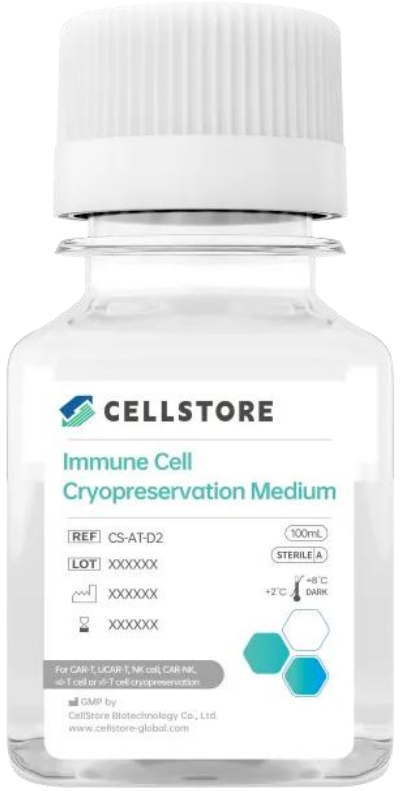
Immune Cell Cryopreservation Medium

CELLSTORE

CS-AT-D2 (10% DMSO, 100mL/bottle)

FDA Drug Master File No. 042219 / NMPA Pharmaceutical Excipients F20250000310

For the cryopreservation of immune cells such as CAR-T, UCAR-T, NK, CAR-NK, αβ-T or γδ-T, etc.



Product Specifications

- Ready-to-use
- Ice-controlling Technology
- cGMP-manufactured with pharmacopeia ingredients
- Chemically Defined
- Animal component-free
- Freeze directly in -80°C freezer when working with small volumes
- Endotoxin < 0.25 EU/mL

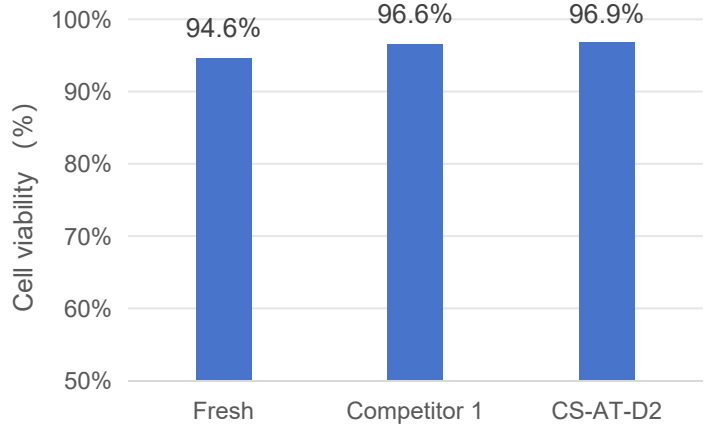
Shelf Life: 12 months

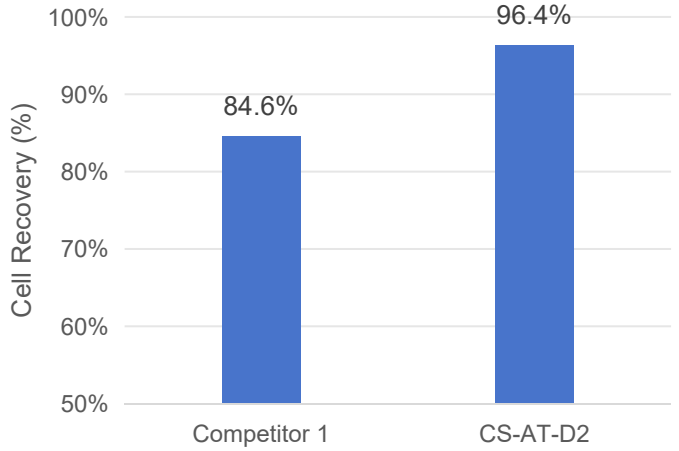
Storage Temperature: 2℃ - 8℃

PERFORMANCE TEST- αβ- T Cryopreservation

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: αβ- T

Comparison of cell viability and recovery of αβ-T cells after cryopreservation and thawing





