



Engineering safety into allogeneic therapies

11th Annual CAR-TCR Summit || September 2026

Dr Damien Zanker
Head of Clinical Manufacturing

Targeting Ovarian Cancer and Endometriosis

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Cartherics at a Glance

Cartherics is a late pre-clinical stage cell therapy company developing 'off-the-shelf' iPSC-NK treatments for solid cancers and endometriosis



- Based in Melbourne
- Commenced operations Jan 2016
- Currently ~30 staff



- Operating from a dedicated 1,800m² purpose-built facility
- Recently upgraded cleanrooms



- 'Off-the-shelf' platform, using gene-edited iPSCs to produce immune cells with enhanced function
- 17 issued patents over 6 families

Robust IP Protecting Cartherics' Core Innovations

Key Metrics: >50 active filings globally, 17 issued patents (across 6 families), complemented by strategic in-licensed IP.

Patented Innovations

- **Novel CAR constructs:** Protecting CAR designs targeting validated antigens (e.g., TAG-72, TF).
- **Proprietary gene edits:** Covering knock-outs and knock-ins to boost efficacy, persistence, and TME resistance.
- **Engineered iPSC Platform:** Foundational patents on our engineered iPSC lines and their differentiation into therapeutic immune cells (iNKs, etc).
- **Further innovations:** Including novel receptor fusions and cell engineering strategies.



Valuable Trade Secrets

- Methods for feeder-free differentiation of iPSCs to functional immune cells.

IN-LICENSED IP / TECHNOLOGY PARTNERS:



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The Crippling Burden of Neglected Women's Health

A Two-Part Crisis in Women's Health: A Lethal Cancer and a Debilitating Disease

1

Ovarian Cancer: A Lethal Disease of Late Diagnosis

- ~325,000 new cases diagnosed and ~200,000 deaths globally each year.
- Severely limited treatment options.
- >75% of cases diagnosed at a late stage (III/IV).
- 5-year survival rate for stage III is 41% and only 20% for stage IV.

2

Endometriosis: The Widespread and Overlooked Cancer Precursor

- Affects 190 million women globally.
- Cause of debilitating pain, organ damage and infertility.
- Current treatments are inadequate.
- There is no cure.
- Endometriosis is a risk factor for ovarian cancer.

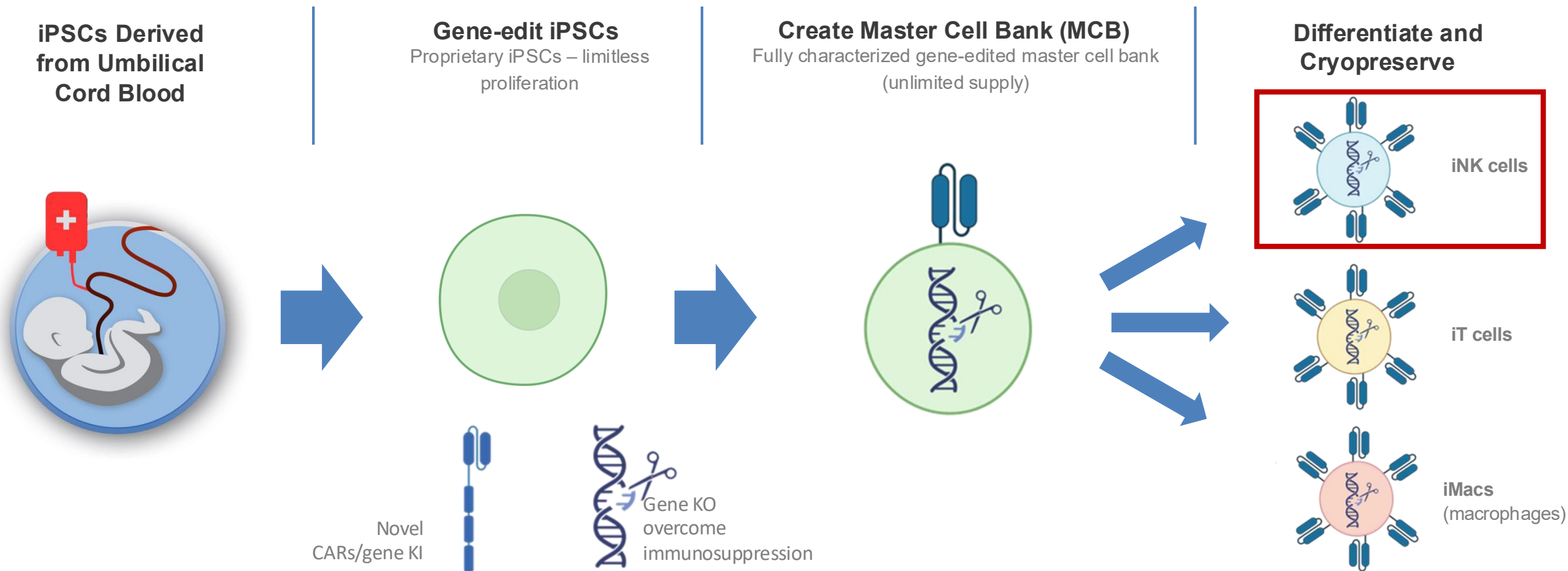
Evidence suggests a strong link between ovarian cancer and endometriosis, and they may have overlapping biology. Cartherics is developing therapies that target specific antigens common to both diseases.



• **Key Takeaway:** Our strategy leverages a de-risked entry in ovarian cancer as a gateway to treating the broader endometriosis crisis.

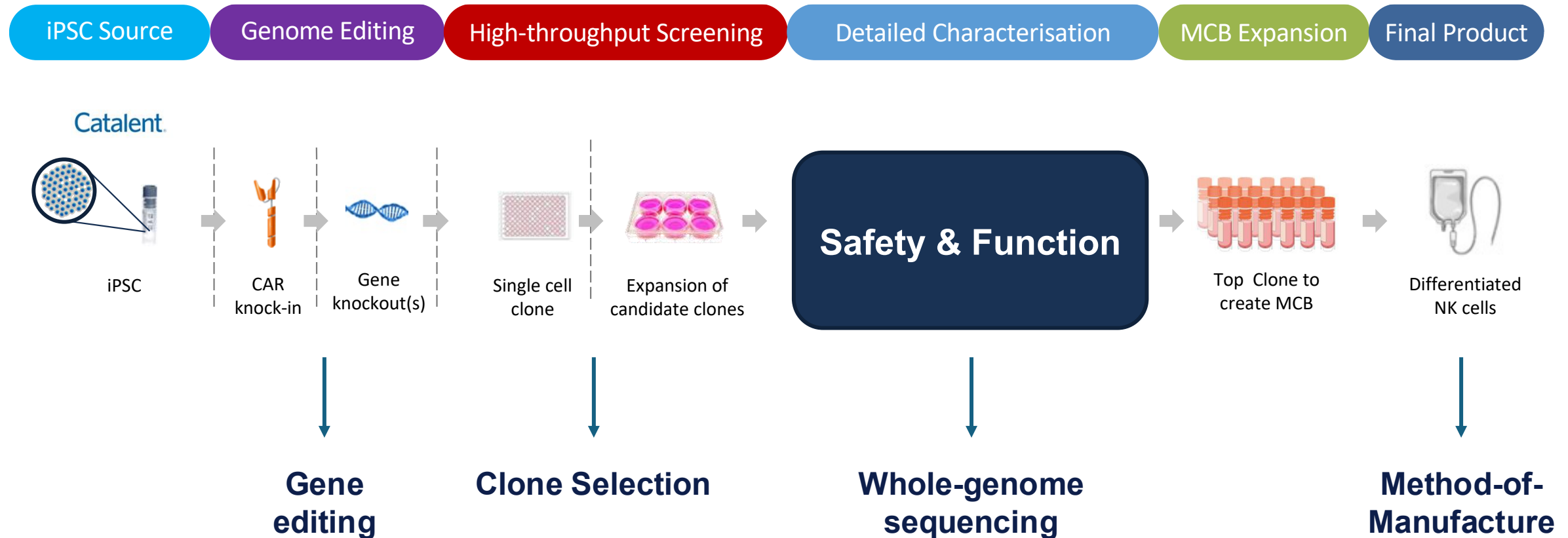
Cartherics Cell Therapy Platform

Enables the rapid development of a diverse range of products and immune cell types



