

ASX Release

13 December 2021

AROVELLA LICENCES THE RIGHTS TO A NOVEL MONOCLONAL ANTIBODY / CAR TO TREAT CANCERS

- Arovella has acquired from MD Anderson an exclusive global licence to the patent rights for a monoclonal antibody (mAb) that targets a DKK1 peptide
- The technology can be used as a Chimeric Antigen Receptor (CAR) for the treatment of blood cancers and solid tumours
- The DKK1-CAR/mAb has the potential to target a wide cancer spectrum and has a large population potential
- DKK1-CAR-T cells have robust activity against blood cancers and solid tumours
- Expands Arovella's iNKT cell therapy pipeline by combining the DKK1-CAR with its iNKT cell therapy platform
- Licensing fees funded through existing cash reserves
- Webinar to be held at 11:00 am AEDT today discussing the licence from MD Anderson. [Click here to register.](#)

PERTH, AUSTRALIA 13 December 2021: Arovella Therapeutics, (ASX: ALA), a biotechnology company focused on developing its invariant Natural Killer T (iNKT) cell therapy platform, today announces that it has signed a global, exclusive licence agreement with The University of Texas MD Anderson Cancer Center for the patent rights to a novel mAb developed for cancer treatment.

This is the first monoclonal antibody directed against a DKK1 peptide found in complex with HLA-A2 on the surface of cancer cells (DKK1). DKK1 is a target that is found in many cancer types, including blood cancers and solid tumours and 40-50% of the population is HLA-A2 positive, meaning that this technology may be applicable across a wide spectrum of cancers that affect a significant proportion of the population.

Higher levels of DKK1 in cancer patients may serve as a prognostic biomarker for cancers such as Multiple Myeloma, Head and Neck Squamous Cell Carcinoma (HNSCC), Pancreatic Adenocarcinoma (PAAD), and Lung Squamous Cell Carcinoma (LUSC). Higher DKK1 production has been observed in bladder cancer and increased production of DKK1 may assist Non-small Cell Lung Carcinoma (NSCLC) cell invasion and migration. It has also been suggested that increased DKK1 levels may cause resistance to chemotherapy in cancers such as ovarian cancer.

Arovella's CEO and MD, Dr Michael Baker, commented: *"The data that we have seen for the DKK1-CAR is compelling. We see a lot of promise in combining DKK1-CAR with our iNKT cell therapy platform and expect synergistic effects for the treatment of certain cancers. The next steps are to confirm the specificity, safety and proof-of-concept data in animal models before advancing this into manufacturing."*

Numerous studies have shown that multiple myeloma cells overproduce DKK1. It is also documented that multiple myeloma cells produce CD1d, which is recognised by invariant Natural Killer T (iNKT) cells, the core of Arovella's iNKT cell therapy platform. Arovella expects that by combining the DKK1-CAR with its iNKT cell therapy platform, it will lead to a more effective product to treat multiple myeloma and potentially other cancers. To date, the DKK1 mAb has shown promise in treating multiple myeloma when used as a single agent in mouse models. The DKK1-CAR-T successfully eliminates cancer in numerous cancer models, including multiple myeloma, pancreatic cancer, lung cancer and triple negative breast cancer.

More than a decade of work has gone into the production and testing of the DKK1 mAb. Professor Qing Yi, now at Houston Methodist, developed the technology during his time at MD Anderson as a tenured Professor of Medicine. At Houston Methodist, Professor Yi has continued the research, assessing the potential of the DKK1-CAR. Professor Yi was recruited to Houston Methodist in 2018 through a US\$6m Cancer Prevention and Research Institute of Texas (CPRIT) award.

Professor Yi commented: *"We have been working on the role of DKK1 for more than a decade. To target a range of cancers, we knew we needed to target something unique on the surface of different cancer types. That is why we generated the DKK1-peptide targeting mAb and CAR, because the DKK1 peptide in complex with HLA-A2 is found on many cancers and as expected, we see robust data treating several cancer types."*

Key terms of the Licence Agreement

Under the terms of the licence agreement, Arovella has secured the right to use the technology for the treatment of human disease, for which it has agreed to pay MD Anderson license fees, development milestones and single digit royalty payments based on net sales. Upfront fees associated with the license agreement will be funded entirely from existing cash reserves. The licence agreement commences with an effective date of 13 December 2021 and extends to the later of the expiration of applicable patent rights or agreed upon number of years.

Arovella's role in the oncology market

The Licence Agreement involving the DKK1 mAb adds substantially to Arovella's existing exposure to the immuno-oncology market. The Company acquired the licence for a novel iNKT cell therapy platform in June 2021 and is developing a CD19 targeting CAR to treat haematological malignancies.

Since acquiring the licence to the iNKT cell therapy platform, Arovella has added new members to its Board of Directors, its Scientific Advisory Board and its management team. Arovella believes that acquiring the licence to another CAR adds substantial value to its iNKT cell therapy platform.

ASX: ALA

Arovella Therapeutics Limited
ACN 090 987 250



Investor Webinar

Arovella Therapeutics' CEO and MD, Dr Michael Baker, will hold an investor webinar today, Monday 13 December 2021 at 11:00 am AEDT to discuss the technology that is the focus of the licence agreement.

Click the link below to register:

https://us02web.zoom.us/webinar/register/WN_gHpepQP7RzKjJ0wB9rDFQA

After registering, you will receive a confirmation email about how to join the webinar. A recording of the webinar will be available at the same link shortly after the conclusion of the session.

For and on behalf of the Board and for further information, please contact:

Dr Michael Baker

Chief Executive Officer & Managing Director

Arovella Therapeutics Ltd

Tel +61 (0) 403 468 187

mbaker@arovella.com

NOTES TO EDITORS:**About Arovella Therapeutics Ltd**

Arovella Therapeutics Ltd (ASX: ALA) is a biotechnology company focused on developing therapies to treat human disease. Arovella's two focus areas are oncology and conditions that impact the central nervous system. Arovella is developing its invariant natural killer T (iNKT) cell therapy platform from Imperial College London to treat blood cancers. The Company is also developing low-risk oral sprays to reformulate existing pharmaceuticals. The potential benefits of administering drugs through the oral mucosa (i.e. cheeks, tongue, gums and palate) include ease of use, lower dosage, reduced side effects and faster response time. Arovella's product pipeline includes an oral spray for the platelet-lowering drug anagrelide to treat metastatic disease in the background of high platelets, and ZolpiMist™, a first-in-class oral spray of zolpidem tartrate to treat short-term insomnia. ZolpiMist is approved by the FDA and the TGA and is marketed in the USA. Arovella has rights to the product outside of the US and Canada. Other products in development include oral sprays to treat migraine headaches, motion sickness, and drug-resistant epilepsy.

For more information, visit www.arovella.com

This announcement contains certain statements which may constitute forward-looking statements or information ("forward-looking statements"), including statements regarding negotiations with third parties and regulatory approvals. These forward-looking statements are based on certain key expectations and assumptions, including assumptions regarding actions of third parties and financial terms. These factors and assumptions are based upon currently available information and the forward-looking statements contained herein speak only as of the date hereof. Although the expectations and assumptions reflected in the forward-looking statements are reasonable in the view of the Company's directors and management, reliance should not be placed on such statements as there is no assurance that they will prove correct. This is because forward-looking statements are subject to known and unknown risks, uncertainties and other factors that could influence actual results or events and cause actual results or events to differ materially from those stated, anticipated or implied in the forward-looking statements. These risks include, but are not limited to: uncertainties and other factors that are beyond the control of the Company; global economic conditions; risk associated with foreign currencies; and risk associated with securities market volatility. The Company assumes no obligation to update any forward-looking statements or to update the reasons why actual results could differ from those reflected in the forward-looking statements, except as required by Australian securities laws and ASX Listing Rules.



