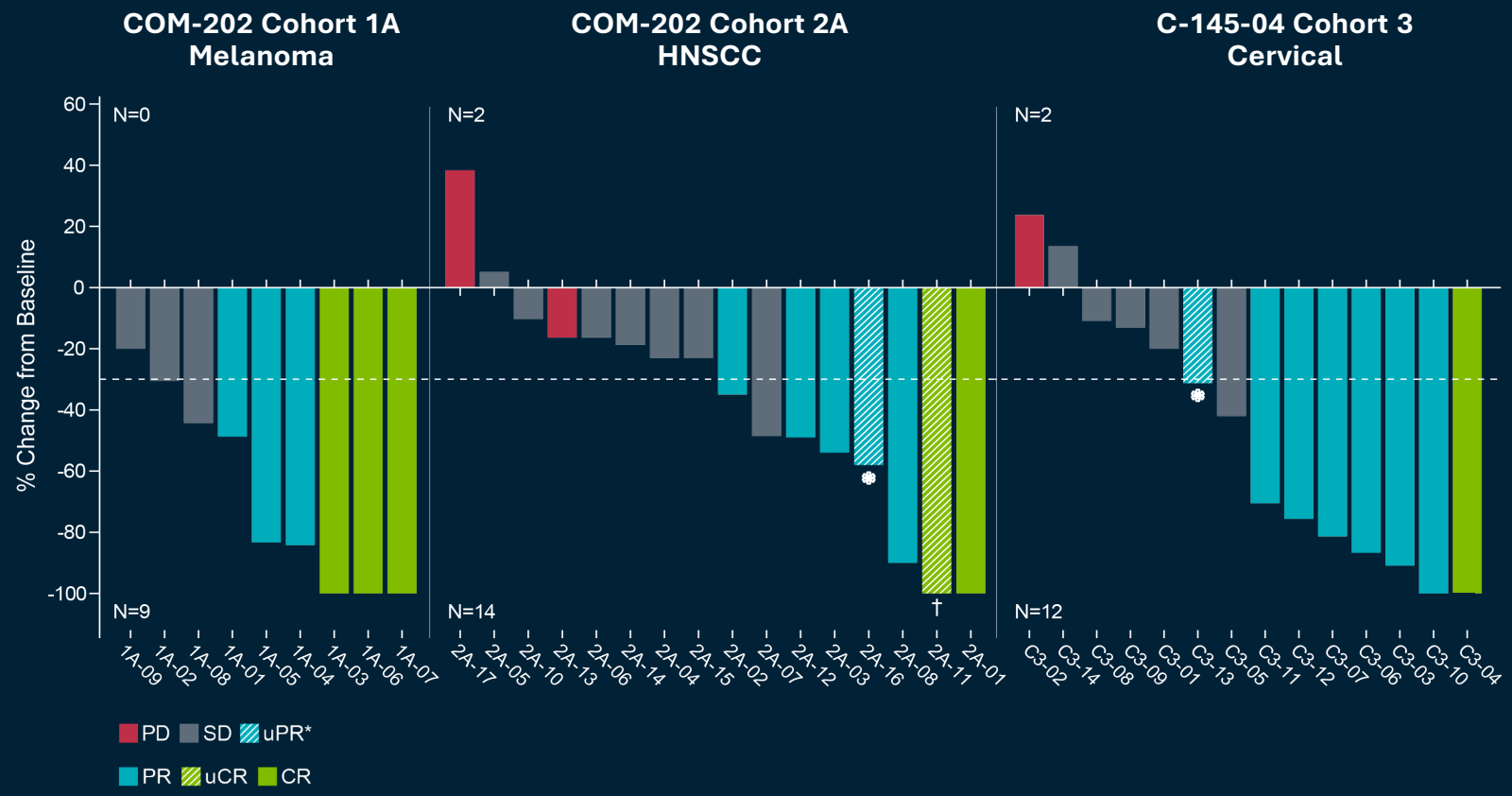
Best Overall Response for Iovance TIL+Pembro in 3 Solid Tumors

Consistent Reductions in Tumor Burden Compared to Pembro Alone in Melanoma, Cervical and HNSCC[1]