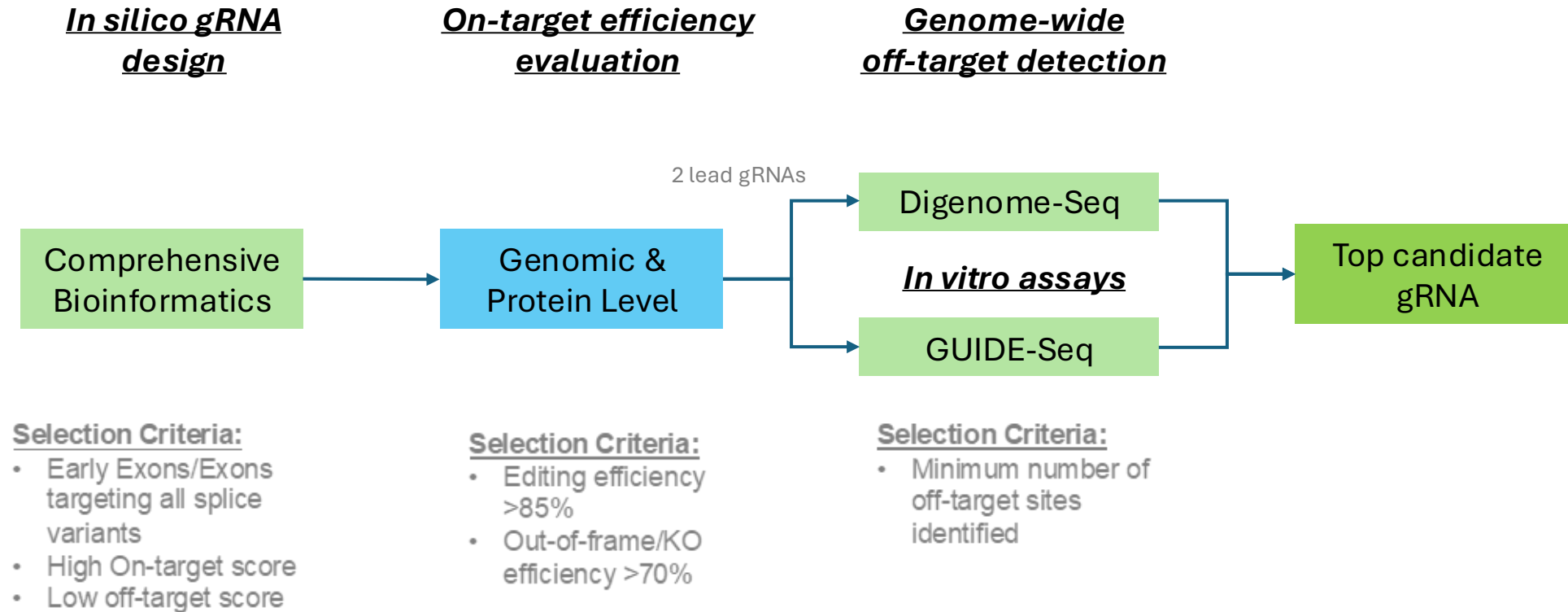
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A Scalable and Robust iPSC-Derived CAR-NK Platform



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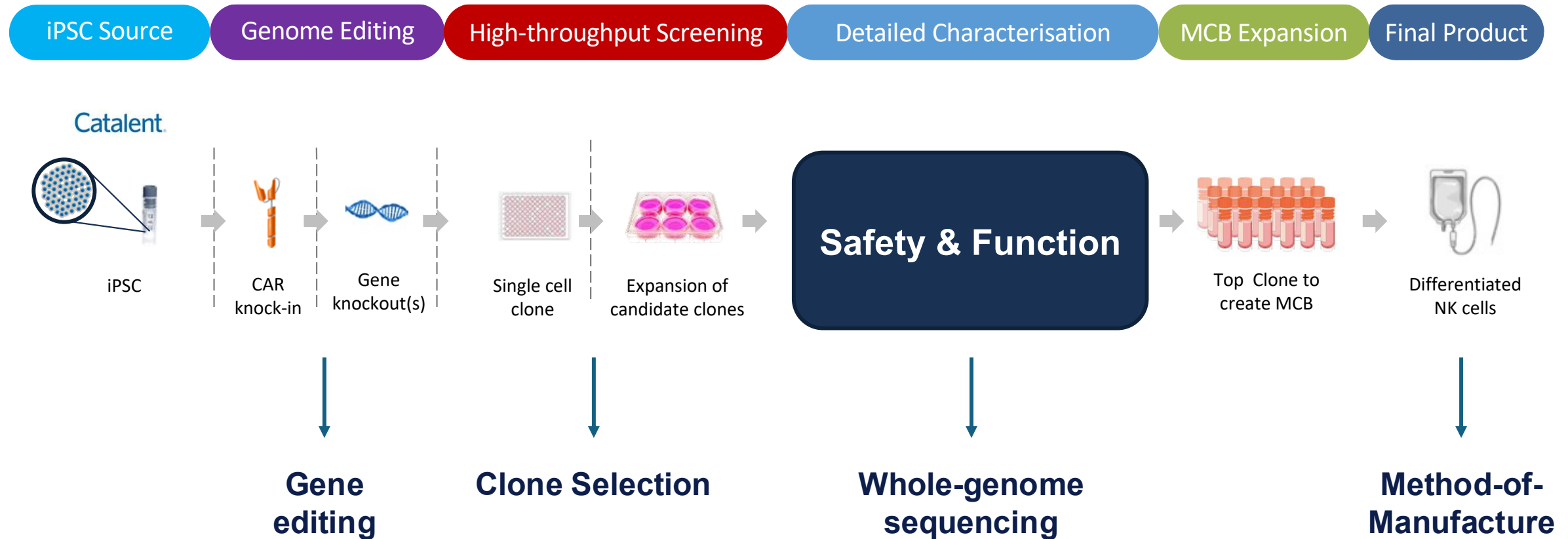
Robust Genome Editing Strategy Using CRISPR/Cas9



- gRNAs selected based on **high-editing efficiency** and **low off-target effects**

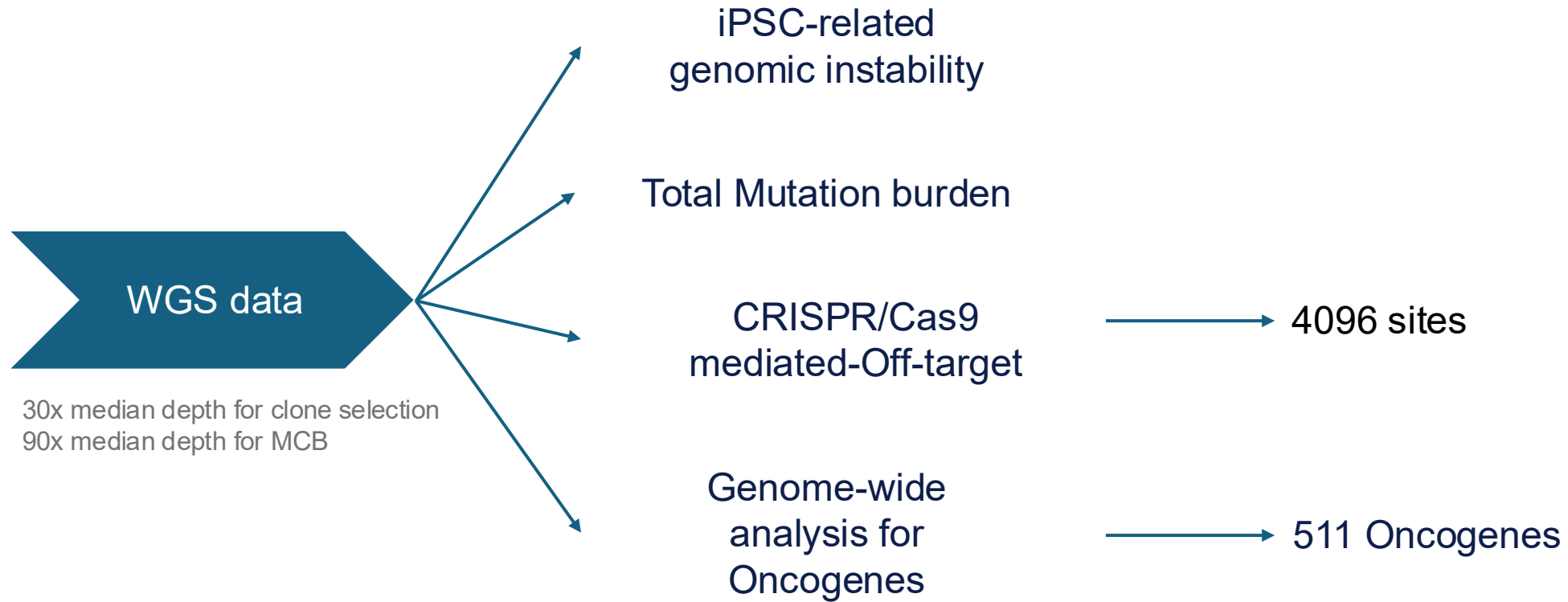
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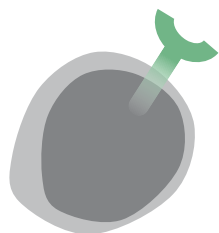
Developing a Robust and Comprehensive WGS Pipeline



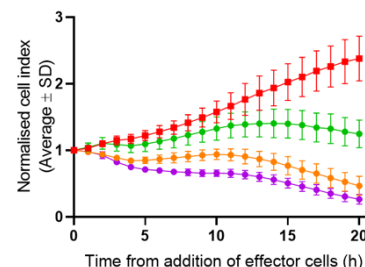
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Robust Functional Characterisation of Top Candidate Clones

Do we have the optimal iNK cell?



Do they kill target cells *in vitro*?



Can they be manufactured at scale?



iNK viability,
purity, phenotype,
CAR expression

In vitro function

Yield per iPSC and
predicted scale-up

- MCB clone selected based on detailed **safety** and **functional** profile

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How are we using this pipeline?

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Our Pipeline: A Phased Approach to Clinical Strength

A Deliberate Strategy: Validate the Platform, Then Unleash its Full Potential.

1

Program 1: CTH-401, Platform Validation – Lead Program

- **Indication:** Relapsed/refractory ovarian cancer, with expansion potential into earlier-stage ovarian cancer, other TAG-72+ solid tumours and endometriosis.
- **Strategic Goal:** Achieve **first-in-human data** to validate the safety and activity of our core iPSC-NK platform. This is our top priority.



2

Program 2: CTH-501, Next-Generation Target

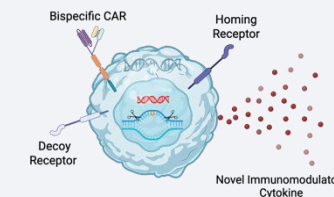
- **Indications:** Endometriosis.
- **Strategic Goal:** Rapidly expand our pipeline with additional product candidates.