ASX: ALA

Exclusive Global Licence
DKK1 Monoclonal Antibody (mAb)
from The University of Texas
MD Anderson Cancer Center

December 2021

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Investment Highlights DKK1 mAb Licence



Exclusive, Global Licence

Arovella Therapeutics secured a licence to a novel DKK1 mAb for a unique target found on many cancer types, including blood cancers and solid tumours



A Validated Cancer Target

Literature describes DKK1 as a target for immunotherapy that is overproduced in several different cancers



Long Development History

The technology has been under development for a number of years at the University of Texas MD Anderson Cancer Center and Houston Methodist Hospital



Standalone mAb or CAR Potential

Compelling preclinical evidence demonstrating potent activity as a standalone drug or as a Chimeric Antigen Receptor (CAR) for cell therapy



Commercially Attractive Deal

Upfront licence fee funded through Arovella's cash reserves with industry standard milestone payments and royalties



Robust Intellectual Property

Clear patent protection with composition of matter and long patent life filed in major territories with a favourable search report

Arovella Company Overview

Financial Snapshot

ASX CODE	ALA
Market capitalisation ¹	\$16.8 million
Shares on issue	480.92 million
52-week low / high	\$0.033 / \$0.075
Cash (30 September 2021)	\$5.1 million

Major Shareholders

Shareholder	Ownership (%) ¹
ZERRIN INVESTMENTS PTY LTD	16,010,000 (3.33%)
UBS NOMINEES PTY LTD	15,064,640 (3.13%)
DYLIDE PTY LTD	12,500,000 (2.60%)
KAMALA HOLDINGS PTY LTD	11,500,000 (2.39%)
CHELSEA INVESTMENTS PTY LTD	10,000,000 (2.08%)

1. As of 10 December 2021

ALA Price and Volume - 12 Months¹

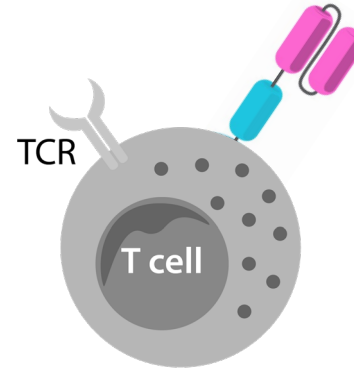


Why DKK1-CAR is Unique

- The DKK1 mAb was developed at MD Anderson and can be incorporated into a chimeric antigen receptor (CAR)
- DKK1 is increased in many cancer types¹
 - Multiple myeloma (Blood Cancer)
 - Pancreatic cancer
 - Breast cancer
 - Lung cancer
- Too much DKK1 can indicate poor overall survival and shorter disease-free survival¹
- This is a new tumor antigen that extends the limited set of targets for blood cancers and solid tumor CAR therapy
- The target is differentiated from others by its presence across numerous cancer types
- DKK1-CAR-T cells display activity against blood cancer and solid tumours

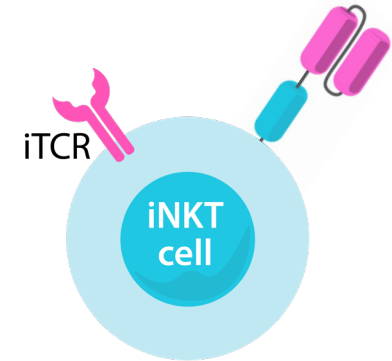
1. Zhu et al., 2021

Already Completed



DKK1-CAR-T cells
Multiple Myeloma ✓
Pancreatic Cancer ✓
Lung Cancer ✓
Breast Cancer ✓

Arovella To Complete



DKK1-CAR-iNKT cells
Multiple Myeloma
Pancreatic Cancer
Lung Cancer
Breast Cancer

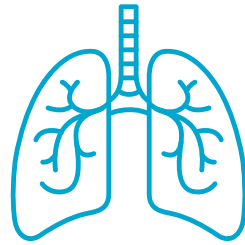
DDK1-CAR-T Cells Work Against Many Cancers



Multiple Myeloma¹

34,900 cases in
the US per annum

55.6% 5-year
survival rate



Lung Cancer²

235,760 cases in
the US per annum

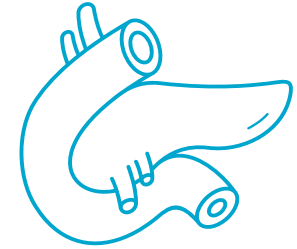
21.7% 5-year
survival rate



Triple Negative Breast Cancer^{3,4}

28,150 cases
in the US per annum

76.9% 5-year
survival rate



Pancreatic Cancer⁵

60,400 cases
in the US per annum

10.8% 5-year
survival rate

1. <https://seer.cancer.gov/statfacts/html/mulmy.html>

2. <https://seer.cancer.gov/statfacts/html/lungb.html>

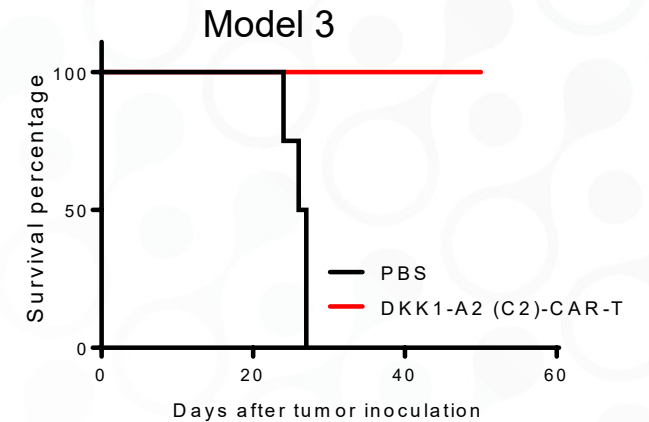
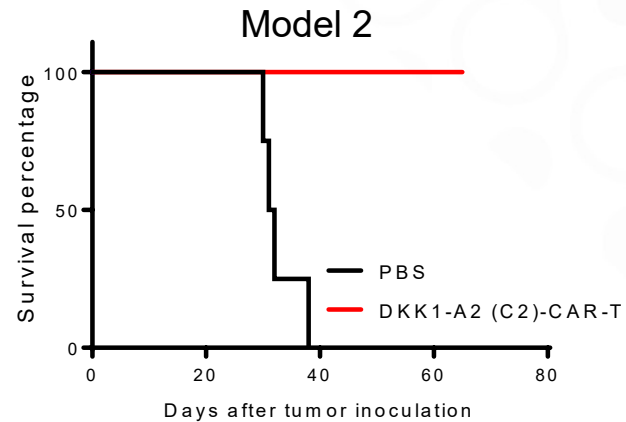
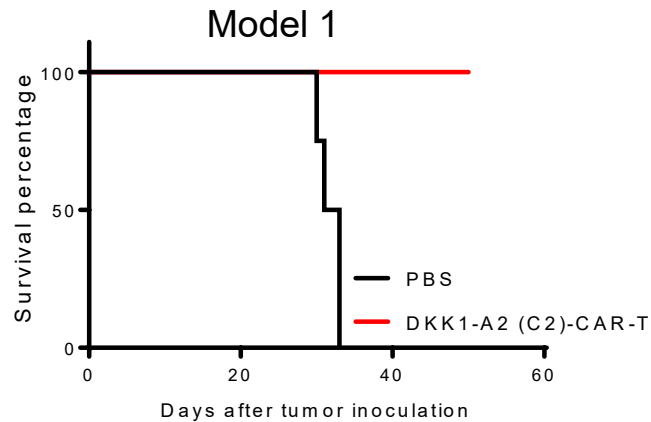
3. <https://seer.cancer.gov/statfacts/html/breast-subtypes.html>