ORR

(Full Analysis Set)

- Melanoma, 60.0% (including 3 CRs (30%))
- HNSCC, 38.9%
- Cervical, 57.1%

Tumor burden reductions in nearly all efficacy-evaluable patients

1. O'Malley et al, SITC 2021, Abstract 492 (Data cutoff: September 22, 2021)

*Patients 2A-16 and C3-13 had a first PR assessment but had not reached the confirmatory assessment at the time of the data cut

†Patient 2A-11 had a first CR assessment but had not reached the confirmatory assessment at the time of the data cut but had previously achieved a PR and is included as a confirmed responder per RECIST 1.1

Abbreviations: CR, complete response; HNSCC, head and neck squamous cell carcinoma; PD, progressive disease; pembro, pembrolizumab; PR, partial response; SD, stable disease; uCR, unconfirmed complete response; uPR, unconfirmed partial response

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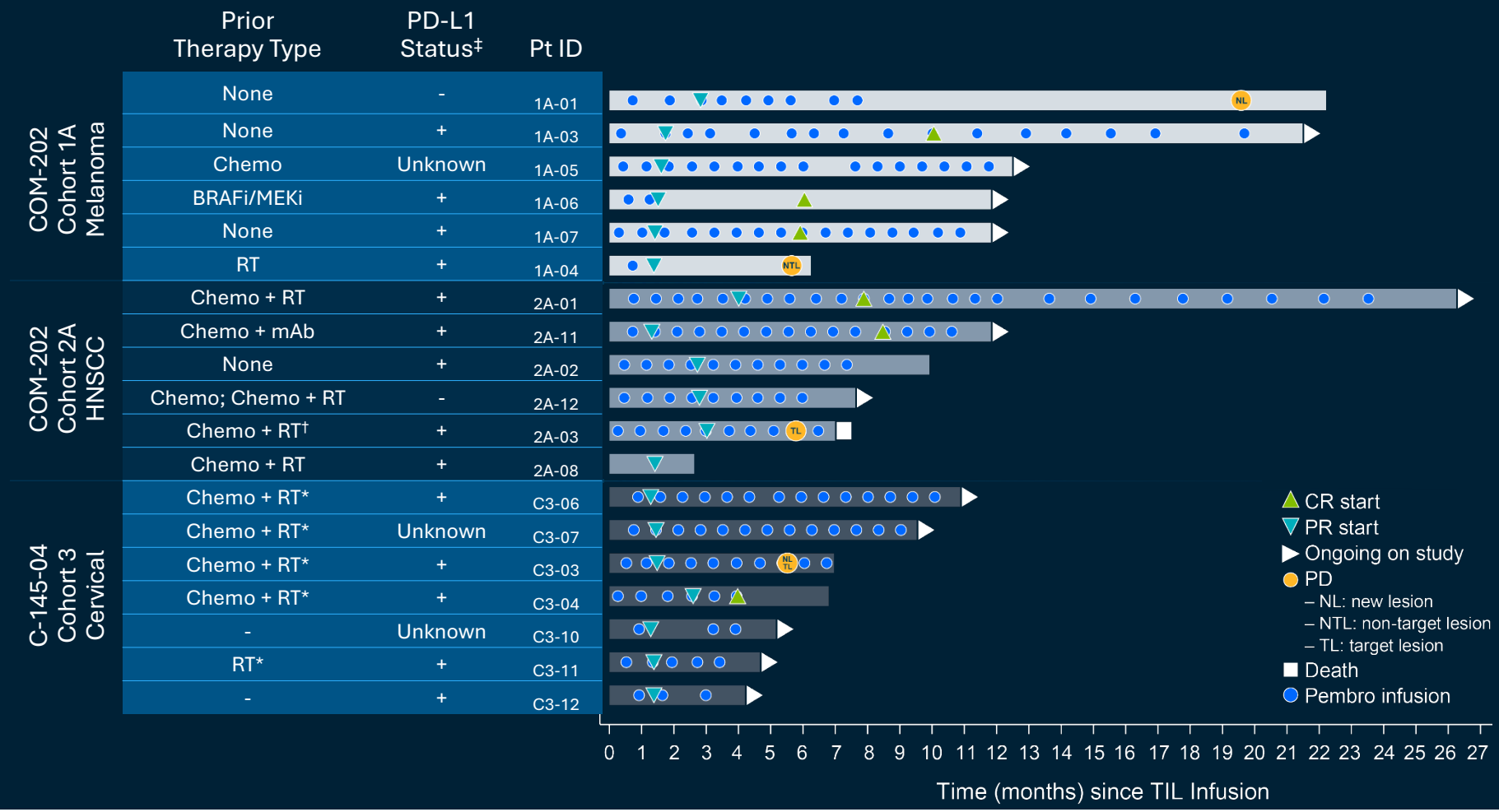
Time to Response (PR or Better) in 3 Solid Tumors[1]