3

Program 3: CTH-502, Tumor Microenvironment ("TME")-Resistant "Armoured" Cells

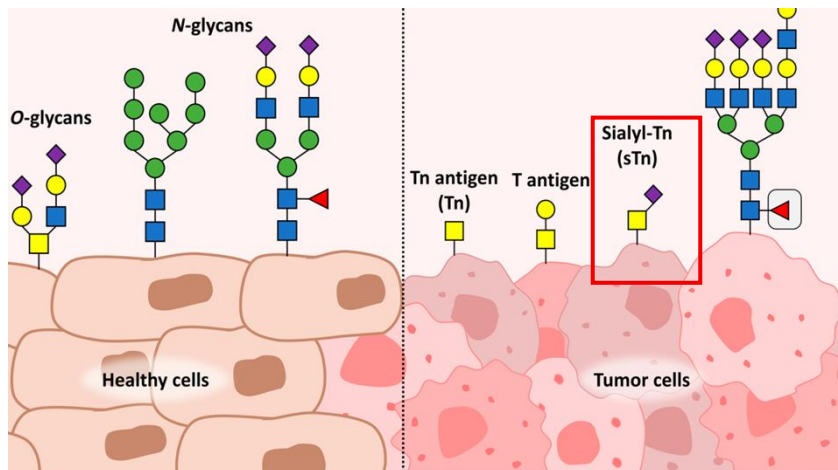
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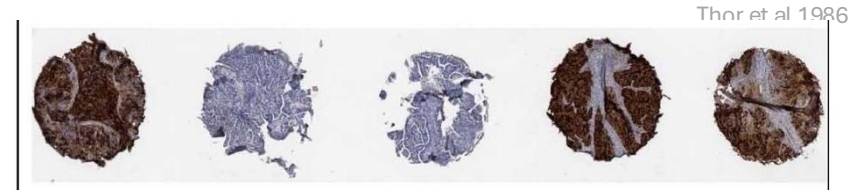
Overview: TAG-72 as a therapeutic target

TAG-72 is not a simple single-gene antigen. It is a large mucin-like glycoprotein carrying the Sialyl-Tn (STn/CD175s) glycan epitope.



TAG-72 antigen expression reported across epithelial-derived cancers

Ovarian	100%
Colorectal	94%
Breast	84%
NSCLC	96%



Ovarian cancer biopsy TMAs with 45 cases of clear cell cancer and 22 cases of Serous cancer confirmed TAG-72 staining (against negative control tissues) in 85% of Clear Cell carcinomas and 95.4% of Serous carcinomas.

TAG-72/STn marks tumour cells and is associated with features of aggressive, immune-evasive disease.

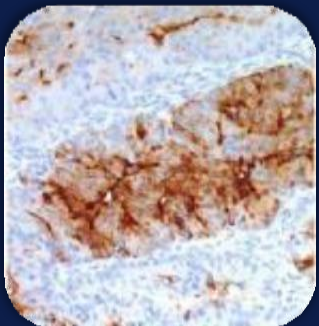
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CTH-401: Lead Product Candidate

First TAG-72 CAR-NK cell therapy

iPSCs gene-edited using CRISPR/Cas9

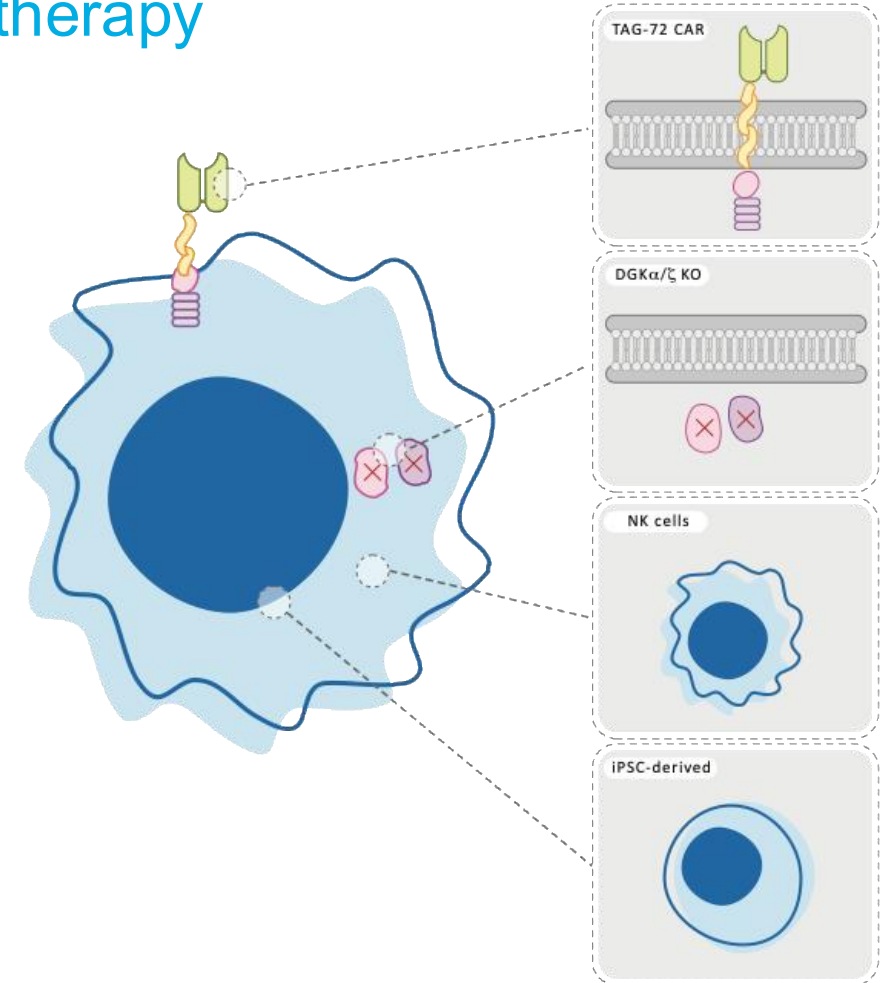
- **TAG-72 CAR knock-in**
 - Complements normal NK cell killing functions
- **DGK α ζ gene knock-outs**
 - Enhance anti-tumoral efficacy



Tumour-associated glycoprotein-72 (TAG-72)

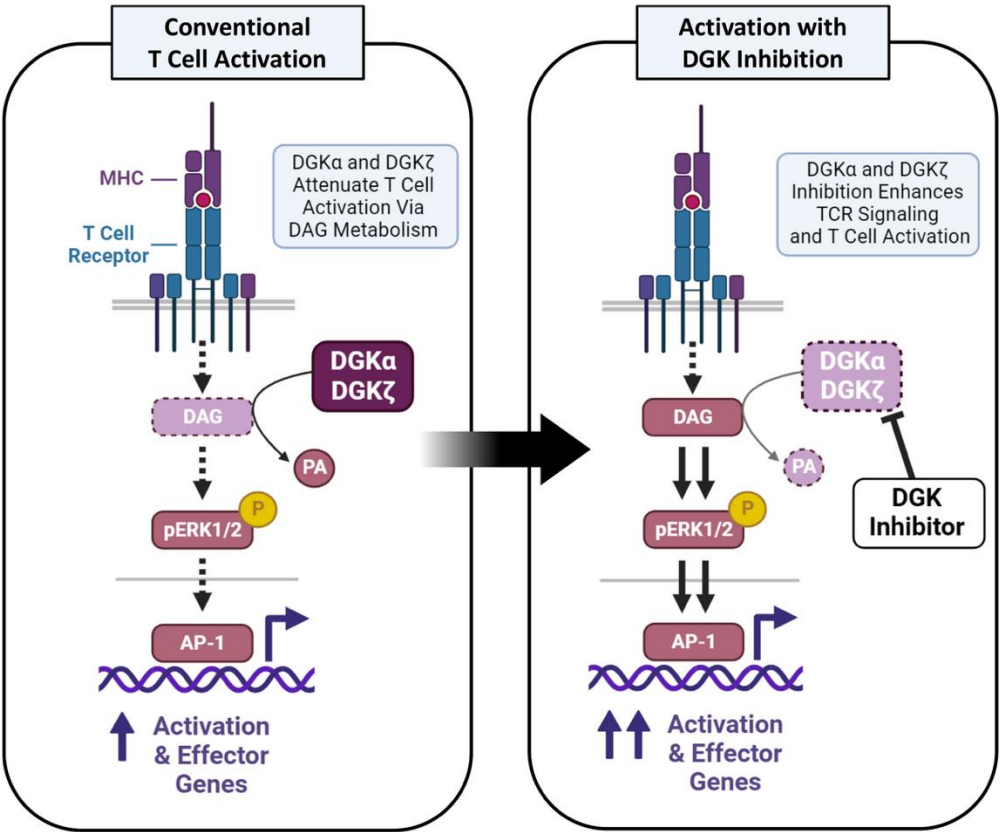
- Well-validated tumour target
- Found on many cancers including ovarian, gastric, colorectal, pancreatic cancers

Image: Ovarian cancer biopsy with TAG-72 staining (brown) by immunohistochemistry (Ponnusamy et al 2007)



