



IMUGENE

01 November 2021

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Introduction to Imugene

Imugene is a biotech company headquartered in Australia and publicly traded on the Australian Securities Exchange (ASX:IMU)

2013

Paul Hopper built Imugene around a technology that originated from the Medical University of Vienna



2015

Leslie Chong from Genentech joined Imugene

2017

HER-Vaxx, our HER-2 targeted B Cell Immunotherapy entered the clinic

2018

Licensed extensive B cell portfolio and platform from OSU and Mayo Clinic comprising of PD1, HER1, HER2, HER3, VEGF, IGF-1R, CD28



2019

Completed the acquisition of a prolific oncolytic virus from City of Hope invented by Dr Yt



MAY 2021

Licensed onCARlytics from City of Hope invented by Dr Y Fong, Dr S Priceman & Dr A Park



AUG 2021

Strategic Partnership with Celularity



SEP 2021

Entered the S&P/ASX 300 Index

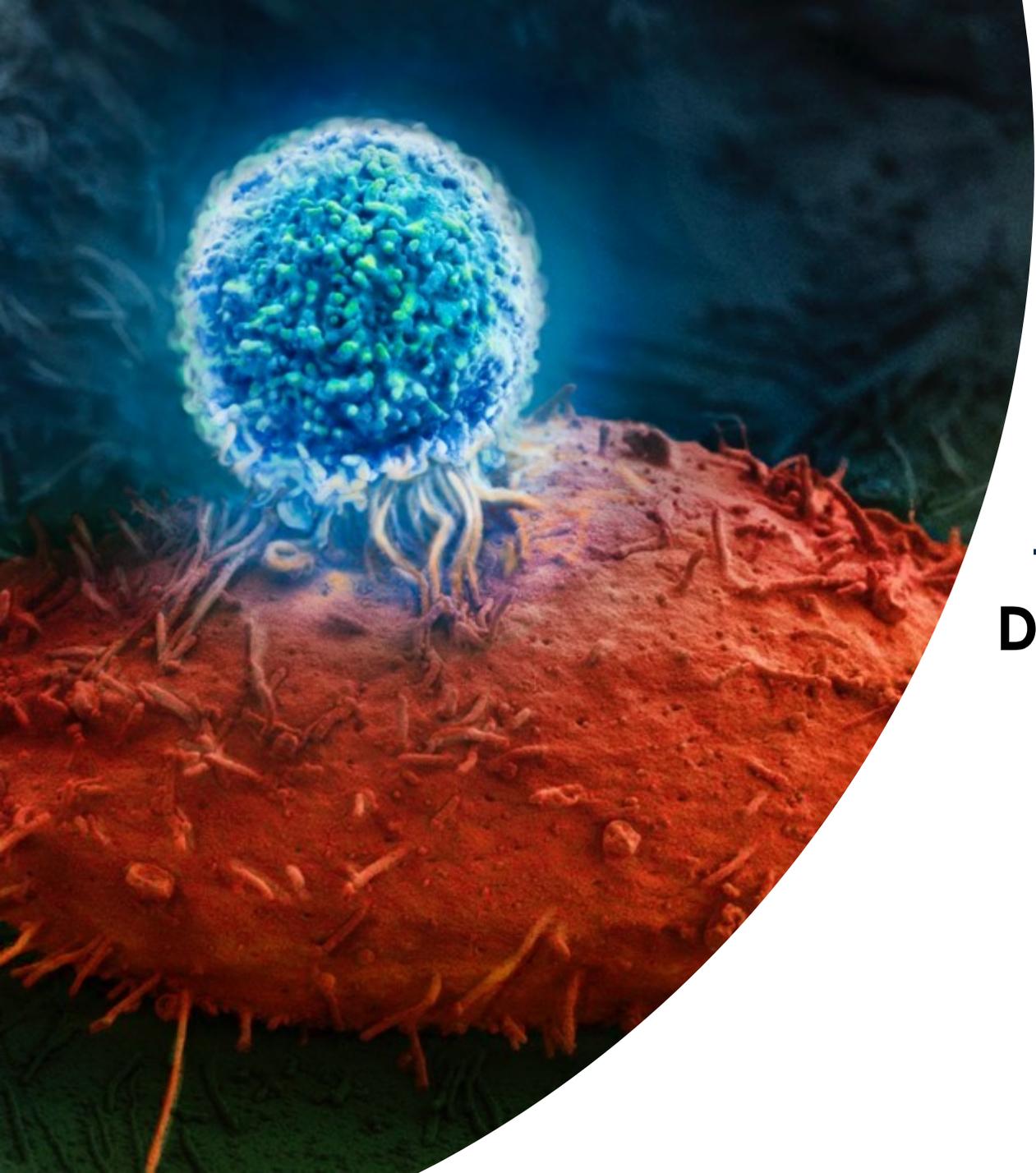
NOV 2021

Strategic Partnership with Eureka



Partnership Highlights

- Strategic Research Partnership Eureka Therapeutics, Inc. for the Treatment of Solid Tumours
- Collaboration will explore the therapeutic potential of a combination of Imugene's CD19 oncolytic virus **onCARlytics** in combination with Eureka's anti-CD19 **ARTEMIS**[®] T-cell therapy for the treatment of solid tumours.
- In head-to-head pre-clinical studies against CAR-T cells, **ARTEMIS**[®] T-cells demonstrated superior efficacy, enhanced tumour infiltration, and less T-cell exhaustion.
- In the clinic, **ARTEMIS**[®] T-cells have demonstrated reduced cytokine release syndrome (CRS) and other cytokine-related toxicities compared to CAR-T cells, potentially improving the efficacy and safety of a combination approach
- Imugene's novel strategy to treat solid tumors uses **onCARlytics** to prime the tumor cells for destruction by eliciting the expression of a validated tumor marker, CD19, then used as a target for CD19 cellular therapy