Ongoing responses at data cutoff:

- Melanoma, 66.7% (4/6)
- HNSCC, 50.0% (3/6)
- Cervical, 71.4% (5/7)

Median study follow-up (months):§

- Melanoma, 11.5
- HNSCC, 7.8
- Cervical, 7.6

1. O'Malley et al, SITC 2021, Abstract 492 (Data cutoff: September 22, 2021)

*Prior therapies given for loco-regional disease †Treatment for loco-regional disease with progression 12 months after completion of therapy ‡Positive, defined as TPS ≥5% (melanoma), CPS ≥20% (HNSCC), CPS ≥1% (cervical) §Based on overall survival data using the reverse Kaplan-Meier method

Each bar is presented for each patient starting from date of TIL infusion up to date of new anti-cancer therapy, end of assessment, death, or data cutoff date, whichever occurs earlier

Abbreviations: Chemo, chemotherapy; CPS, combined positive score; CR, complete response; PD-L1, programmed death ligand-1; pembro, pembrolizumab; PR, partial response; RT, radiotherapy; TIL, tumor infiltrating lymphocytes; TPS, tumor proportion score; NL, new lesion; NTL, non-target lesion; TL, target lesion

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Launch Readiness

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Best-in-Class Manufacturing

Continuous cost, quality & efficiency improvement

- Increase throughput
- Redundant & reliable suppliers
- Reduce material costs
- Consistent success rates
- Reduce overhead costs