4. <https://www.cancer.org/cancer/breast-cancer/about/types-of-breast-cancer/triple-negative.html>

5. <https://seer.cancer.gov/statfacts/html/pancreas.html>

DKK1-CAR-T Cell Activity in Multiple Myeloma

DKK1-CAR-T cells were tested in three different animal models for multiple myeloma, and it extended lifespan in all standard models



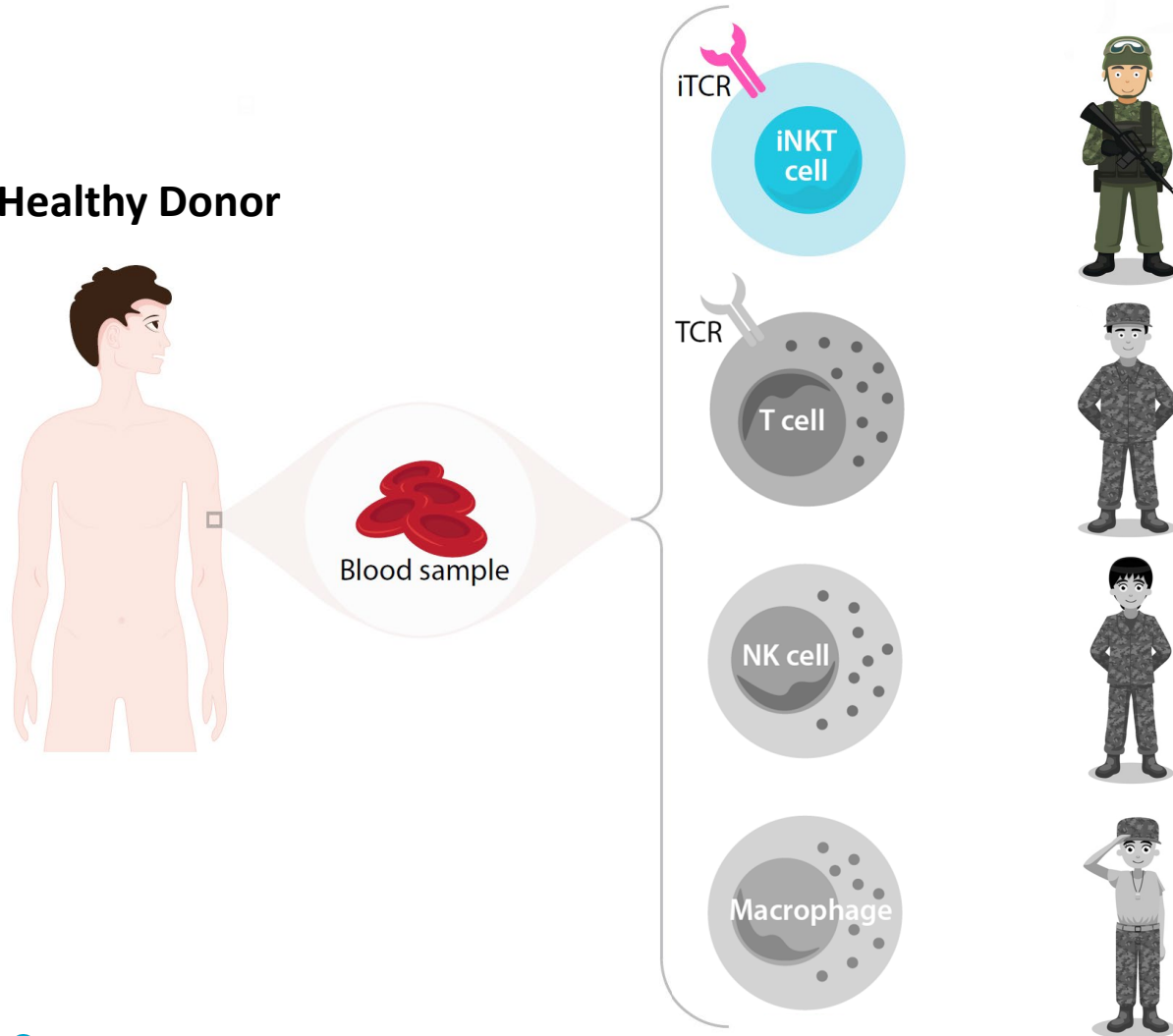
- » All treated mice were alive at 50-60 days, while untreated mice succumbed to the cancer at 30-40 days
- » Multiple myeloma cells also have CD1d on their surface, so combining DKK1-CAR with our iNKT cells will provide dual-targeting
- » iNKT cells are being developed to be used off-the-shelf

Expand the Cell Therapy Revolution: iNKT Cells

iNKT Cell Benefits

- iNKT cells are one of the most potent naturally occurring immune cells
- iNKT cells naturally target and kill cancer cells
- iNKT cells activate other beneficial immune cells
- iNKT cells can be used “off the shelf” as they don’t cause graft versus host disease (GVHD)
- iNKT cells show significantly improved killing of CD1d producing cancers over T cells when combined with chimeric antigen receptors (CARs)