- Nonclinical in vitro and in vivo combination studies with **ARTEMIS**[®] and **onCARlytic** to commence



Developing Safer and More Effective T-cell Therapies for Solid Tumors

Dr. Cheng Liu
President and CEO



Leader in Solid Tumor T-cell Therapy

Proprietary ARTEMIS® technology empowering T-cells to infiltrate solid tumors

Lead clinical assets to treat liver cancer (HCC) in Phase I/II trials

Multiple near-term clinical milestones

Multiple partnerships/collaborations

Headquartered in San Francisco Bay Area



Eureka Ranks in Top 10 CAR-T Patent Assignees Worldwide

Table 2 | Top CAR-T cell assignees

Rank	Assignee	Patents	
		No. of files	No. of families
1	University of Pennsylvania (United States)	908	108
2	Bristol Myers Squibb (United States)	507	82
3	Novartis (Switzerland)	499	71
4	Cellectis (France)	495	52
5	Memorial Sloan Kettering Cancer Center (United States)	482	60
6	Department of Health and Human Services (United States)	457	67
7	University College London (United Kingdom)	428	40
8	Fred Hutchinson Cancer Research Center (United States)	244	40
9	Eureka Therapeutics (United States)	226	24
10	Baylor College of Medicine (United States)	223	36
11	University of California (United States)	220	45
12	Gilead Sciences (United States)	220	27
13	Bluebird bio (United States)	211	27
14	City of Hope National Medical Center (United States)	203	27
15	Dana-Farber Cancer Institute (United States)	192	36
16	Seattle Children's Hospital (United States)	176	15
17	Autolus Therapeutics (United Kingdom)	172	39
18	CARsgen Therapeutics (China)	150	30
19	University of Texas (United States)	150	24
20	Roche Holding (Switzerland)	134	12

nature
biotechnology

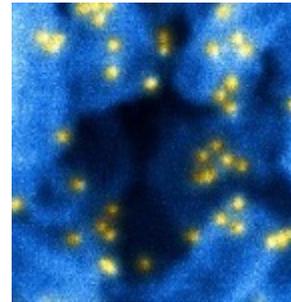
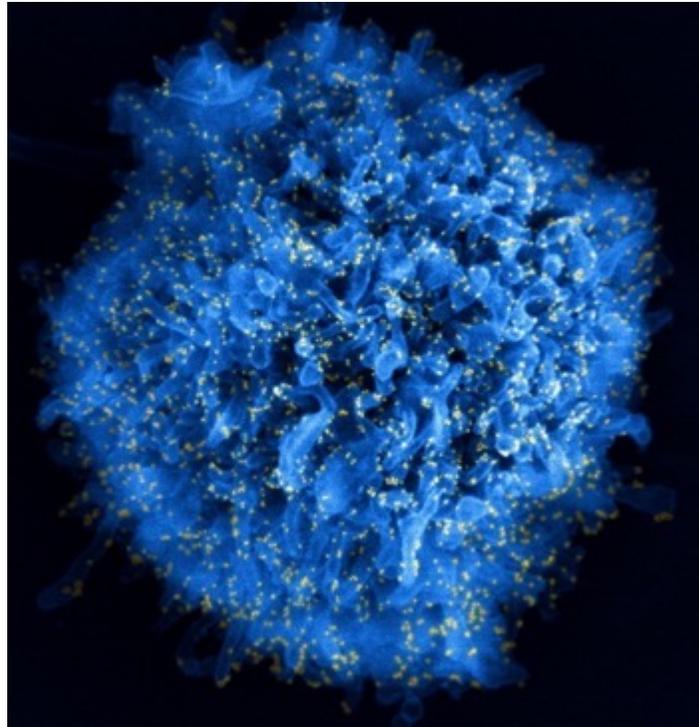


(No. 4 Among Industries)

**Top CAR-T Cell
Patent Assignee
Worldwide
2020**

Eureka ARTEMIS® Technology Platform

ARTEMIS



ARTEMIS receptor is primarily localized in microvilli.