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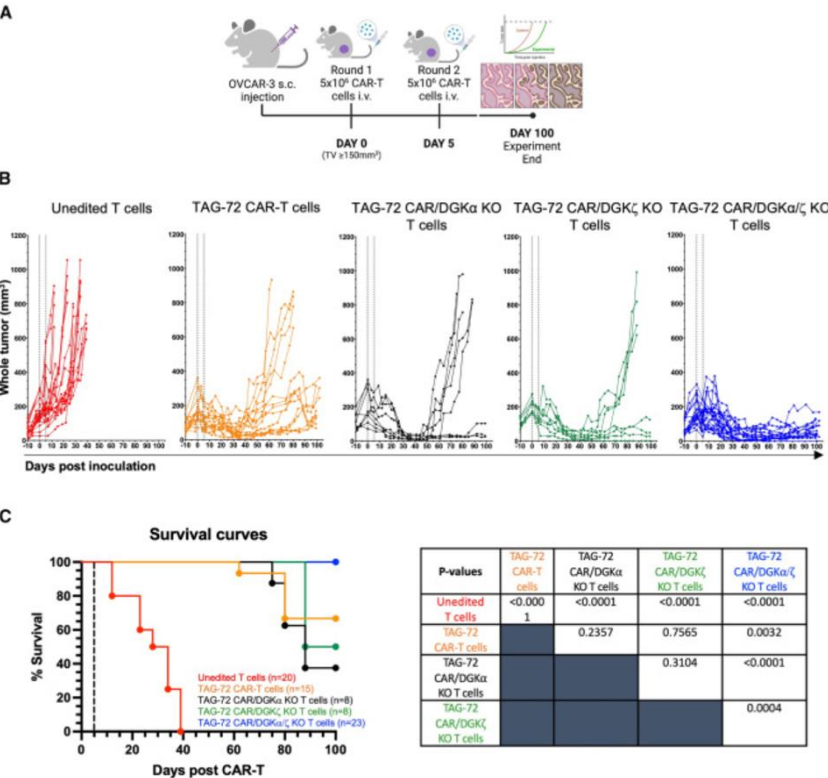
Dual DGKαζ KO delivered durable tumor control in TAG-72 CAR-T cells



ORIGINAL ARTICLE · Volume 33, Issue 2, 200962, June 18, 2025 · Open Access [Download Full Issue](#)

CRISPR-Cas9 knockout of DGKα/ζ improves the anti-tumor activities of TAG-72 CAR-T cells in ovarian cancer

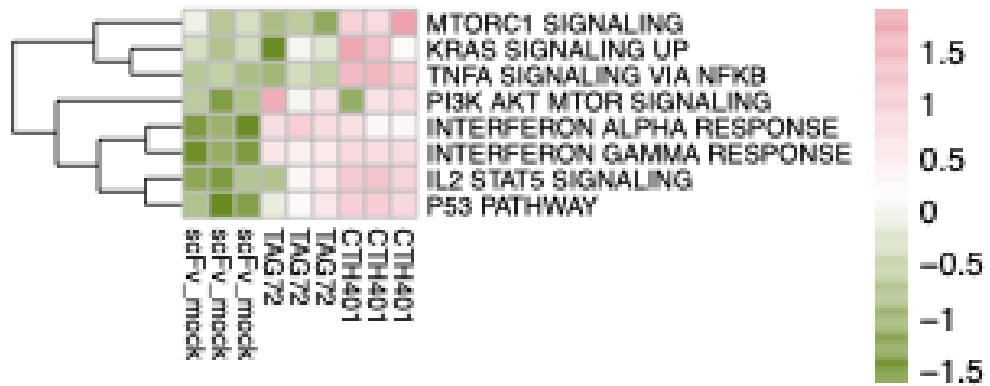
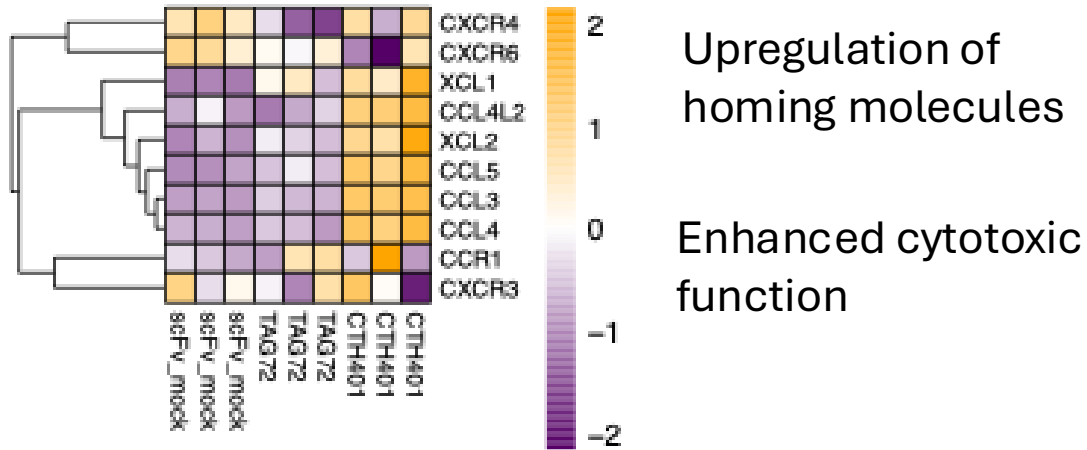
Vera J. Evtimov ^{1,2,5} · Nhu-Y N. Nguyen ^{1,2,5} · Maree V. Hammett ^{1,2,5} · ... · Alan O. Trounson ^{1,2} · Richard L. Boyd ^{1,2} · Runzhe Shu ^{1,4} ... Show more



Durable control to Day 100

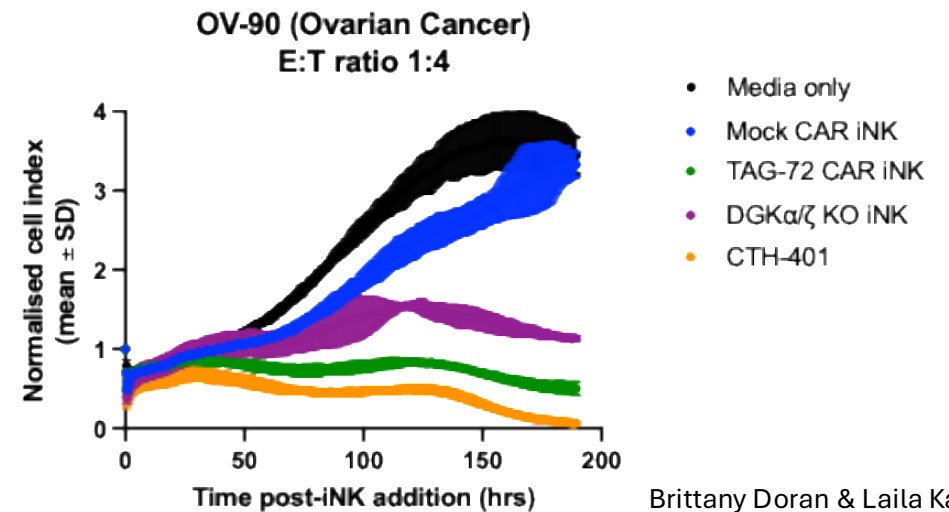
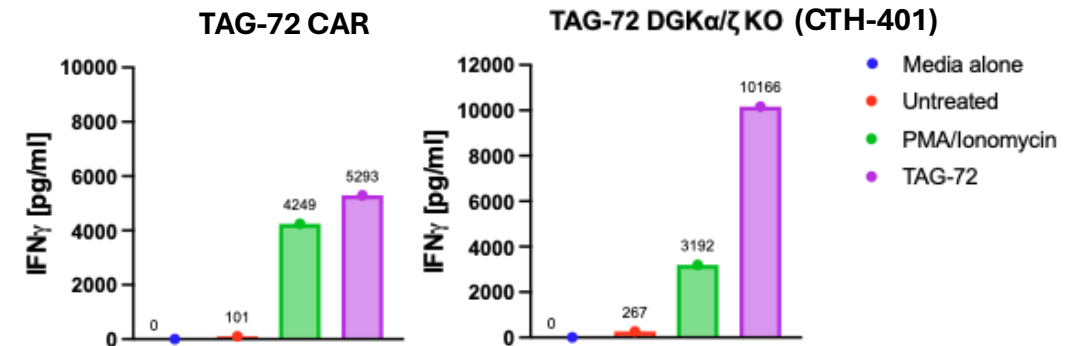
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RNA seq analysis