Healthy Donor



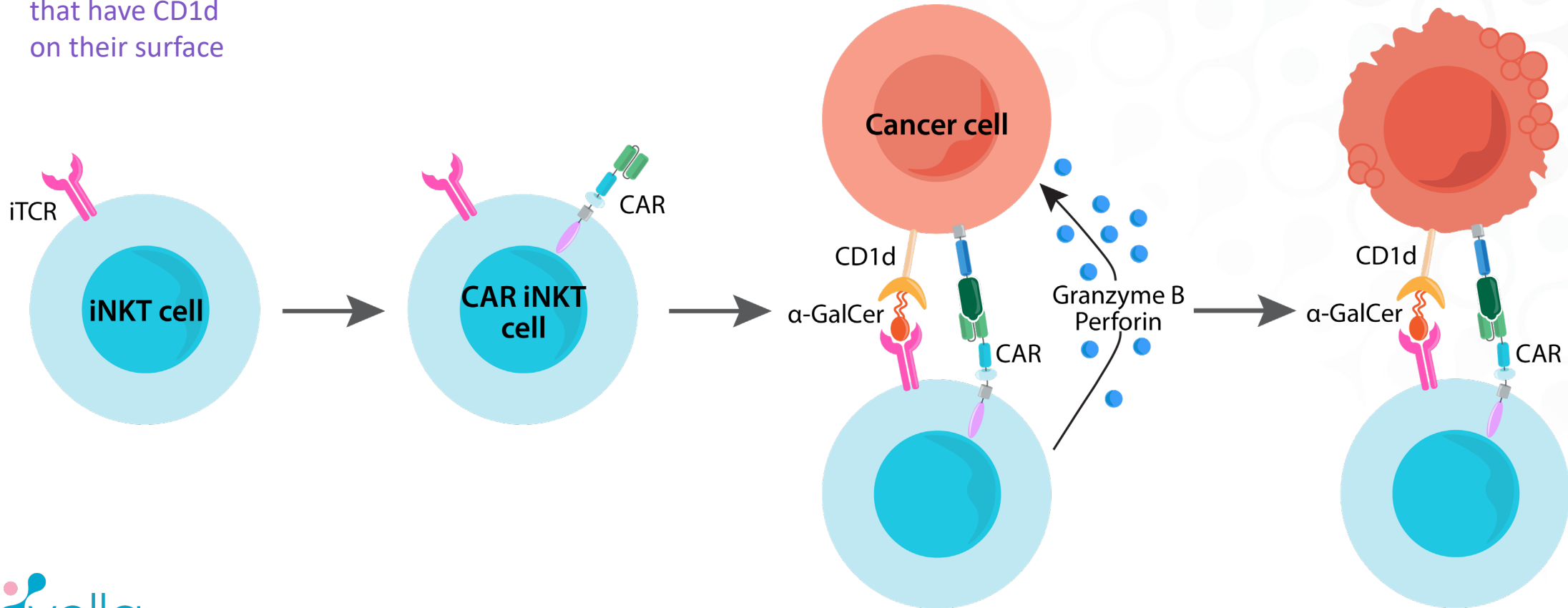
How does the CAR-iNKT Cell Therapy Platform Work?

1. iNKT cells contain an iTCR that naturally assists to recognise and kill cancer cells that have CD1d on their surface

2. We introduce a chimeric antigen receptor (CAR) to target cancer cells, making them dual targeting

3. CAR-iNKT cells are activated after they attach to the cancer cells, releasing components to trigger cancer cell death

4. The cancer cell is killed, and other components are recruited to assist

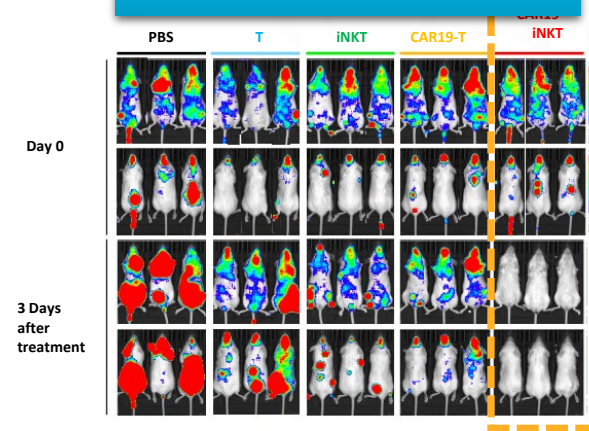


ALA-101: CAR19-iNKT Cells to Treat Blood Cancers

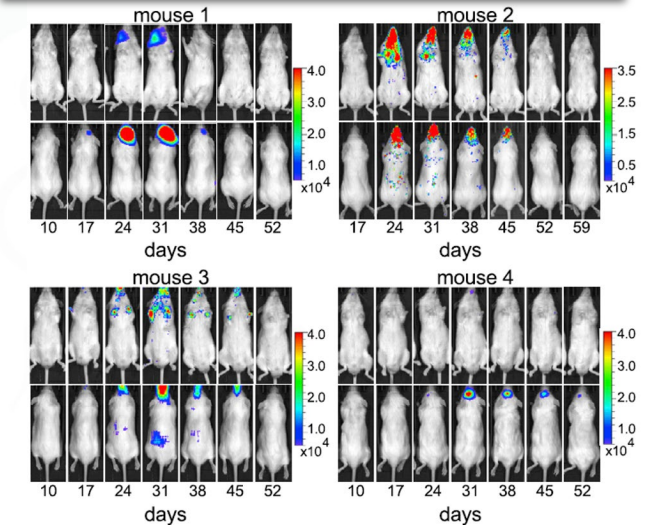
- ALA-101 is being developed as an off-the-shelf cell therapy for the treatment of CD19 expressing blood cancers
- Preclinical data:
 - Demonstrates that ALA-101 has strong activity against CD19 expressing cancers
 - Demonstrates that ALA-101 is more efficient at clearing tumour cells than conventional cell therapies when the cancers produce CD1d
 - Demonstrates that ALA-101 can result in better animal survival than conventional cell therapies
 - Validates the use of iNKT cells as a treatment for CD19 expressing cancer types
- We expect to select our manufacturer in Q4 CY2021

CAR19-iNKT Outperforms Conventional Therapies

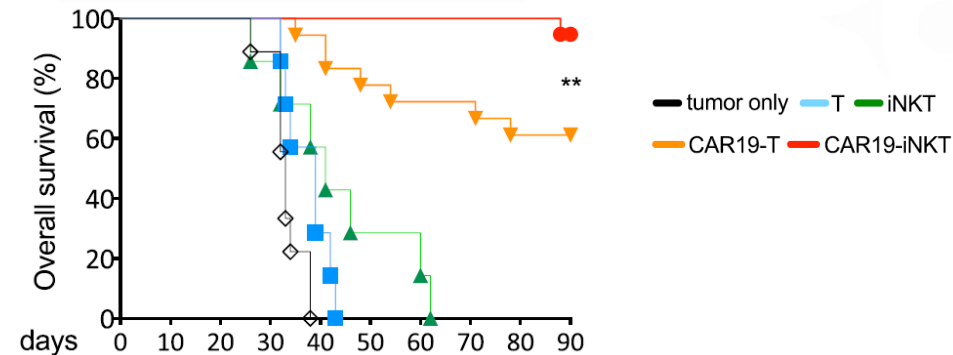
Faster Killing of Cancer Cells That Have CD1d



Spontaneous Secondary Remission



Increased Survival Over CAR-T Cells



DKK1-CAR-T Preclinical Safety

Prof Yi Has demonstrated:

- They only kill cells that have the target on their surface
- They do not kill healthy blood cells
- They do not cause weight loss when administered to mice
- The DKK1 mAb targeted only 1 out of 35 tissues tested (tonsil)

Arovella will confirm:

- That the DKK1 technology does not target or attack healthy cells
- The ability to combine DKK1-CAR with Arovella's iNKT cell therapy platform



The Inventor – Professor Qing Yi

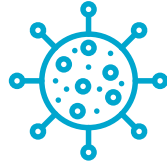


HOUSTON
Methodist
LEADING MEDICINE



**Karolinska
Institutet**

arovella
THERAPEUTICS



Professor Qing Yi is a trained medical immunologist with over 25 years of experience. He is one of the leading investigators in the fields of tumor immunology and immunotherapy in multiple myeloma and other cancers. He has trained at the **Karolinska Institute, MD Anderson, the Cleveland Clinic** and is now at **Houston Methodist**.



Professor Yi is the Director for the Center for Translational Research in Hematological Malignancies and Associate Director for the Cancer Center Basic Research Programs, Cancer Center Houston Methodist.