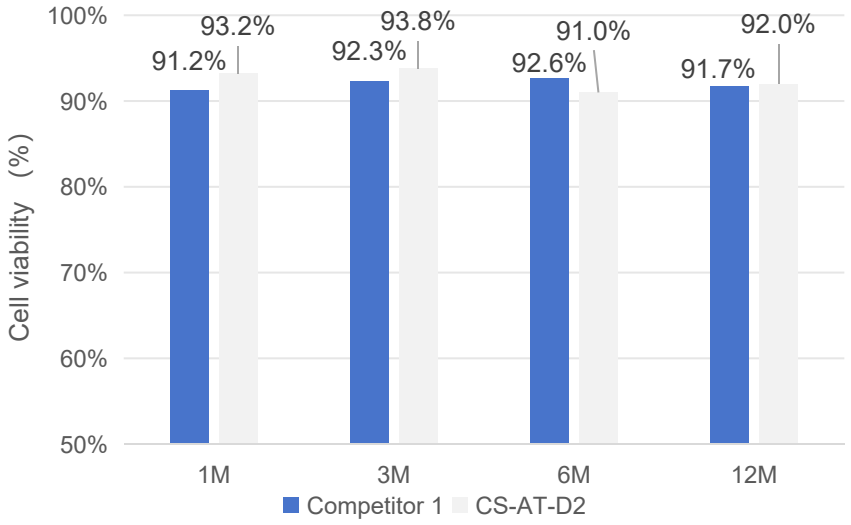
Note: Freezing density: 1×10^7 cells/mL

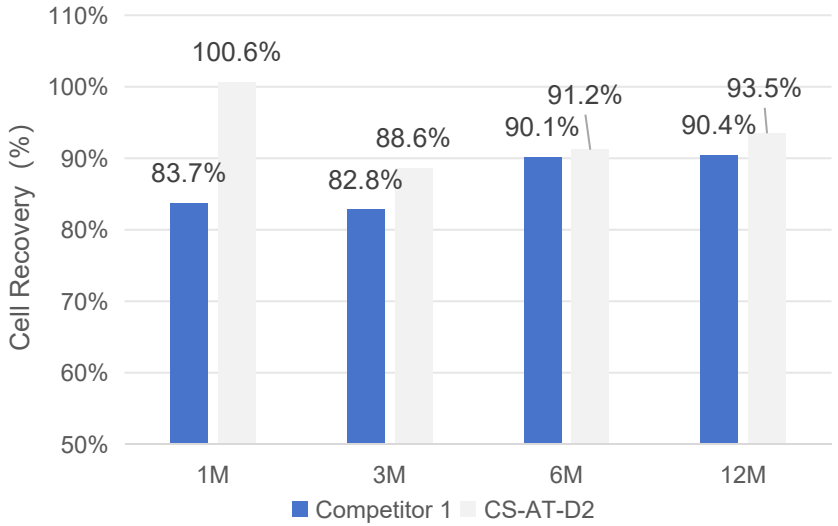
CS-AT-D2 can support the high-density and high-efficiency cryopreservation of αβ-T cells.

PERFORMANCE TEST- αβ- T Cryopreservation

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: αβ- T

Comparison of cell viability and recovery of αβ-T cells after cryopreservation and thawing for long-term