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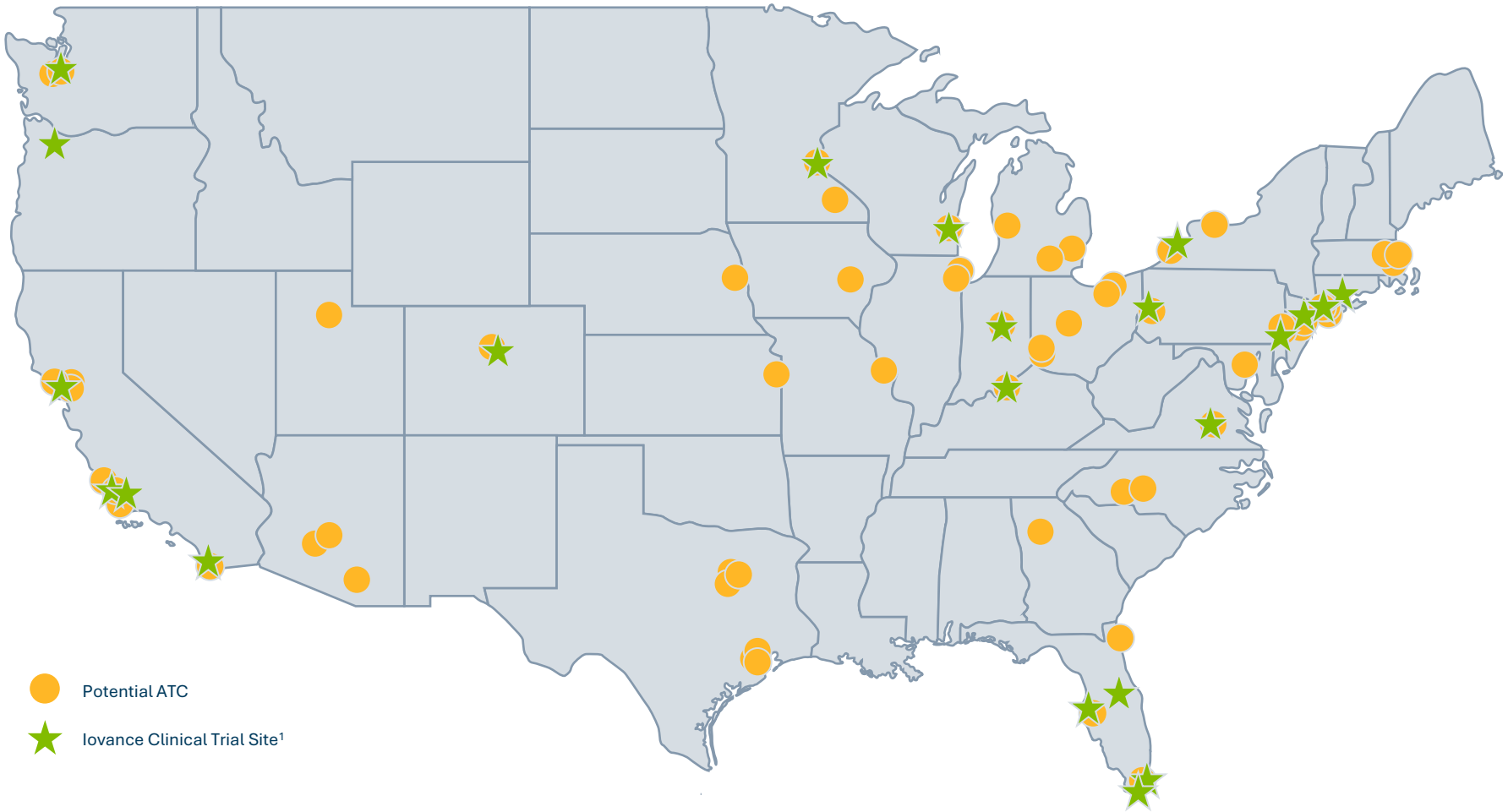
Targeting Potential Authorized Treatment Centers (ATCs)



Targeting Considerations

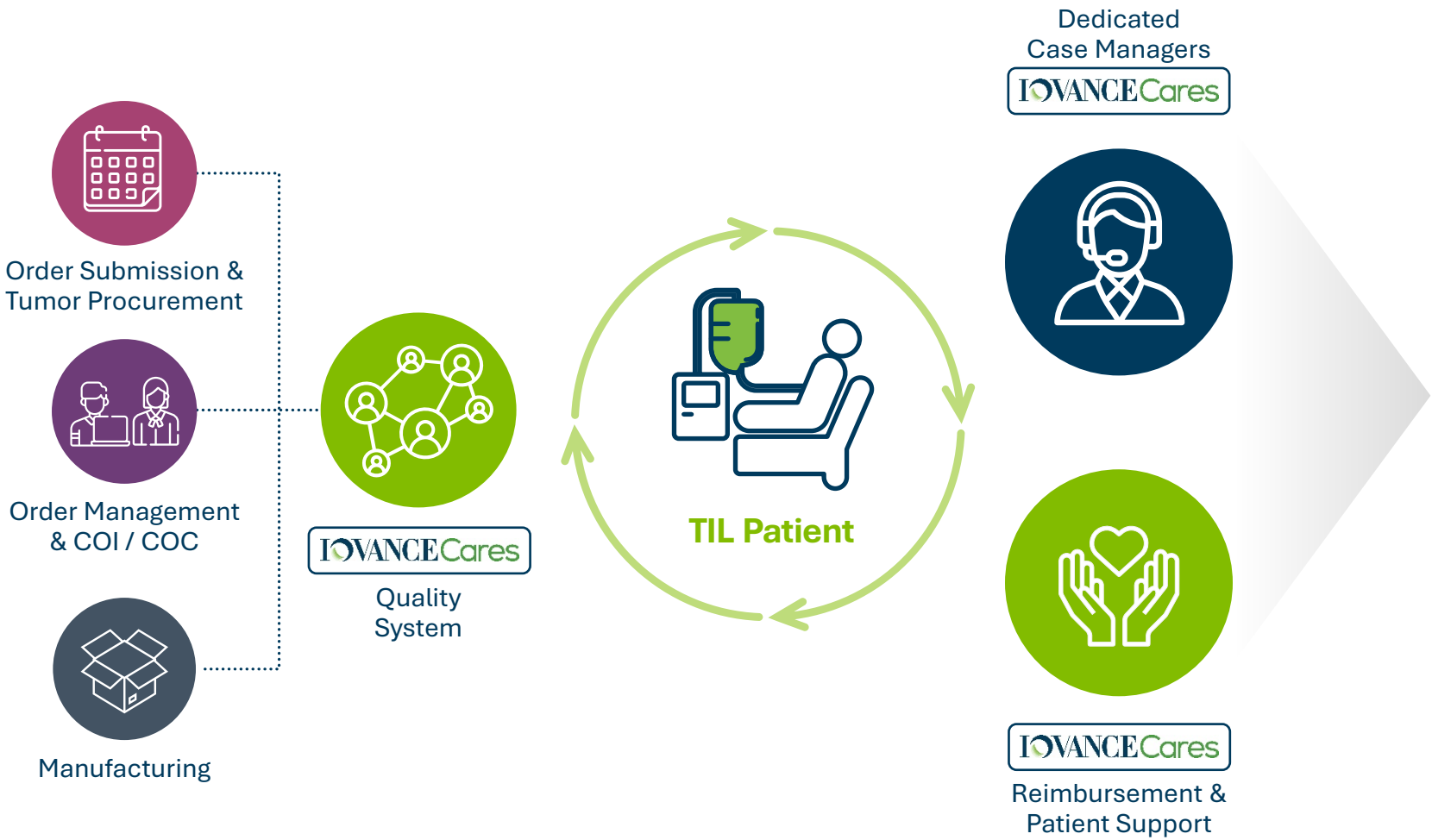
- Patient volume
- NCCN status, KOLs
- Existing cell therapy / BMT
- Iovance clinical trial(s)