Professor Yi has been awarded 9 R01 grants, 1 project and 1 core grant in the MD Anderson Myeloma SPORE (P50), 4 R01-type translational grants from the LLS, 4 Senior Researcher Awards from the MMRF, 2 K99/R00 grants, and numerous intramural and industry grants. Dr Yi was recruited to Houston Methodist through an Established Investigator Award from CPRIT with a total grant amount of ~US\$6 million.



Professor Yi and colleagues have published more than 160 peer-reviewed research articles, with 45 being in top-tier journals with an impact factor of greater than 10.

Robust Intellectual Property

- » Patent life until 2039
- » As the first DKK1-CAR product, it has a robust patent position
- » Title: Monoclonal Antibodies Against MHC-Bound Human Dickkopf-1 Peptides and Uses Thereof
- » Applicant: Board of Regents, The University of Texas System
- » Patent applications have been filed in the US, Europe, Canada, China, and Australia
- » Favorable Search Report



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(19) World Intellectual Property Organization
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

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Commercial Activity for iNKT Cell Players



1. <https://www.gilead.com/news-and-press/press-room/press-releases/2021/8/kite-and-appia-bio-announce-collaboration-to-research-and-develop-allogeneic-cell-therapies-for-cancer>
2. As of 9 December 2021
3. <https://ir.athenex.com/news-releases/news-release-details/athenex-acquire-kuur-therapeutics-expand-cell-therapy>

ALA-104: DKK1-CAR-iNKT Cells

- Arovella will leverage the expertise of Professor Qing Yi and Professor Tassos Karadimitris to develop the DKK1-CAR-iNKT cell therapy
- Confirm specificity and safety of the DKK1-CAR in 2021 and 2022
- Test the DKK1-CAR-iNKT cells in multiple myeloma, breast cancer, lung cancer and pancreatic cancer models in 2022

December
2021



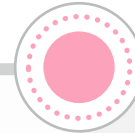
DKK1-CAR-iNKT
Cell Therapy

- Confirm that the DKK1 technology only targets cancerous tissue and not healthy cells
- Combine the DKK1-CAR with the iNKT cell therapy platform
- Initiate preclinical studies for relevant tumour types – blood cancers and solid tumours

iNKT Cell
Therapy
Platform

- Continue to analyse additional CARs to add to the platform
- Continue to prosecute patents for the platform
- Select manufacturer for the CAR19-iNKT cell therapy
- Commence production of the plasmids for the CAR19-iNKT cell therapy product
- Recruit additional cell therapy experts

June
2022



- Enter into a Sponsored Research Agreement with Houston Methodist and Professor Qing Yi
- Complete preclinical studies for relevant tumour types using DKK1-CAR-iNKT cells
- Initiate process development for manufacturing
- Develop the drug product manufacturing strategy

- Complete manufacture of the plasmid for the CAR19-iNKT cell therapy
- Initiate the manufacture of the GMP Lentivirus and iNKT cells for clinical trials
- Finalise clinical trial plan for the CAR19-iNKT cell therapy

December
2022



Arovella's Cell Therapy Pipeline

Developing Therapeutics to Help People Live Longer and Healthier Lives

Cell Therapy							
	Target	DISCOVERY	PRECLINICAL	PHASE 1		PHASE2/3	
ALA-101 (CAR19-iNKT)	CD19	CD19 expressing lymphoma					
ALA-102	Not Disclosed	ND					
ALA-103	Not Disclosed	ND					
ALA-104 (DKK1-CAR-iNKT)	DKK1 peptide	Multiple Myeloma & Solid Tumours					

Senior Leadership Team



Paul Hopper
CHAIRMAN

Over 25 years experience in the medical, healthcare & life sciences sectors. Focussed on start-up and rapid growth companies, he has served as either Founder, Chairman, non-executive director or CEO, of more than fifteen companies in the US, Australia and Asia. Mr Hopper has founded, or technology seeded, six companies on the ASX and Nasdaq.



IMUGENE
Developing Cancer Immunotherapies



Viralytics



David Simmonds
DIRECTOR

David was a senior audit partner with Ernst & Young from 1989 to 2017. From 2008 to 2013, David led the Capital Markets desk in Australia with responsibility for overseeing or reviewing all Australian cross border fundraisings. David was a member of the Board of MS Research Australia.



Dr. Michael Baker
CEO & MANAGING DIRECTOR

Over 15 years experience in scientific research, drug development and venture investing sectors. He was an Investment Manager with the leading Australian life science fund, BioScience Managers. He also conducted due diligence to shortlist investment opportunities and played an active role in managing portfolio companies.



Dr. Debora Barton
DIRECTOR

Over 20 years of oncology experience, in academia, as a practicing physician and in the biotechnology / pharmaceutical industry. Served in key senior executive positions, including Carisma Therapeutics where Dr. Barton is currently the Chief Medical Officer, Iovance Biotherapeutics and Advanced Accelerator Applications, acquired by Novartis during Debora's tenure.



Dr. Liz Stoner
DIRECTOR

Dr. Stoner is a distinguished biopharma executive, who brings decades of international industry experience to her role, including senior roles in Clinical Development Operations at Merck Research Laboratories. Liz is an Executive Partner at MPM Capital, and she has held numerous leadership roles at MPM portfolio companies. Liz was previously an Assistant Professor of Paediatrics at Cornell University Medical College.



David Phillips
DIRECTOR

Senior Business Development Executive with over 35 years in the healthcare industry. Including 23 years in GSK, 12 years in Biotech and as Managing Partner of SR One (GlaxoSmithKline's Corporate Venture Fund). During this period Mr Phillips was a member of the investment committee reviewing greater than 30 deals. David has been responsible for over 50 Pharma/Biotech deals and 10 M&A transactions.



Summary DKK1 mAb and Cell Therapy



Exclusive, Global Licence

Arovella Therapeutics has secured a licence to a novel DKK1 mAb for a unique target found on many cancer types, including blood cancers and solid tumours



Robust Intellectual Property

Clear patent with composition of matter and long patent life filed in major territories with a favourable search report



A Validated Cancer Target

Literature describes DKK1 as a potential target for immunotherapy that is overproduced in several different cancers



World Class Leadership

We have a leadership group that has extensive experience with drug development, particularly cell therapies



Commercially Attractive Deal

Upfront licence fee funded through Arovella's cash reserves with industry standard milestone payments and royalties



Growth Trajectory

Arovella is the only ASX-listed company developing iNKT cell therapies for cancer treatment and the only company worldwide with a DKK1-CAR

Thank You

Dr. Michael Baker

CEO & Managing Director

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Appendices

Cancer Continues to be a Major Health Issue



Worldwide, an estimated 19.3 million new cancer cases (18.1 million excluding non-melanoma skin cancer) occurred in 2020¹



Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020²



The global cancer biologics market should reach \$143.0 billion by 2026 from \$77.5 billion in 2021 at a (CAGR) of 13.0%³

1. <https://pubmed.ncbi.nlm.nih.gov/33538338/>

2. <https://www.who.int/news-room/fact-sheets/detail/cancer>

3. <https://www.businesswire.com/news/home/20211004005398/en/Global-Market-for-Biological-Therapies-for-Cancer-2021-2026---ResearchAndMarkets.com>

What is Cell Therapy?