Keziah Ting

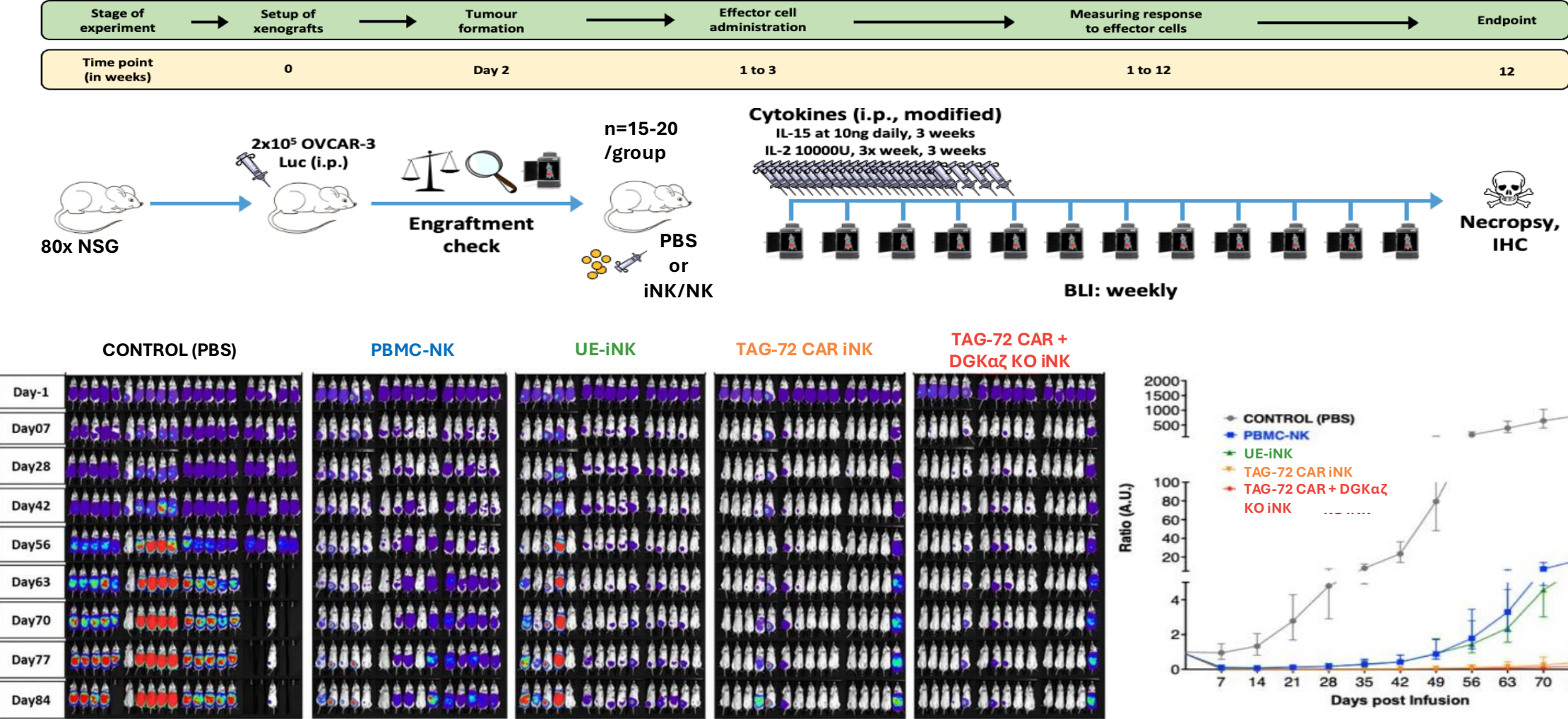
In vitro cytotoxicity



Brittany Doran & Laila Karra Khalil

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TAG-72 CAR + DGKαζ KO iNK show antitumour activity in an ovarian cancer mouse model



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IND-enabling studies

- 4-week toxicity study ✓
- 9-month tumorigenicity safety study ✓

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Transitioning to clinical manufacture

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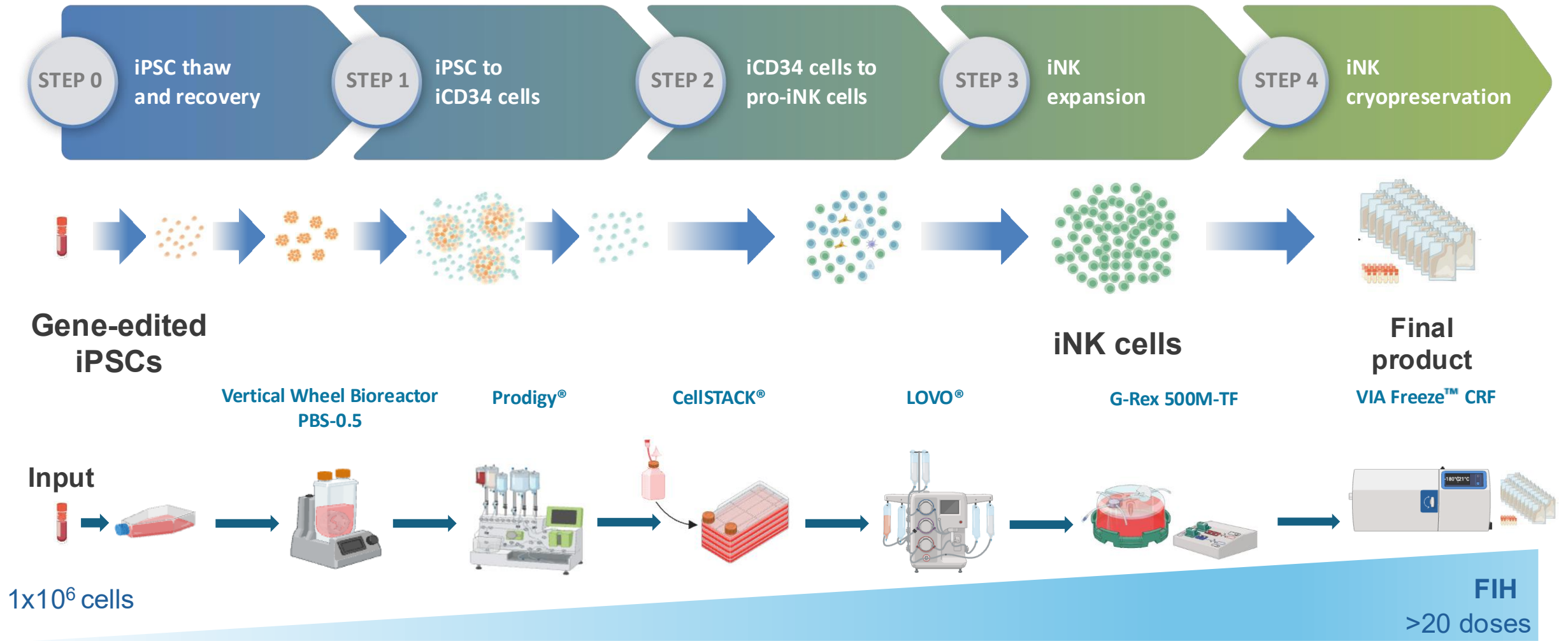
Manufacturing Facilities

- Commissioned Oct 2025
- Two 45m² (500f²) Grade B manufacturing spaces
- In-house QC and EM testing spaces
- Support for closed processing
- Completion of two clinical scale CTH-401 batches



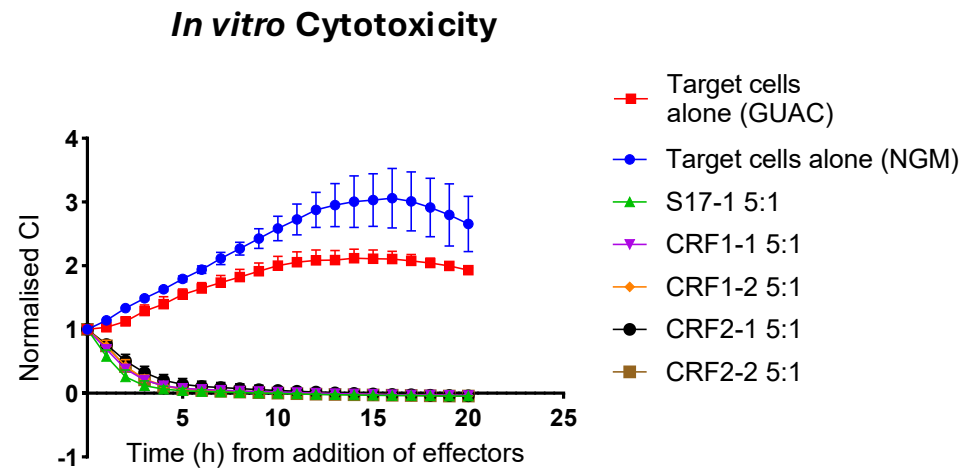
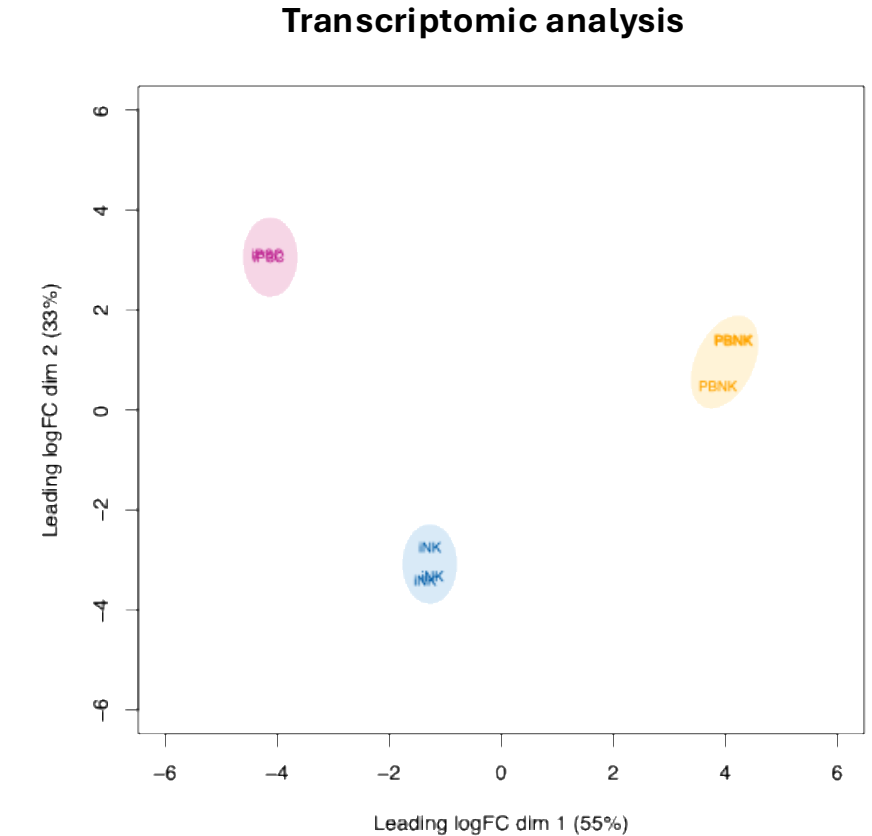
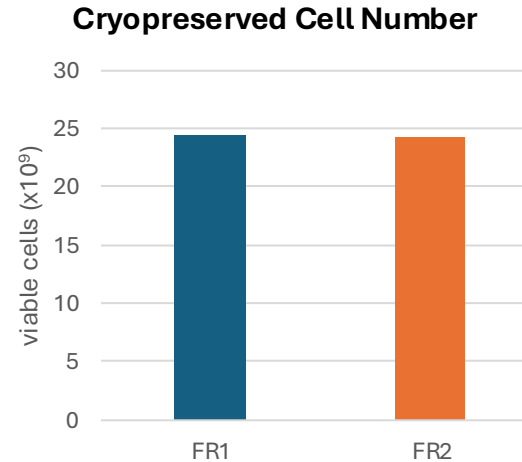
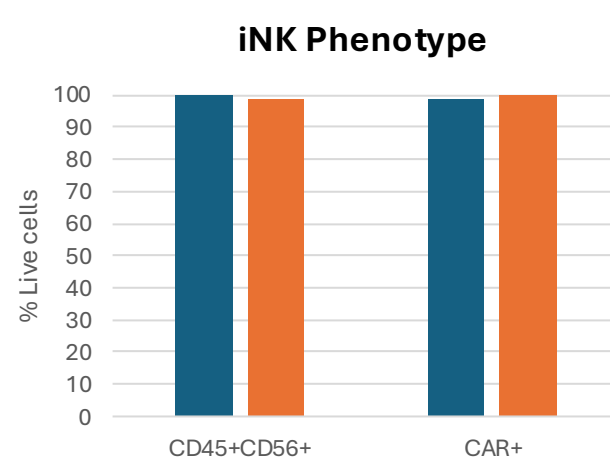
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Clinical scale manufacturing: One vial of iPSC into >20 billion iNK cells