Drive Demand

- Top account prioritization
- Community referrals

1. ClinicalTrials.gov

Supporting Providers & Patients: IovanceCares™



Customer-Centric

- Patient management ecosystem
- Proprietary COI/COC
- Treatment center quality program

Patient-Centric

- Dedicated case managers
- Reimbursement support
- Patient support

Abbreviations: COI, Chain of Identity; COC, Chain of Custody

Research Pipeline

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What's Next

Genetically modify TIL	Develop more potent TIL	Optimize process	Expand TIL into new regimens
Cellectis TALEN® collaboration agreement to support a clinical program[2]	PD-1+ selected TIL	Gen 3 (16-day) process (COM-202)	IOV-3001 IL-2 analog licensed from Novartis: IND enabling studies in 2022
IOV-4001 IND	CD39/69 double negative TILs[1]	Core biopsy (LUN-202 study)	

1. Cubas et al., ESMO IO 2021
2. Ritthipichai et al., ESMO 2020

Advancing Genetically-Modified TIL Toward the Clinic

PD-1 Inactivated TIL (IOV-4001) Expected to Enter Clinical Study in 2022

- Additional immune checkpoint targets
- Cytokine tethered TILs
- Additional transient and stable gene insertion and inactivation

Financial Summary & Milestones

Well-Capitalized in Pursuit of TIL Commercialization

September 30, 2021	In millions (unaudited)
Common shares outstanding	156.7
Preferred shares outstanding	2.9[1]
Stock options and restricted stock units outstanding	13.7
Cash, cash equivalents, investments, restricted cash	$660.8[2]
Anticipated cash runway sufficient into 2023	

1. Preferred shares are shown on an as-converted basis
2. Includes Restricted Cash of $6.1 million and $203.2 million in net proceeds through ATM offering as of September 30, 2021

2021 Accomplishments

REGULATORY

- BLA: FDA feedback received for potency assays; additional assay data submission & interactions 2H21

PIPELINE

- Melanoma and Cervical: TIL + pembrolizumab data at ASCO and SITC 2021
- Cervical: last patient dosed in Cohort 2, potential to include in BLA
- NSCLC: initial LN-145 clinical data (Cohort 3B); patient dosing in IOV-LUN-202
- HNSCC: expanding TIL + pembrolizumab
- NSCLC: LN-145 clinical data at SITC 2021 (Cohort 3B)