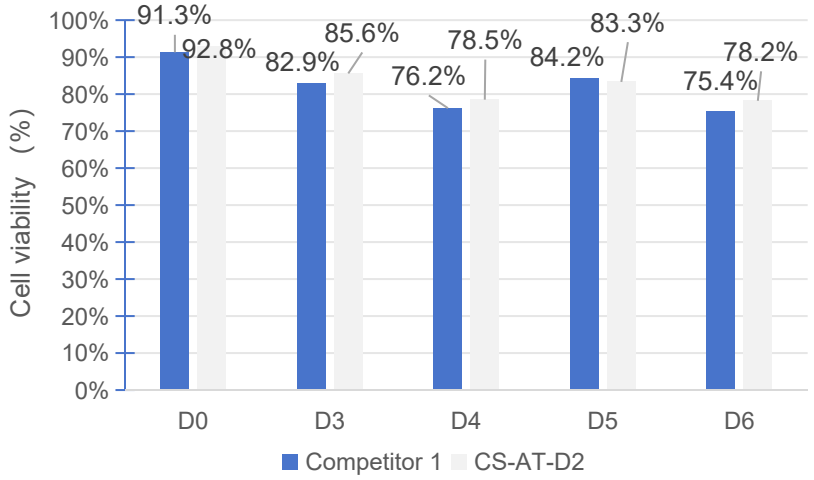
Note: Freezing density: 7×10^6 cells/mL

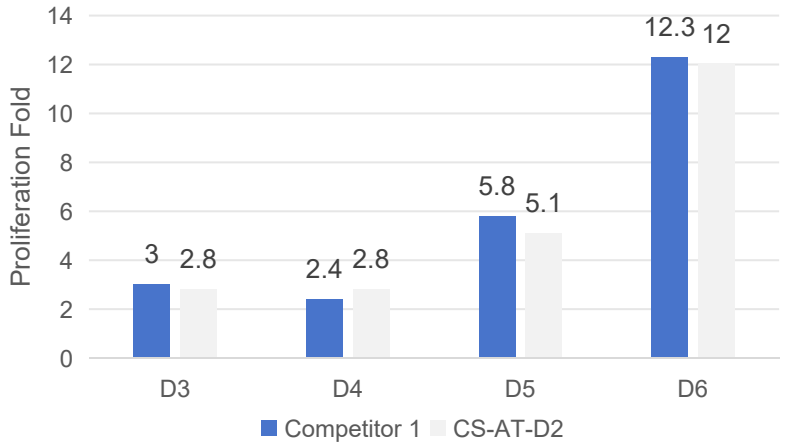
CS-AT-D2 can support the high-density and high-efficiency cryopreservation of αβ-T cells for long-term.

PERFORMANCE TEST- αβ- T Cryopreservation

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: αβ- T

Cell viability and proliferation during 6-day re-culture of thawed αβ-T cells





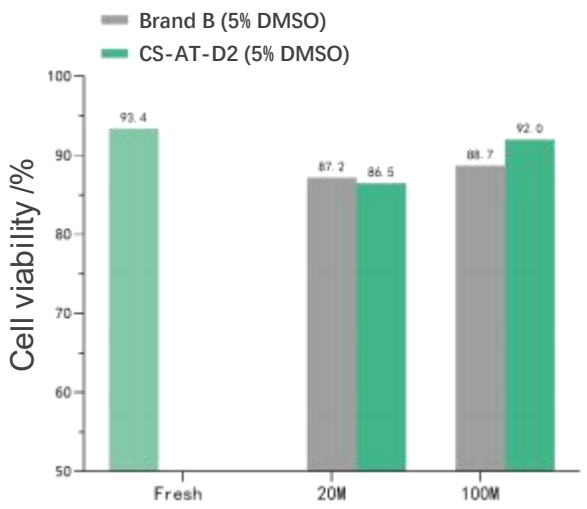
Note: Cryopreserved at 1×10^7 cells/mL for 3 months

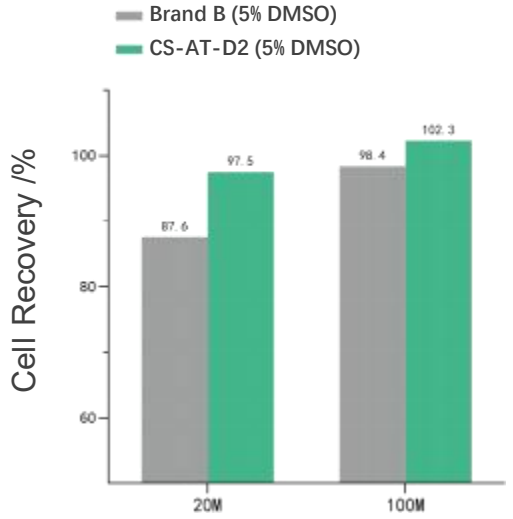
CS-AT-D2 can effectively support post-thaw re-culture of αβ-T cells.