Madeline Cao STRICTLY CONFIDENTIAL AND PROPRIETARY TO CARTHERICS PTY LTD.

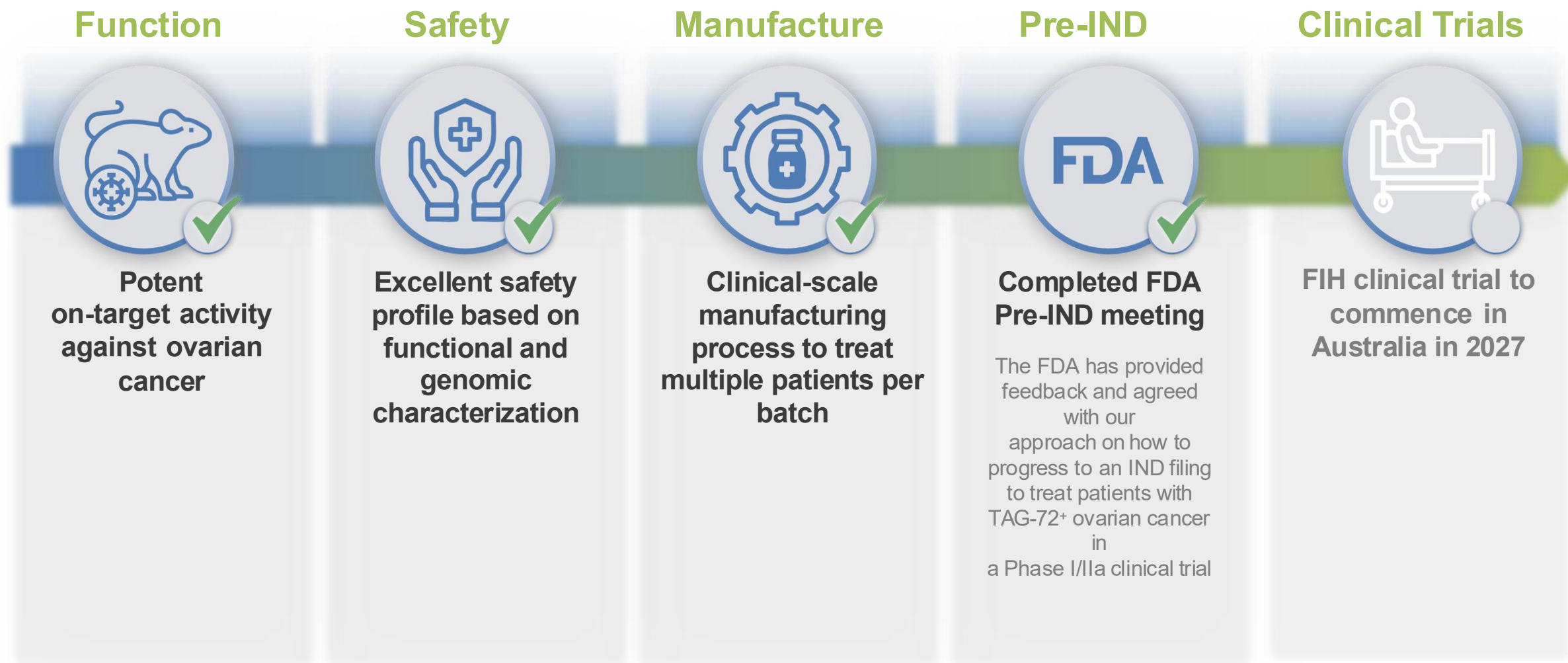
Reproducible production of clinical scale batches



Maree Hammett, Vera Evtimov & Keziah Ting

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Summary: CTH-401- Clear, De-Risked Path to First-in-Human Trials



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Our Pipeline: A Phased Approach to Clinical Strength

A Deliberate Strategy: Validate the Platform, Then Unleash its Full Potential.

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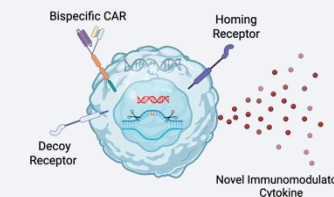
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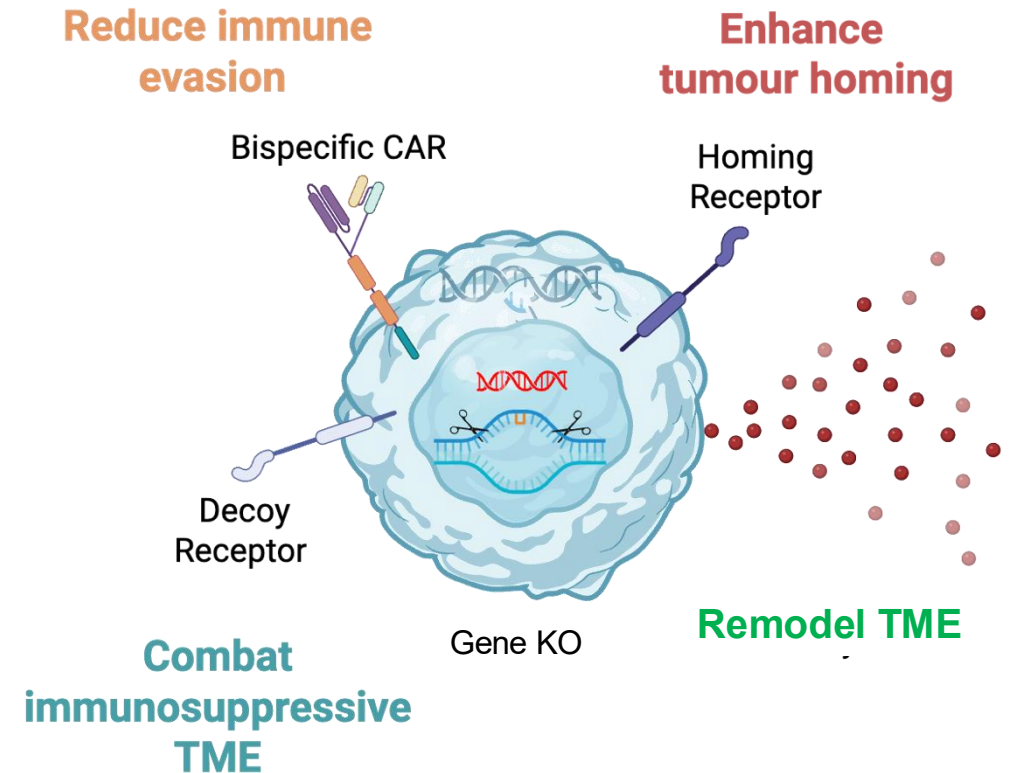
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CTH-500 series: First CAR-NK Cell Therapy for TF in Endometriosis and Cancer

- **Bispecific CAR knock-in**
 - Complements normal NK cell killing functions
 - TAG-72 specificity
 - TF specificity
- **Novel gene-edits**
 - To reduce immune evasion
 - To combat immunosuppressive TME
 - To enhance tumour homing
 - To remodel the TME