MANUFACTURING

- Melanoma and NSCLC: 16-day Gen 3 process in clinic
- Completion of Navy Yard GMP facility (*i*CTC); start clinical manufacturing at *i*CTC

Anticipated 2022 Milestones

- BLA: on track for 1H22 BLA submission
- Melanoma: Cohort 4 data
- NSCLC: enroll IOV-LUN-202 study, execute strategy based on FDA feedback
- Cervical: execute strategy based on FDA feedback for BLA
- TIL + pembrolizumab: continue ongoing cohorts and define early-line melanoma strategy
- Genetically-modified TIL: initiate clinical study of IOV-4001
- Research pipeline: advance new TIL products towards the clinic
- Continue GMP commercial readiness activities

Investment Highlights

Pioneering a Transformational Approach to Cure Cancer

Large market opportunity & strong unmet need

- Initial focus in post-checkpoint solid tumors
- Expansion into combinations and earlier lines of therapy
- Company-sponsored trials in melanoma, cervical, head & neck, NSCLC, and chronic lymphocytic leukemia (CLL)

Potential to be first cell therapy approved for solid tumors

- Accelerated path to approval in melanoma and cervical cancer
- BLA submission expected 2022
- Melanoma: RMAT, Orphan Drug, and Fast Track
- Cervical cancer: BTD, Orphan Drug, and Fast Track

Efficient & scalable proprietary manufacturing

- US and EU capacity with contract manufacturers
- Iovance Cell Therapy Center (*i*CTC) in Philadelphia
- Rapid 22-day Gen 2 manufacturing with 90%+ success rate
- >500 patients treated with Iovance proprietary process

Infrastructure for commercial success

- Fully integrated
- Experienced cell therapy team
- High concentration at Authorized Treatment Centers (ATCs)
- IovanceCares™ proprietary platform
- Analytics

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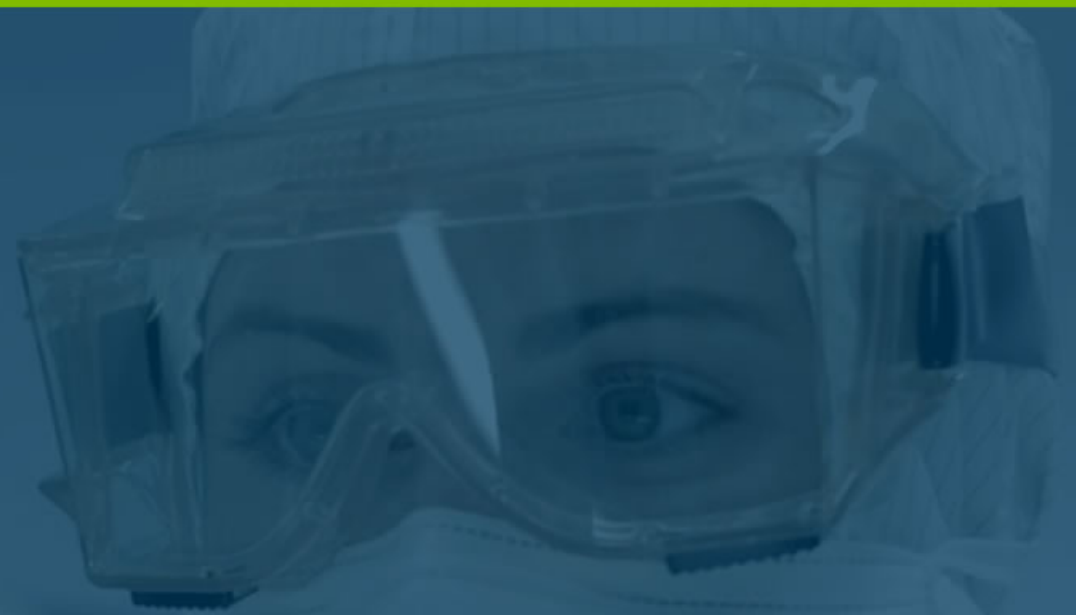

Thank You

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