(Collaboration: Alice Liang, Ph.D. Director of Microscopy Laboratory, NYU Langone Health NYU School of Medicine)

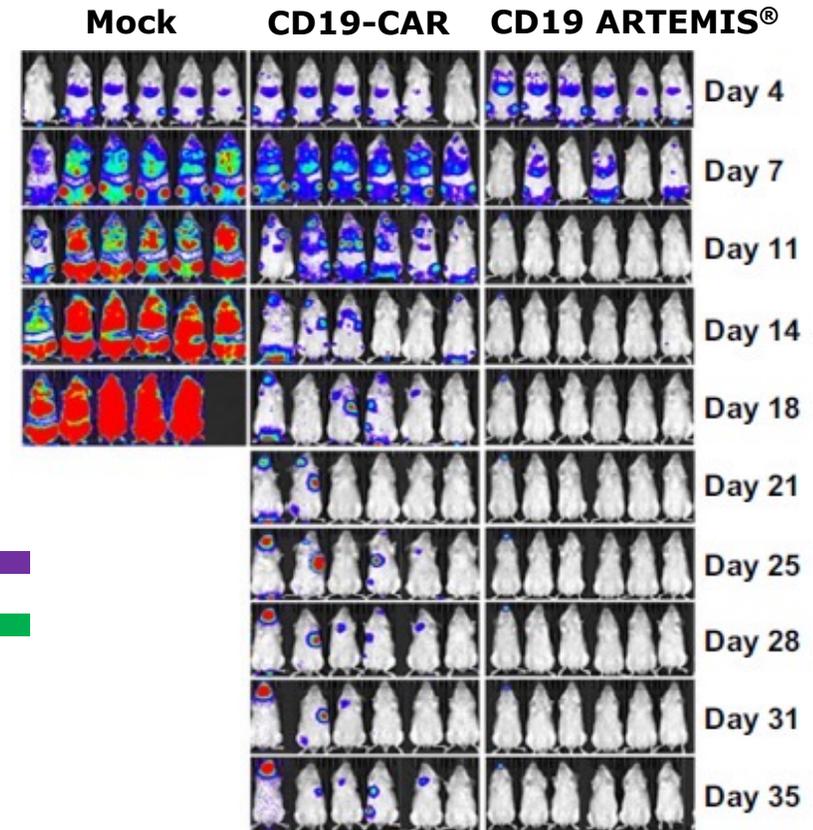
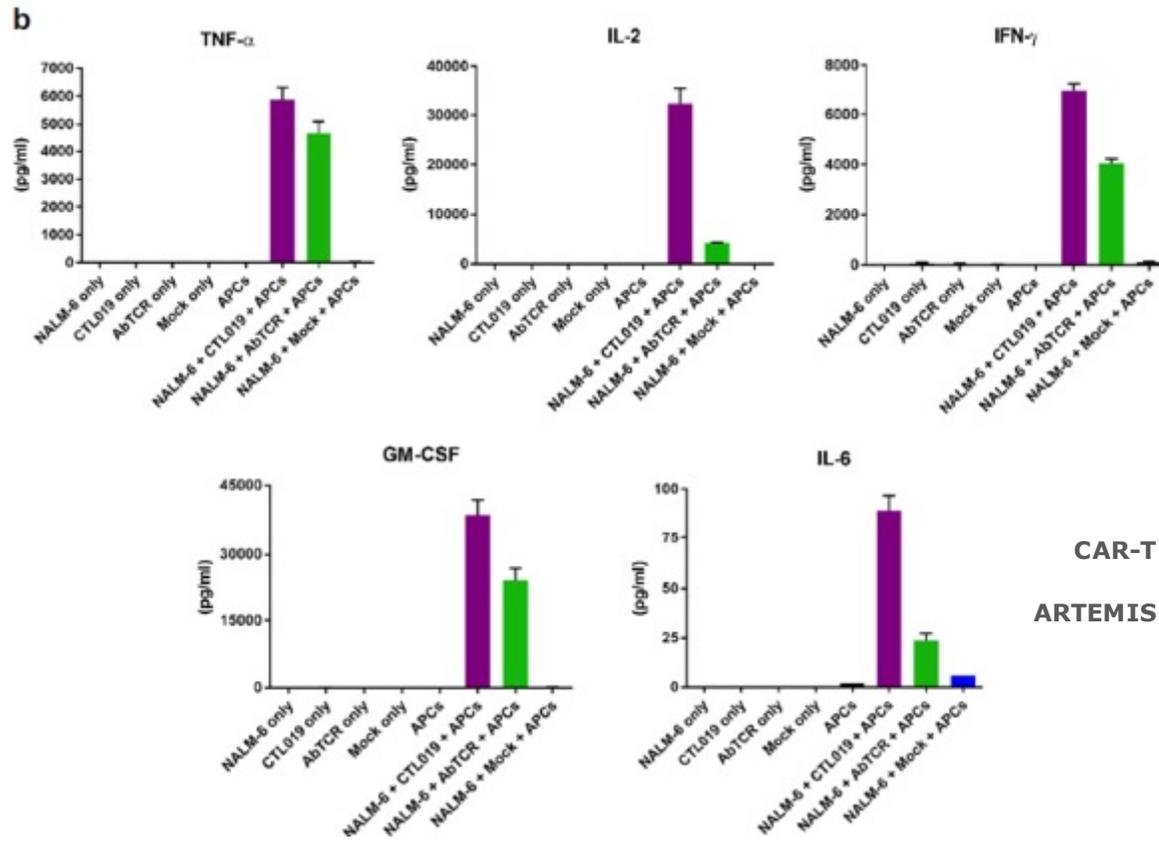
Superiority to CAR