Blood Collection

- Separating out the white blood cells from a patient or healthy volunteer's blood at a hospital or clinic

Isolation and re-programming of immune cells

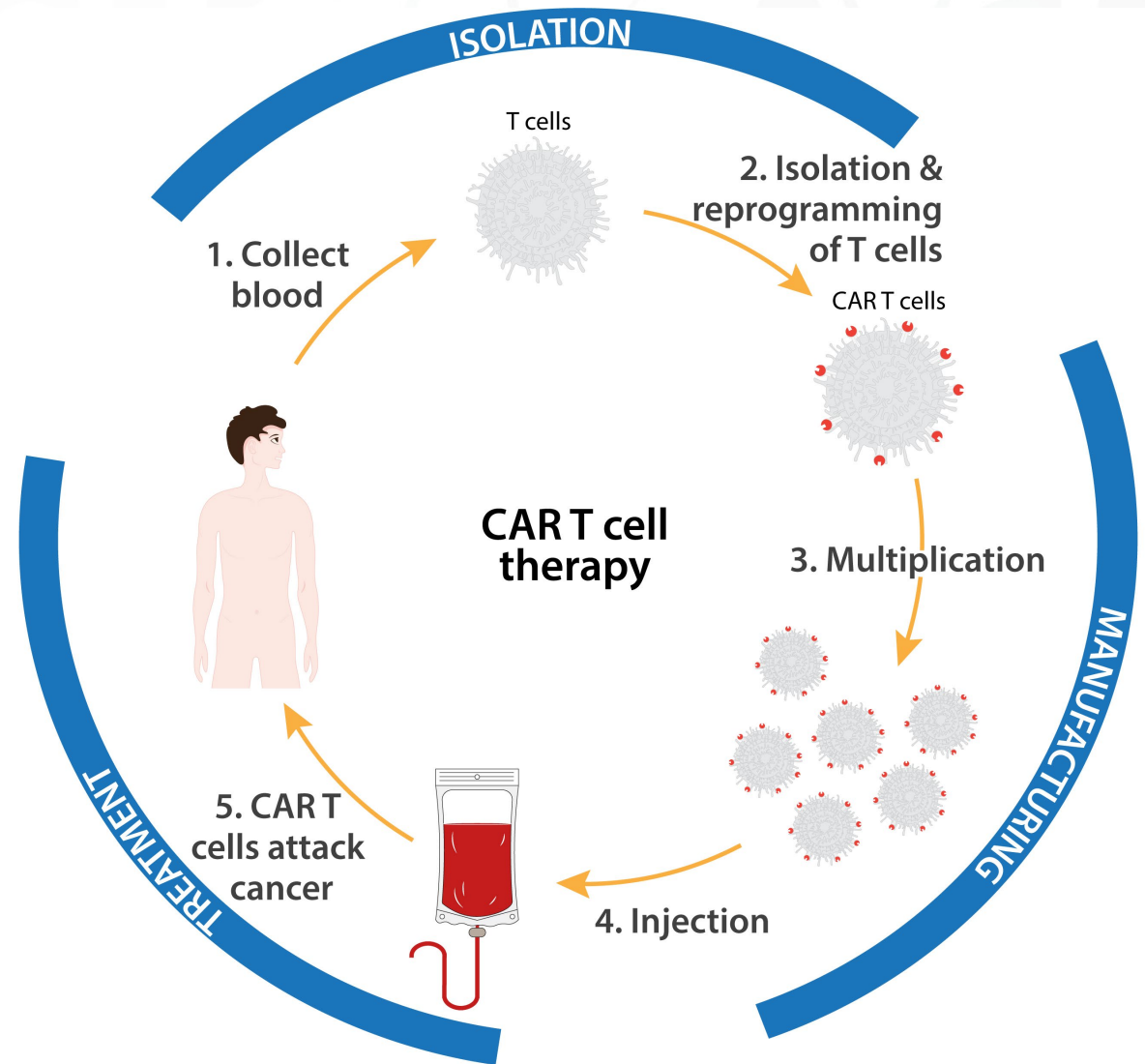
- Immune cells are isolated and re-programmed to produce a chimeric antigen receptor (CAR) that will attack a specific cancer

Multiplication of cells

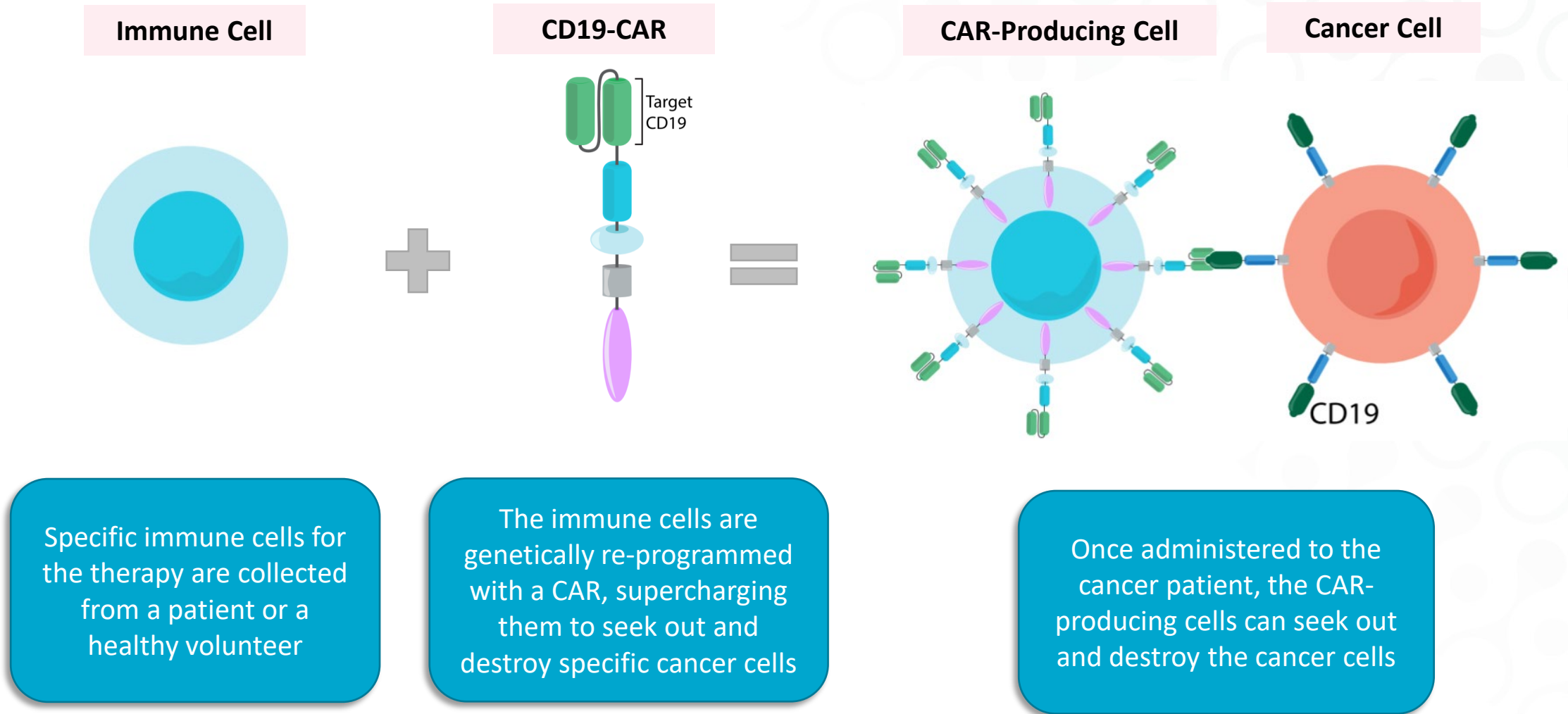
- The cells are grown up to sufficient numbers for patient treatment