PERFORMANCE TEST- NK Cryopreservation

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: NK

Formulated CS-AT-D2 (5%DMSO): Post-thaw viability and recovery of NK cells cryopreserved at 20 million/mL and 100 million/mL



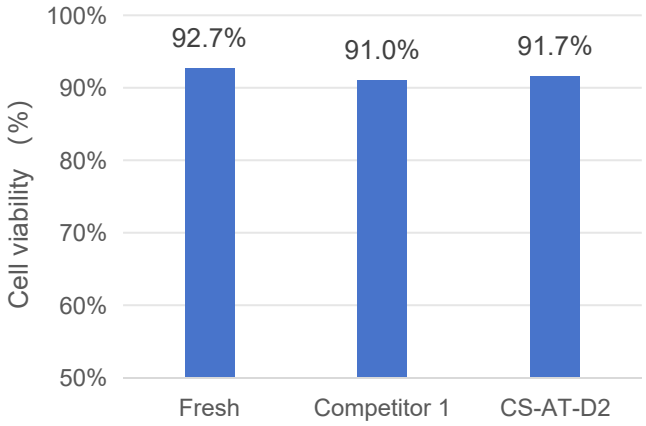


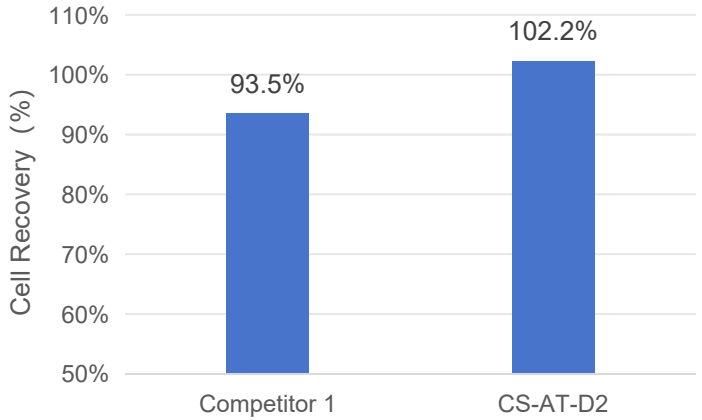
- The formulated CS-AT-D2 (5% DMSO) achieves better post-thaw cell viability and viable cell recovery of NK cells at different densities compared with the control group.
- Supporting the formulation requirements of industrial customers for diverse production processes.

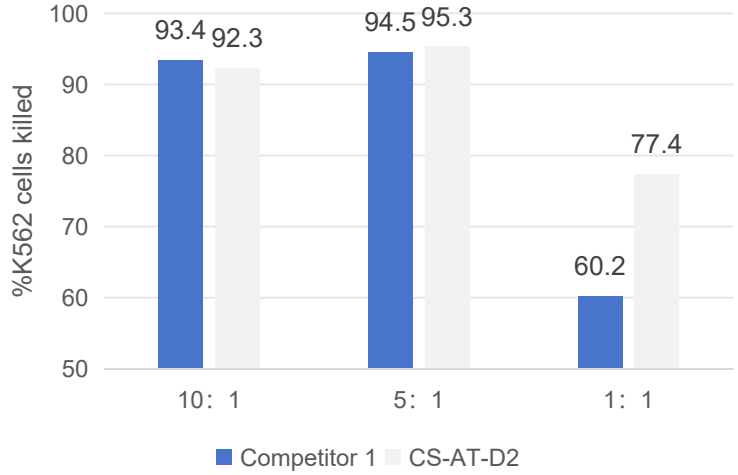
PERFORMANCE TEST- NK Cryopreservation

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: NK

Cell viability, recovery and K562 killing of NK cells post thaw







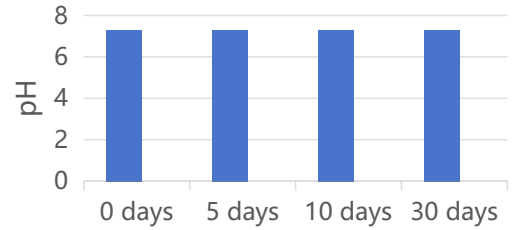
Note: Cryopreserved at 2×10^8 cells/mL for 1 month

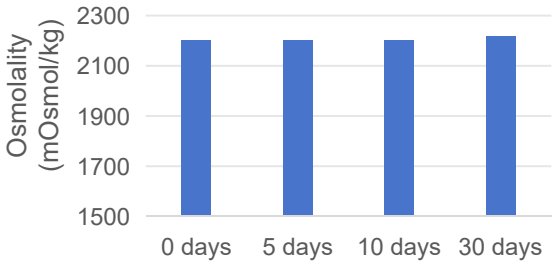
CS-AT-D2 can support the high-density and high-efficiency cryopreservation of NK cells. The cell viability, the recovery rate and the tumor-killing effect are all superior to those of the control group.