- ARTEMIS T-cell therapy is **clinically validated in patients**
- ARTEMIS vs. CAR-T
 - **Superior** efficacy
 - **Enhanced** tumor infiltration
 - **Less** T cell exhaustion
 - **Reduced** Cytokine Release Syndrome (CRS) and cytokine related toxicities

Preclinical Data Demonstrates Superior Safety/Efficacy Profile Compared to CAR T

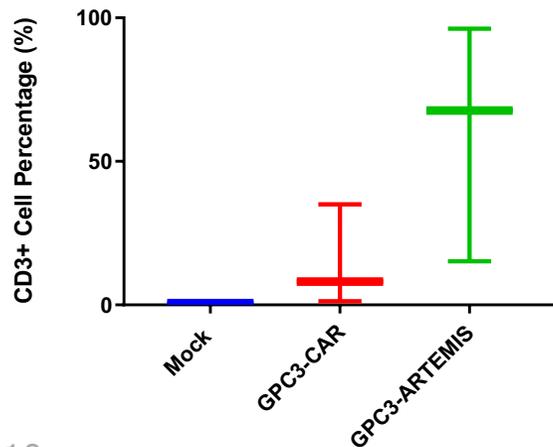
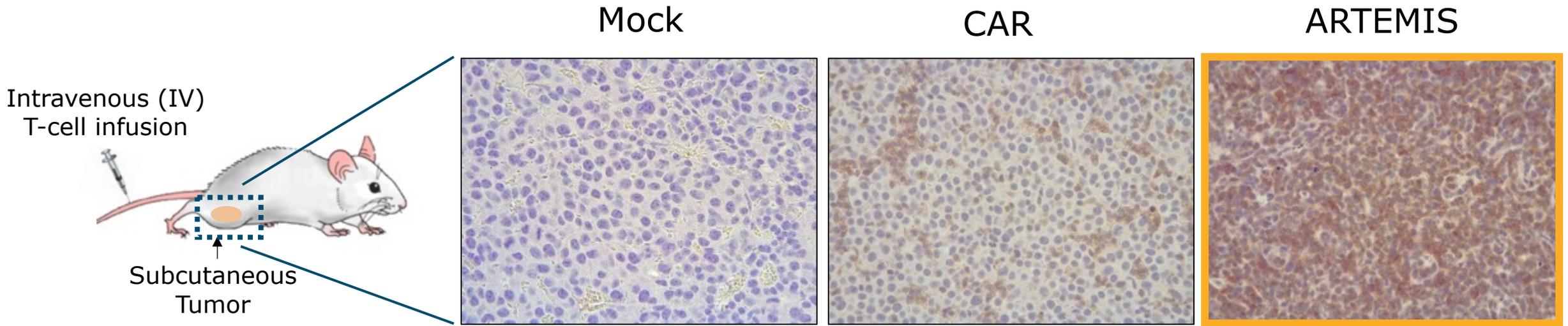
CD19 ARTEMIS® T cells release less CRS-related cytokines than CAR-T, including IL-6

CD19 ARTEMIS® T cells shows matching efficacy in mouse model (Raji)



Xu et al., *Cell Discovery*, 2018

Tumor Infiltration - ARTEMIS vs. CAR-T cells



Scans of tumor tissue stained with T-cell marker CD3 show ARTEMIS T cells armed with **tumor infiltration technology** went deeper into the solid tumor than control and CAR-T cells.