Cells are administered to the patient

- The injected cells will find and kill the cancer cells

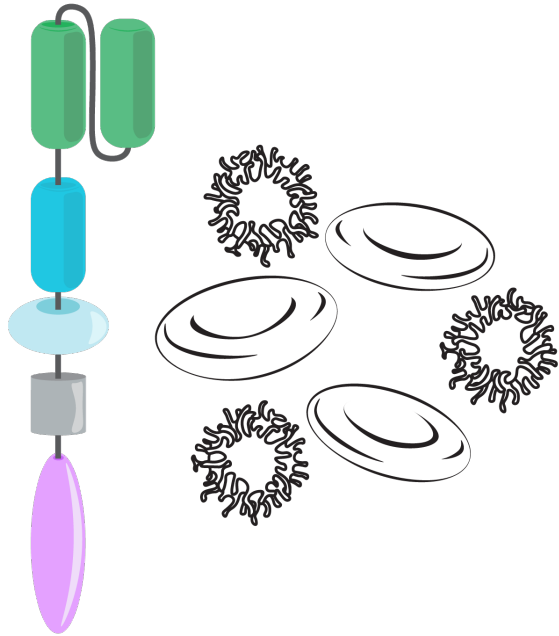


What are Chimeric Antigen Receptors (CARs)?

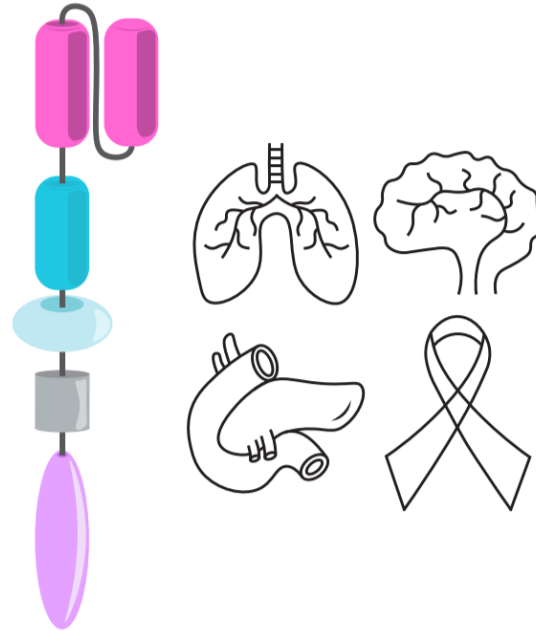


Different CARs to Target Different Cancers or Diseases

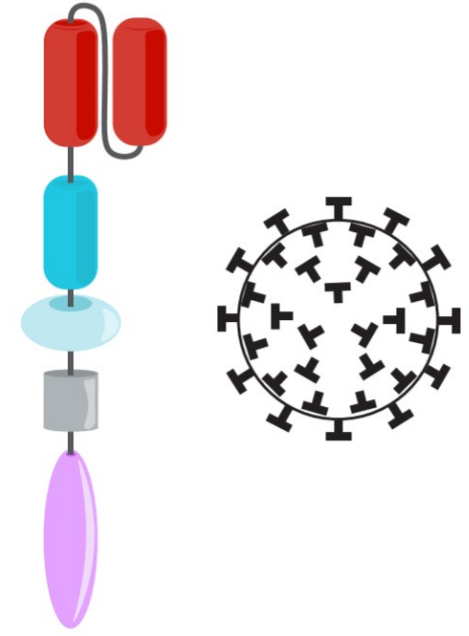
CAR 1 Blood Cancers



CAR 2 Solid Tumours



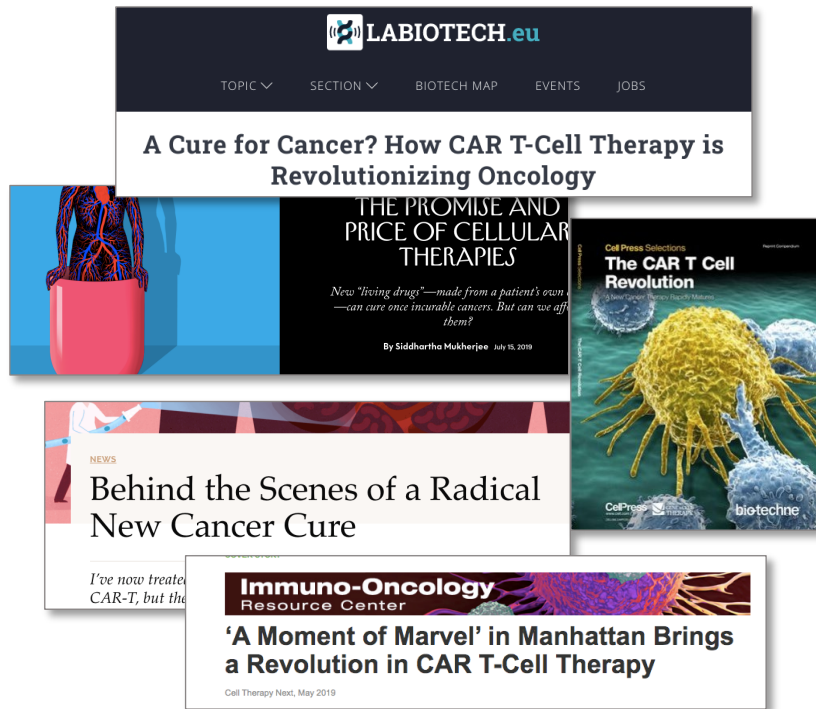
CAR 3 Other Diseases



Chimeric Antigen Receptor (CAR) Cell Therapy Revolution

CAR-T Revolution

Due to their impressive cure rates, CAR-T cell therapies have revolutionised the treatment of cancer. As of October 2021, there are five approved CAR-T products to treat a number of haematological malignancies