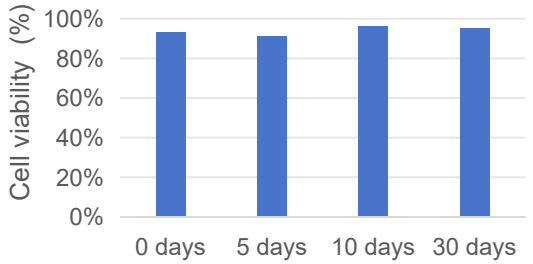
Stability Data

Product： CS-AT-D2 Immune Cell Cryopreservation Medium

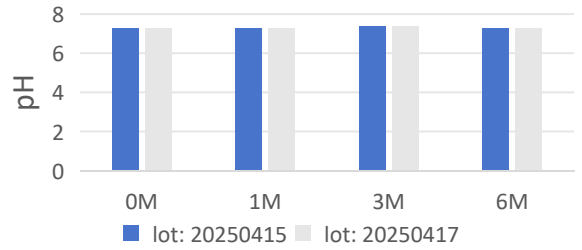
1. Thermo stability (40±2℃)

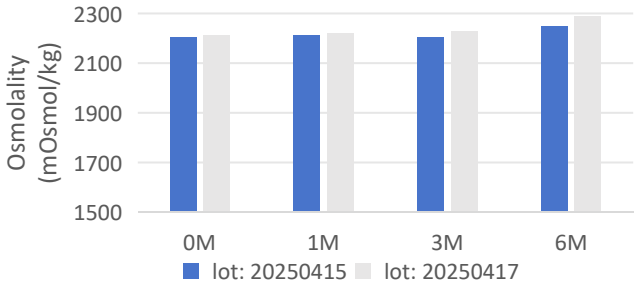


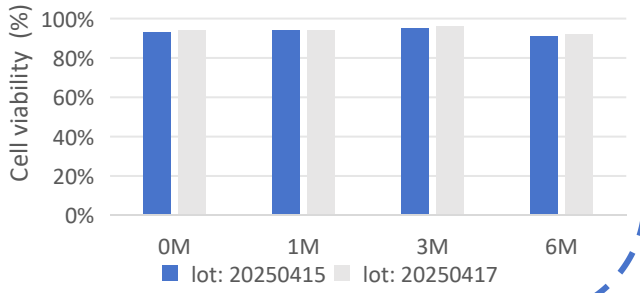




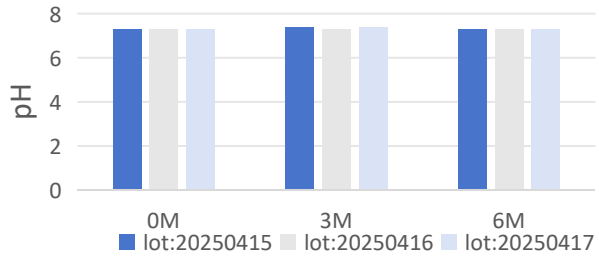
2. Accelerated stability (25±2℃)