ARTEMIS Construct Validated by Independent Researchers



Stephan A. Grupp, MD, PhD

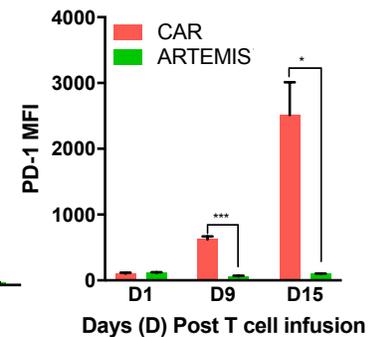
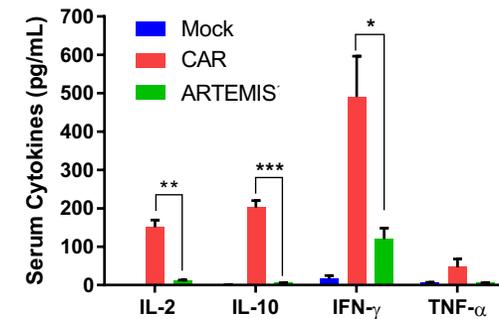
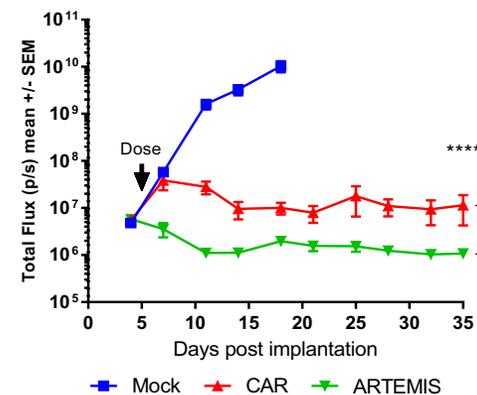
- Delivered CAR T-cell therapy to the first pediatric patient in the world (Emily Whitehead).
- Led the first multicenter global study of Kymriah[®], which became the first CAR-T therapy to receive approval by the FDA.

Published work with Grupp's team

Xu et al. Cell Discovery (2018) 4:62

ARTEMIS vs. CAR-T cells

- Potent anti-tumor activity
- Better safety profile
- Longer durability with less exhausted phenotype



Eureka Pipeline

PROGRAM (TARGET)/INDICATION	DISCOVERY	PRECLINICAL	PHASE 1	PHASE 2	PARTNERS
ET140203 (AFP) Adult HCC/Liver Cancer (ARYA-1)	Wholly-owned program.				
ET140203 (AFP) Pediatric Liver Cancers (ARYA-2)	Wholly-owned program.				
ECT204 (GPC3) HCC/Liver Cancer (ARYA-3)	Wholly-owned program.				
Undisclosed Target Mesothelioma, Ovarian & Pancreatic Cancers	Wholly-owned program.				
Undisclosed Target Lung, Breast & Ovarian Cancers	Wholly-owned program.				
Partnered Asset (BCMA) Multiple Myeloma	Collaboration program.				 Bristol Myers Squibb' / 
Partnered Asset (GPRC5D) Multiple Myeloma	Collaboration program.				 Bristol Myers Squibb' / 
Partnered Asset (MUC16) Ovarian Cancer	Collaboration program.				 Bristol Myers Squibb' / 
Partnered Asset (WT1) Ovarian Cancer	Collaboration program.				 Memorial Sloan Kettering Cancer Center
Partnered Asset (GPRC5D), non-CAR use Multiple Myeloma	Collaboration program.				 SANOFI
Partnered Asset (AFP) Adult HCC, Greater China and ASEAN	Collaboration program.				 药明巨诺 JW Therapeutics 
Partnered Asset (GPC3) Adult HCC, Greater China and ASEAN	Collaboration program.				 药明巨诺 JW Therapeutics 
Partnered Asset (CD19), Oncolytic Virus Solid tumors	Collaboration program.				 IMUGENE Developing Cancer Immunotherapies



The CAR T Solid Tumour Challenge & Imugene's Solution

Chimeric Antigen Receptor (CAR) T cell therapy has had limited activity in solid tumours, largely due to a lack of selectively and highly expressed surface antigens, such as the blood B cell antigen CD19.