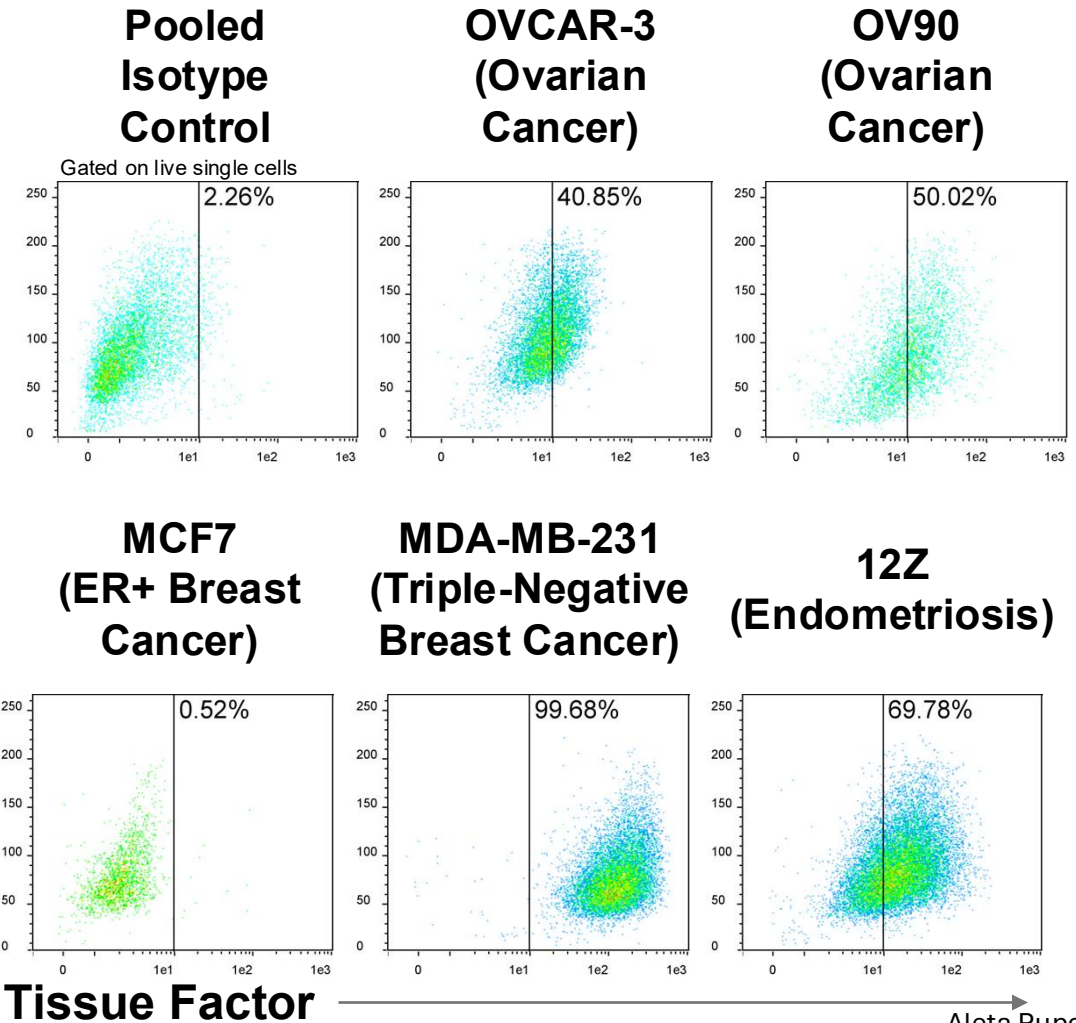
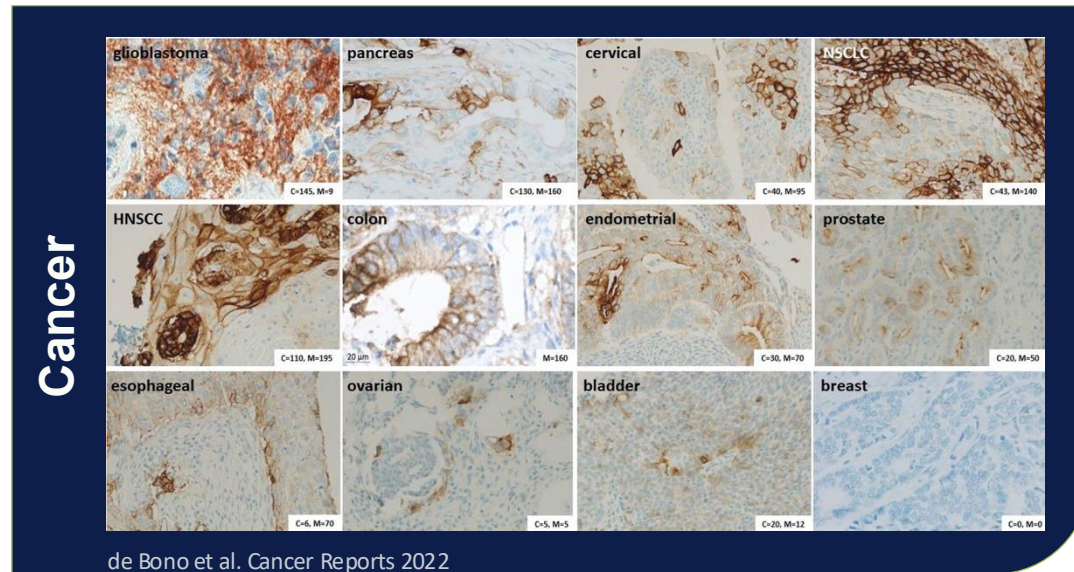


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Overview: Tissue Factor as a therapeutic target

Tissue Factor (TF)

- Found on many adenocarcinomas including ovarian, gastric, colorectal, pancreatic cancers

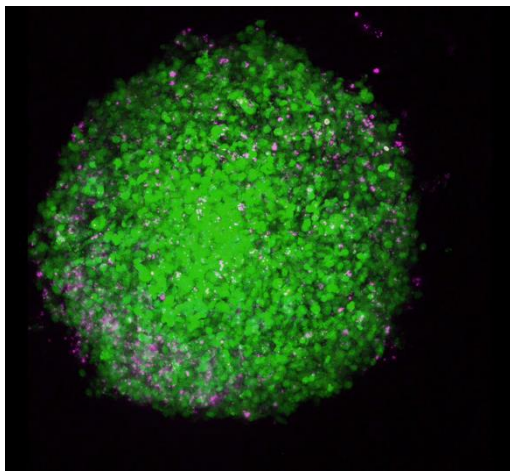


Aleta Pupovac

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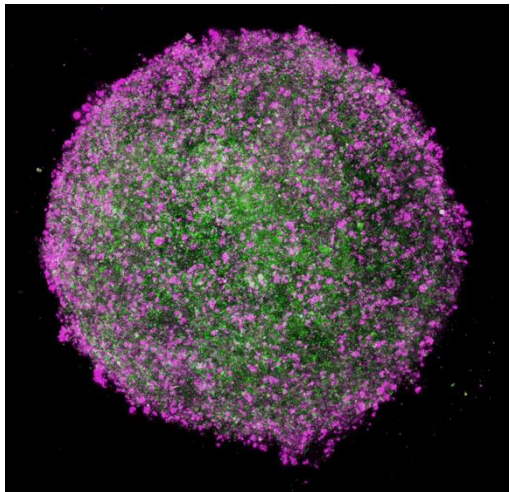
Tissue Factor CAR-iNK Cells Target Cancer

Mock iNK cells



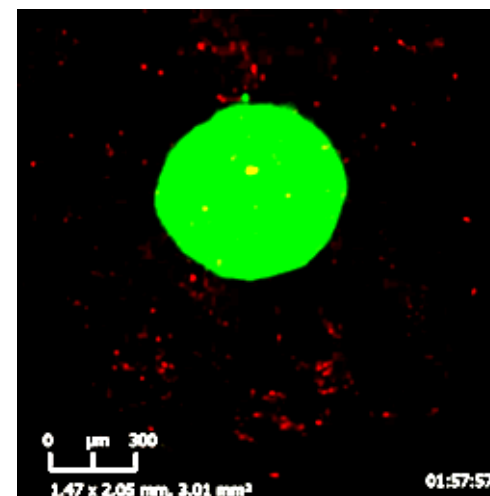
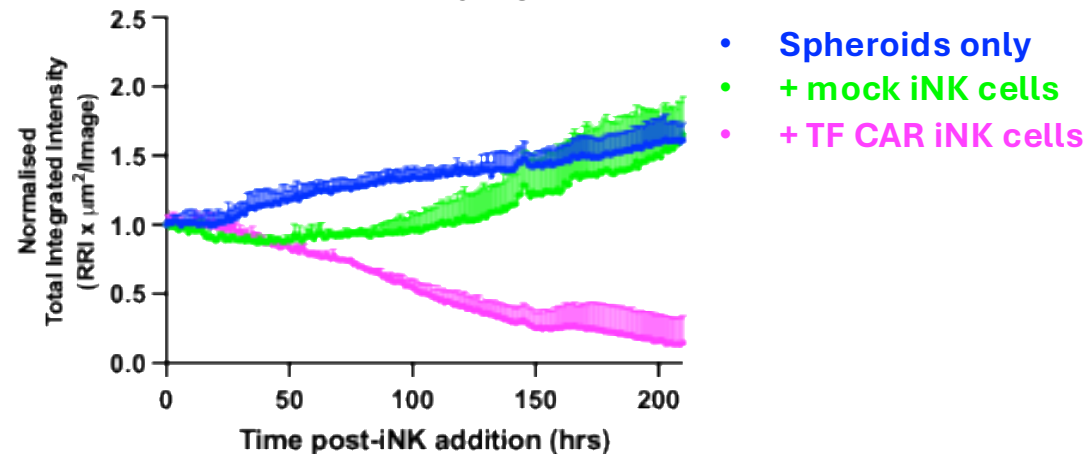
OV90
Mock iNK
3D spheroid Z-stack at
72h post-iNK cell addition