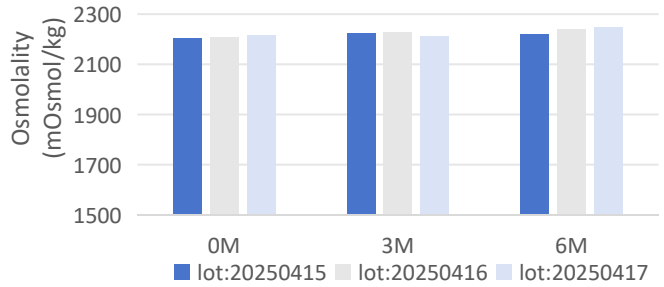


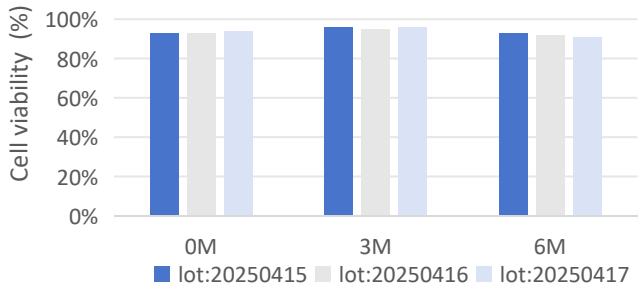




3. Long-term Stability (5±3℃)







Client Reference

CELLSTORE

Established long-term, stable partnerships with multiple leading clients.

JW Therapeutics

JW Therapeutics (Shanghai) Co., Ltd.

LEGEND BIOTECH

Legend Biotech

IASO BIOTECHNOLOGY

IASO Biotechnology

IMUNOPHARM

IMUNOPHARM Technology Co., Ltd.

cygenia

Beijing Cygenta Biotech Co., Ltd.

OBiO® CELL & GENE THERAPY CRO & CDMO

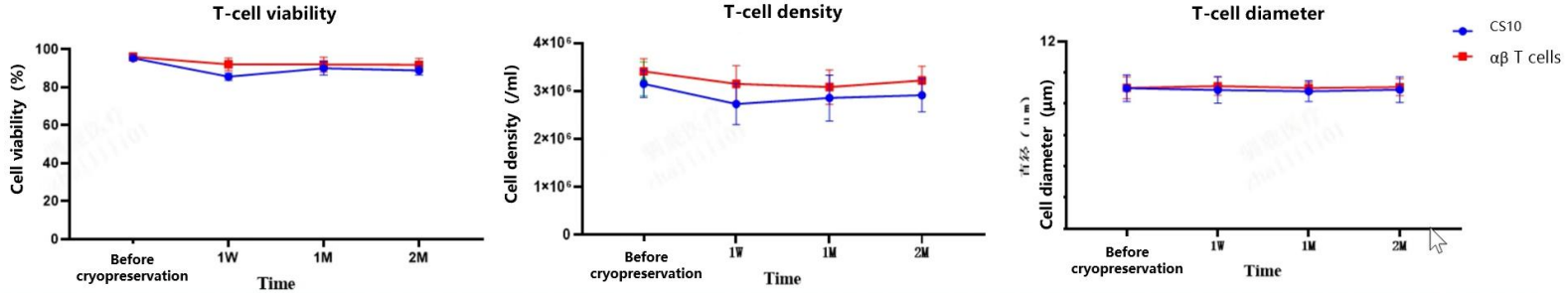
OBio Technology (Shanghai) Corp., Ltd.

CAR-T Cryopreservation (Customer Data)

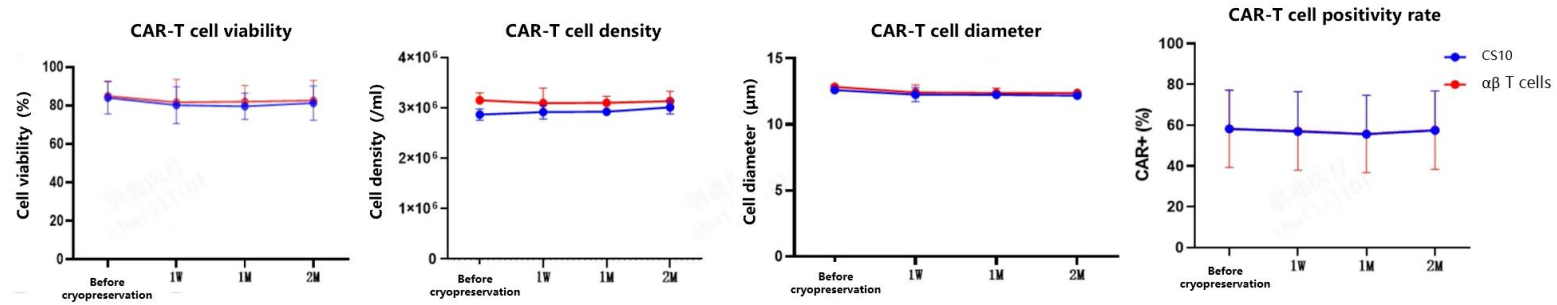
Cell Type	Donors	Group	Recovery Time
T cells	n = 7 (4 healthy donors, 3 patients)	CS10	1 week (1W), 1 month (1M), 2 months (2M)
		CS-AT-D2	
CAR-T cells	n = 4 (1 healthy donor, 3 patients)	CS10	1 week (1W), 1 month (1M), 2 months (2M)
		CS-AT-D2	

Note:
The cryopreservation medium was diluted at a 1:1 ratio before freezing, resulting in a final DMSO concentration of 5%.