CD19 Targeting domain

CD19 CAR T Cells

Solid Tumour

OV generated CD19

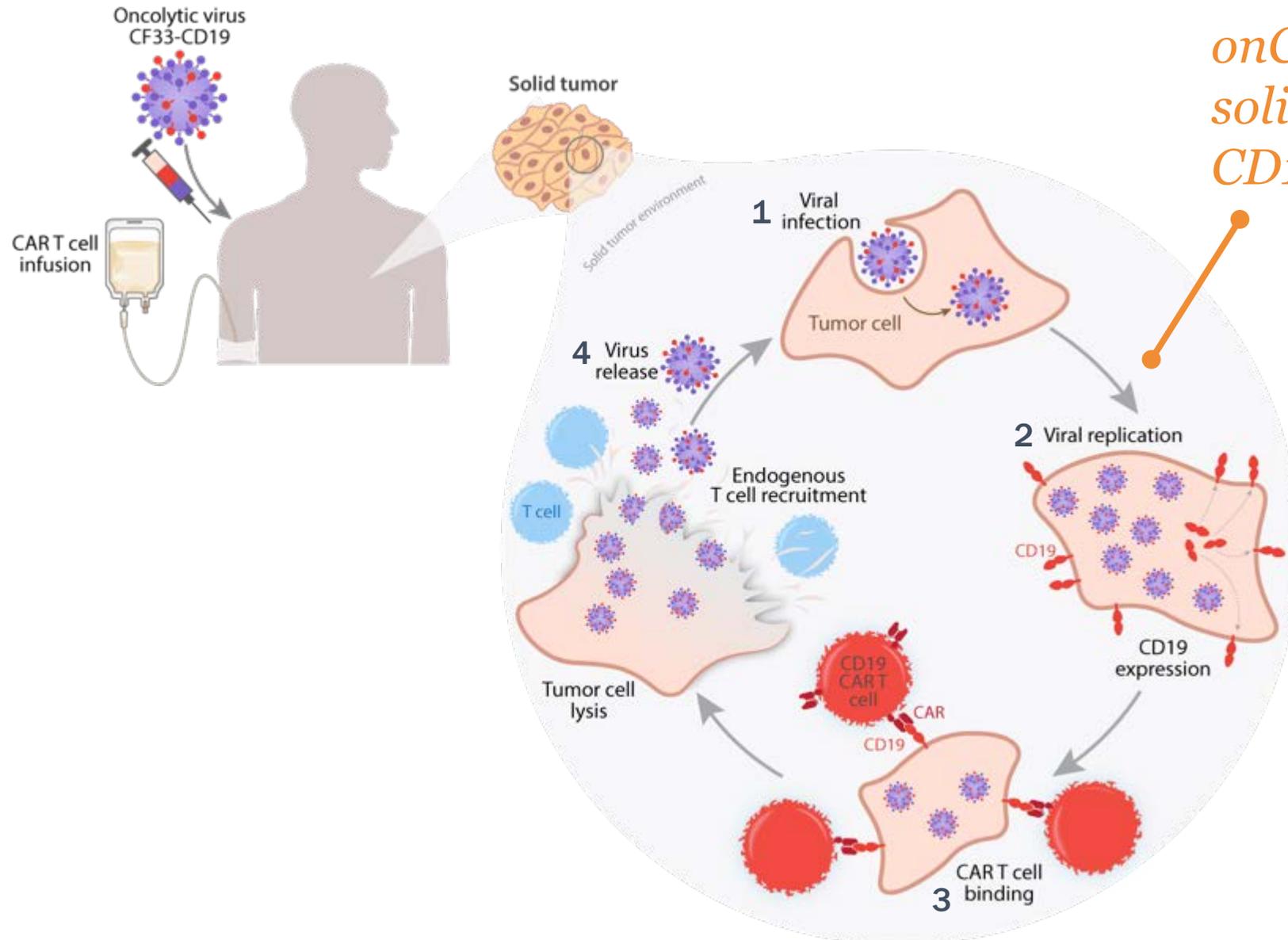
NEW CONCEPT

Utilise OV's as a delivery vector to deliver CD19 antigen to solid tumour cells

Engineer Imugene's CF33 to infect solid tumour cells and insert CD19 transgene to enable presentation of CD19 over the tumour cells during tumour cell infection, onCARlytics (CF33-CD19)

Combination use of autologous or allogeneic CD19 CAR Ts with onCARlytics (CF33-CD19) presents CD19 targets on solid tumours

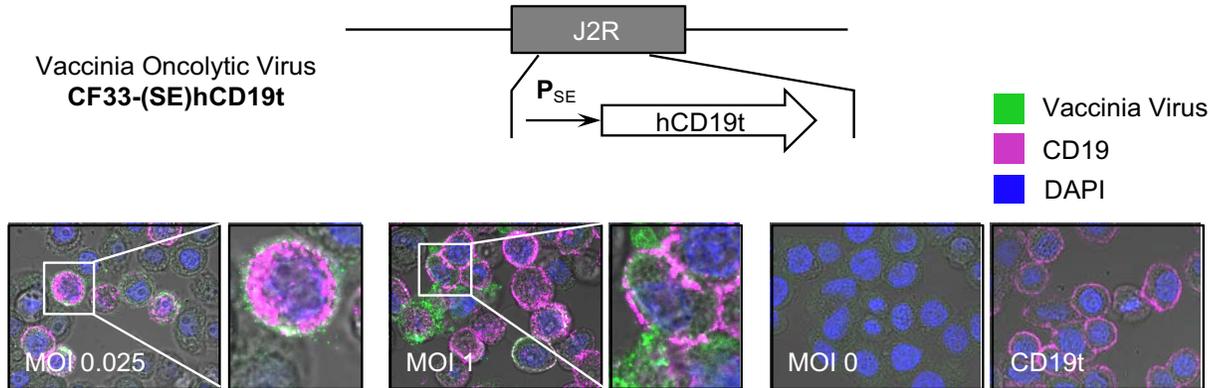
Mechanism of Action: How does it work?