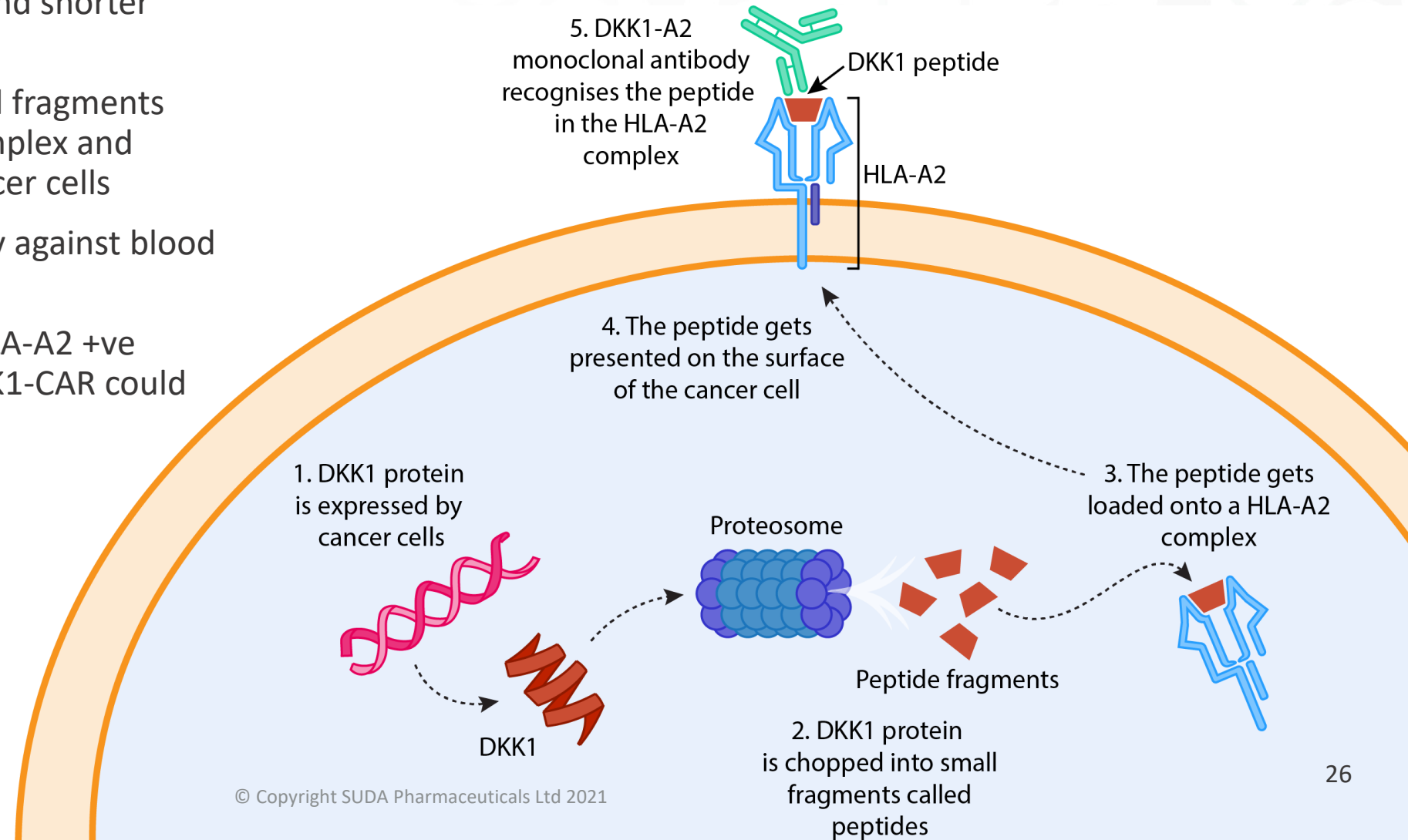


Product	Approval Year	2020 Revenue
 KYMRIAH [®] (tisagenlecleucel) Suspension for IV infusion	2017	US\$474m ¹
 YESCARTA [®] (axicabtagene ciloleucel) Suspension for IV infusion	2017	US\$563m ²
 TECARTUS [™] (brexucabtagene autoleucel) Suspension for IV infusion	2020	US\$44m ²
 Breyanzi [®] (lisocabtagene maraleucel) SUSPENSION FOR IV INFUSION	2021	NA
 Abecma [™] (idecabtagene vicleucel) SUSPENSION FOR IV INFUSION	2021	NA

- <https://www.businesswire.com/news/home/20210204006011/en/Gilead-Sciences-Announces-Fourth-Quarter-and-Full-Year-2020-Financial-Results>
- <https://www.novartis.com/sites/www.novartis.com/files/q4-2020-investor-presentation.pdf>

A Novel Cancer Target – DKK1 (ALA-102)

- DKK1 is increased in many cancer types
- DKK1 overexpression in certain cancers indicates poor overall survival and shorter disease-free survival
- DKK1 can be chopped into small fragments and loaded onto an HLA-A2 complex and presented to the surface of cancer cells
- DKK1-CAR-T cells display activity against blood cancer and solid tumours
- ~40-50% of the population is HLA-A2 +ve meaning the market for the DKK1-CAR could be quite large



DKK1's Role in Cancer

2021



[Oncogene](#),
2021 Jul 01; 40(26)

The dickkopf1 and FOXM1 positive feedback loop promotes tumor growth in Pancreatic and Esophageal Cancers

2019



[Annals of translational medicine](#),
2019 Dec 21; 146(2)

Crosstalk of estrogen receptors and wnt/ β -catenin signaling in Endometrial Cancer

2019



[Oncogene](#),
2019 Dec 06; 38

Dickkopf-1 contributes to Hepatocellular Carcinoma tumorigenesis by activating the Wnt/ β -catenin signaling pathway

2019



[American journal of cancer research](#),
2019 Feb 01; 9(2)

Dickkopf-1 (DKK1) promotes tumor growth via akt-phosphorylation and independently of wnt-axis in barrett's associated Esophageal Adenocarcinoma

2018



[Clinical & experimental medicine](#),
2018 Sep 2035(8)

Dickkopf-1 (Dkk1) protein expression in Breast Cancer with special reference to Bone Metastases

2018



[Oncogene](#),
2018 Mar 18; 37(26)

Activation of the dickkopf1-CKAP4 pathway is associated with poor prognosis of Esophageal Cancer and anti-CKAP4 antibody may be a new therapeutic drug

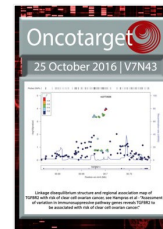
2017



[Cell cycle](#),
2017 Jul 27; 16(17)

The role of dickkopf-1 as a potential prognostic marker in Pancreatic ductal adenocarcinoma

2016



[Oncotarget](#),
2016 Sep 06; 7(43)

Dickkopf-1 expression is associated with tumorigenity and lymphatic metastasis in human hilar Cholangiocarcinoma

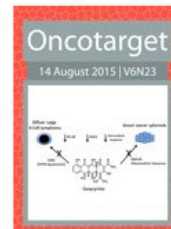
2016



[Journal of cellular and molecular medicine](#),
2016 May 31; 20(9)

Dickkopf-1-promoted vasculogenic mimicry in Non-small Cell Lung Cancer is associated with EMT and development of a cancer stem-like cell phenotype

2015



[Oncotarget](#),
2015 Jun 19; 6(23)

Serum dickkopf-1 is a novel serological biomarker for the diagnosis and prognosis of Pancreatic Cancer



Committed to helping people live longer and healthier lives

Patient-Centric

It starts with the end in mind. In our case, it is our patients. At Arovella, we are invested in making a positive difference in helping patients live longer and healthier lives. Creating a brighter future for people is our driving force.

Data-driven and Milestone Focused

Behind all life-changing therapies is excellent, ground-breaking science. We utilise data to shape our decisions to enable us to reach our set milestones.

Accountable, Honest and We Act With Integrity

Our mission of helping patients focuses us. We hold ourselves to account for our actions. We strive to do what is right for all of our stakeholders.

We Are Persistent and Never Give Up

Drug development is a challenging arena. We are committed to our mission of helping patients, and we will continue to push each other through positive and challenging times in the pursuit of developing life-changing therapeutics.