TF CAR-iNK cells



OV90
TF CAR-iNK
3D spheroid Z-stack at
72h post-iNK cell addition

OV90 (Ovarian Cancer)
1:2 E:T ratio



MDA-MB-231
(Triple-negative breast cancer)
TF CAR iNK
3D spheroid killing over 58h

E:T = 1:2

Brittany Doran & Laila Khalil

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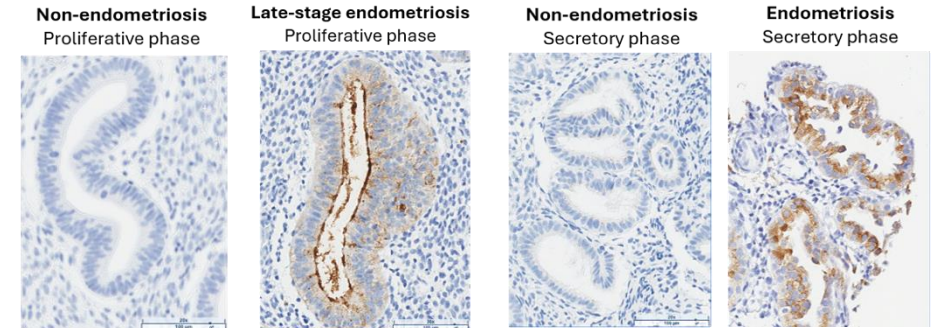
Endometriosis: Tumour antigen overexpression

1 in 7

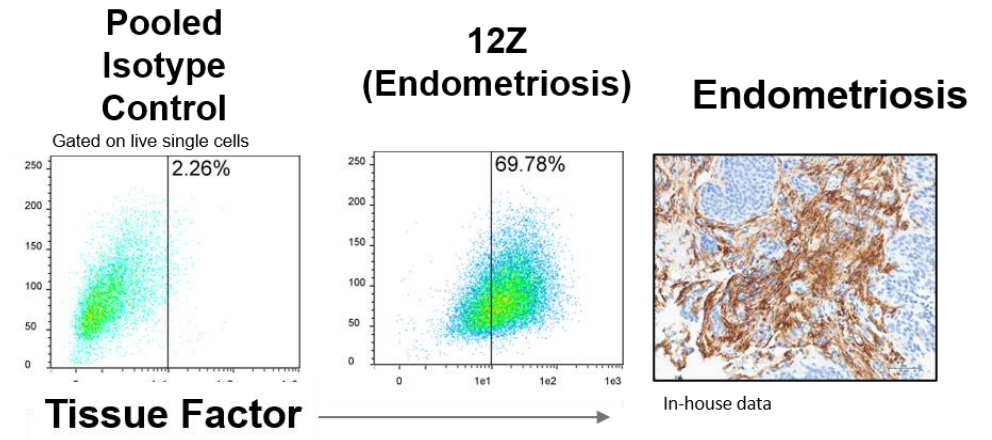
~~1 in 9~~ females are estimated to have endometriosis in Australia, based on those diagnosed with the condition by age 44-49.



TAG-72
(brown)



Tissue Factor

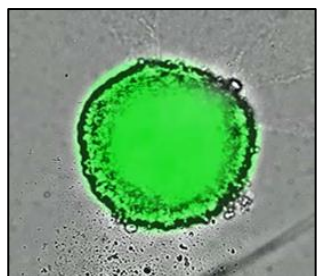
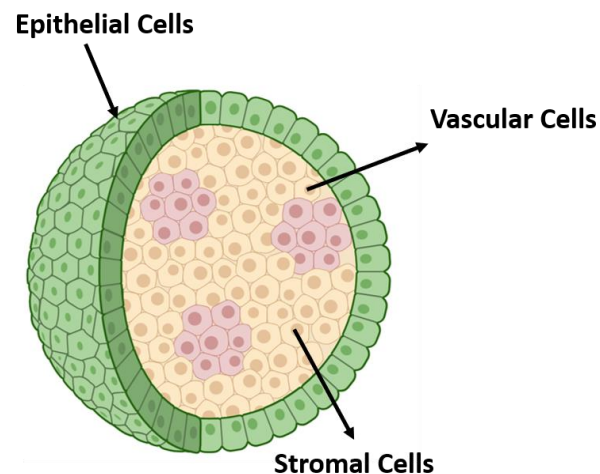


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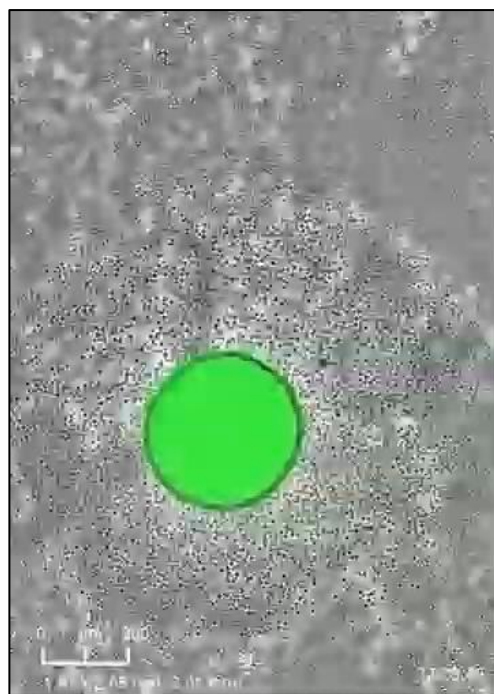
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Can TF-specific CAR-iNK Cells Target Endometriosis?

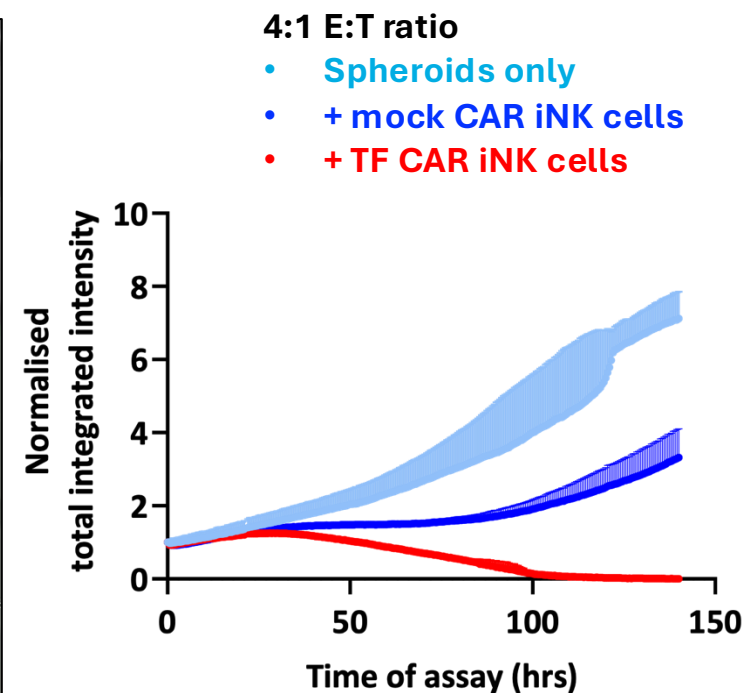
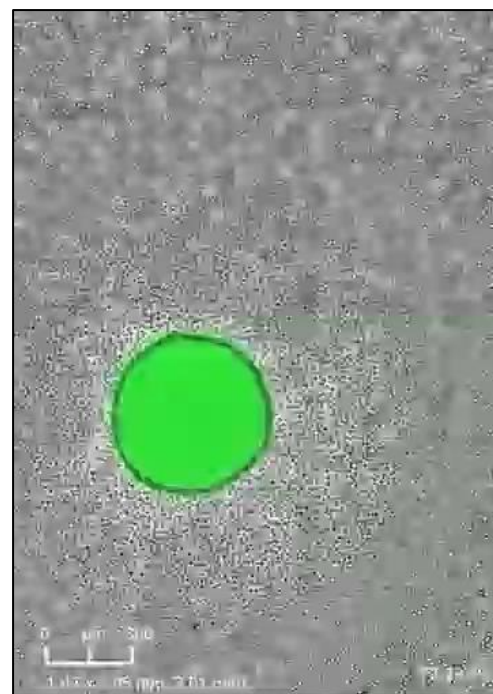
Endometriosis 3D model



Unedited iNK cells



TF CAR-iNK cells



CTH-500 iNK rapidly eliminate endometriosis spheroids

Brittany Doran & Laila Khalil

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Summary

CTH-401: TAG-72-specific iNK-CAR

- Phase I/II Clinical Trial 2027 (Ovarian Cancer)
- Future indications: TNBC, Colorectal Cancer

CTH-500 series

- Promising TF-specific iNK-CAR responses against ovarian cancer, TNBC and endometriosis cell lines
- MCB generation 2027
- Future indications: Ovarian, gastric, colorectal, pancreatic cancers; Endometriosis

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Dr Brittany Doran

Dr Laila Karra Khalil

Manufacturing

Dr Madeline Cao

Kellie Cartledge

Jane Shi

Katherine Bastias Varas

Ayesha Hagos

Quality Control

Nick Sharoglazov

Maree Hammett

Dr Mathew Tiedemann

Harveen Nanda

Shabnam Afaghisaray



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CARtherics



November 2025