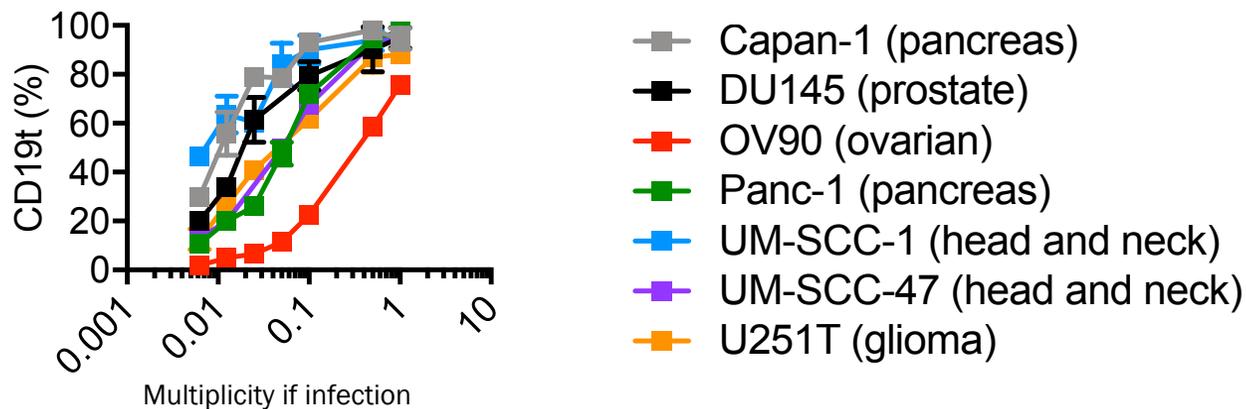
onCARlytics makes solid tumours “seen” by CD19 directed CAR T

1. OnCARlytics infects tumour cells
2. Virus replication and production of CF33-CD19 on the cell surface enabling CD19 CAR T cell targeting
3. Tumour cell lysis leads to viral particle release and the combination promotes endogenous immune cell recruitment to tumours
4. Released viral particles re-initiate virus infection of surrounding tumour cells.

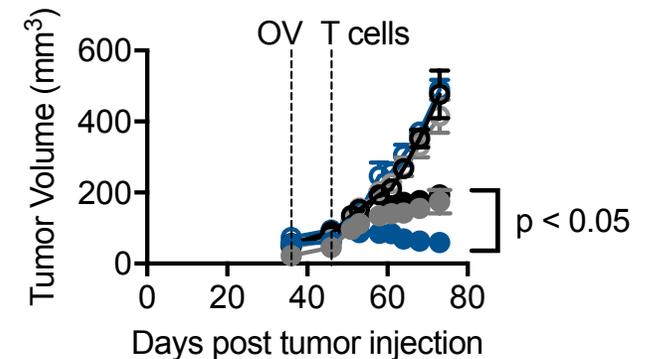
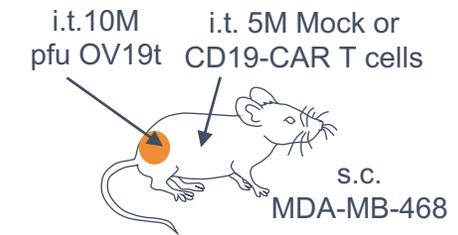
onCARlytics delivers CAR Targets to “targetless” solid tumours



onCARlytics (CF33-CD19) infects a wide array of solid tumour cell lines, with dose-dependent CD19 cell surface expression



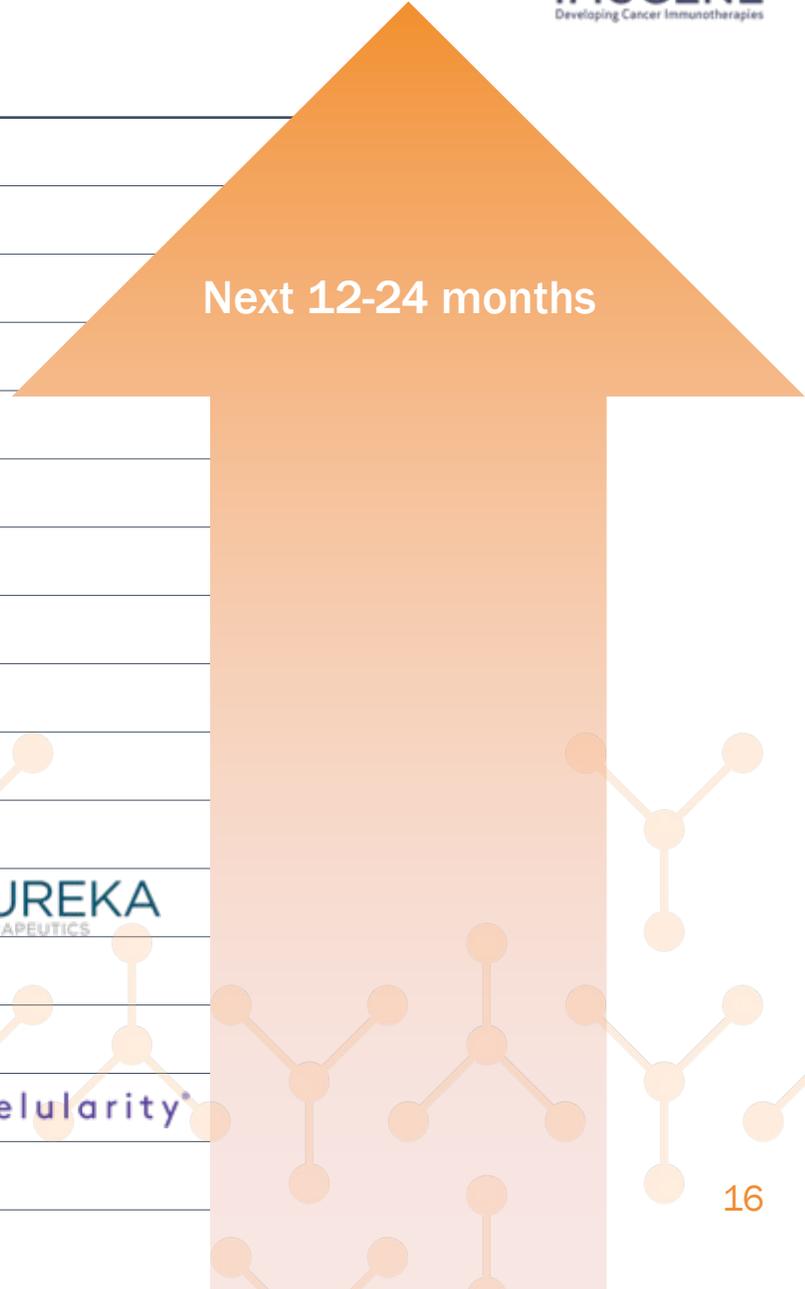
Combination of onCARlytics (CF33-CD19) and CD19-CAR T cells promotes tumour regression in xenograft model of TNBC



- No treatment
- Mock alone
- CAR alone
- OV19t alone
- OV19t + Mock
- OV19t + CAR

Milestones

✓	Technology	Milestone
	onCARlytics	1 st Patient Dosed
	onCARlytics	FDA IND Clearance
	PD1-Vaxx	Combination RP2D
	onCARlytics	GLP Toxicology Study
	VAXINIA	1st Patient Dosed
	onCARlytics	FDA Pre-IND Meeting
	onCARlytics	GMP manufacturing for pre-clinical toxicology & Phase 1 study
	VAXINIA	FDA IND Clearance
	HER-Vaxx	Neo and Next HERIZON studies
	PD1-Vaxx	Maximum Feasible Dose Identified
	HER-Vaxx	OS Primary Endpoint
✓	onCARlytics	Strategic Partnership with Eureka on autologous CD19 CART
✓	CHECKvacc	TNBC IST 1st Patient Dosed
✓	HER-Vaxx	PFS analysis data
✓	onCARlytics	Strategic partnership with Celularity on allogenic CD19 CART
✓	CHECKvacc	FDA IND Clearance



Financial Summary

Public Market Overview

Share Price ¹	A\$0.485
52 week range	0.052 - 0.515
Market Capitalisation ²	A\$2.73B
Cash equivalents (30 Sept 21)	A\$112.2M
Enterprise Value	A\$2.617B

Top 5 Shareholders (as at September 2021)

Paul Hopper	6.96%
HSBC Custody Nominees (Australia)	5.98%
Richard Mann and Assoc.	5.35%
JP Morgan Nominees Australia Pty Limited	4.57%
Citicorp Nominees Pty Limited	3.67%

Note:

1. As of 29 Oct 2021
2. Market capitalisation calculations based on ordinary shares (5.46 bn) only and excludes the dilutive impact of options outstanding (0.64 bn)

Share Price Performance (last 3 months)





IMUGENE
Developing Cancer Immunotherapies

ASX: IMU

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