T-cell cryopreservation and recovery results



CAR-T cell cryopreservation and recovery results



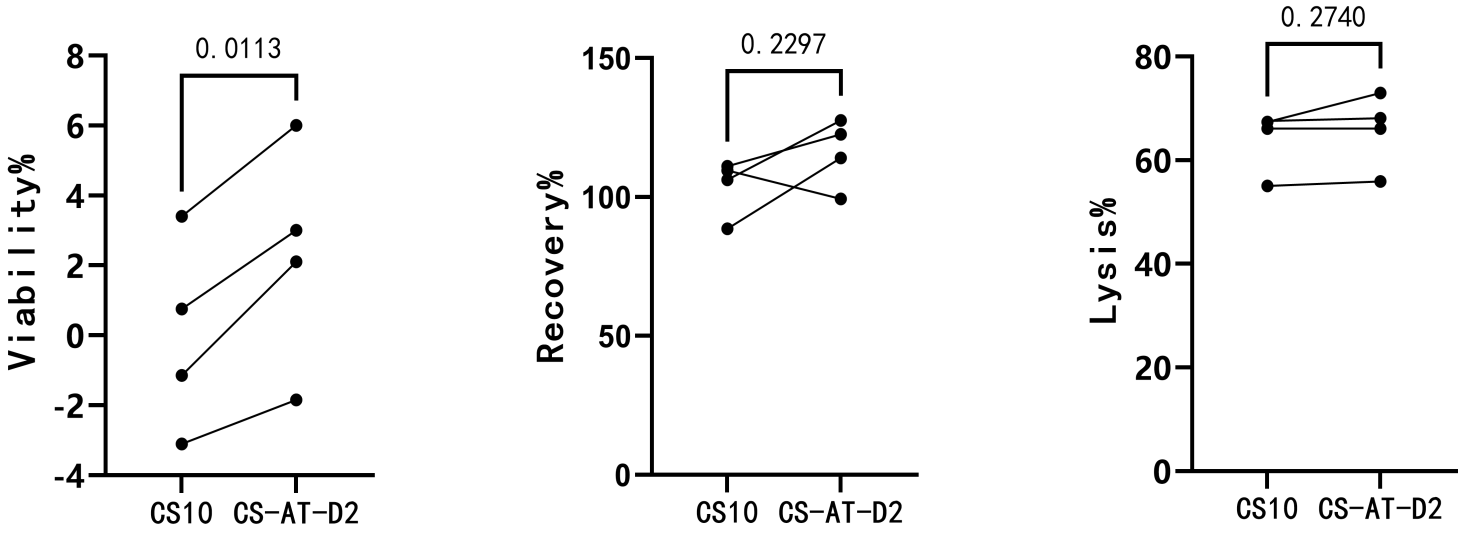
Testing conducted by IASO Biotechnology.
Data feedback received by CellStore in December 2025.

Cells demonstrated robust expansion capacity upon re-culture after thawing.
Post-thaw stability was maintained when cells were kept at room temperature for 1 or 2 hours across different recovery time points.

CAR-T Cryopreservation (Customer Data)

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: CAR-T

Cell Viability, Recovery and Tumor Killing Efficacy after Cryopreservation



Freezing Density: 5×10^7 cells/mL

CellStore CS-AT-D2 enables high-density and efficient cryopreservation of CAR-T cells. Post-thaw analysis demonstrates high cell viability and recovery, with tumor-killing potency and CAR expression maintained at levels superior to or comparable with competitor.

Testing conducted by IMUNOPHARM

Data feedback received by CellStore in June 2025.

IMUNOPHARM

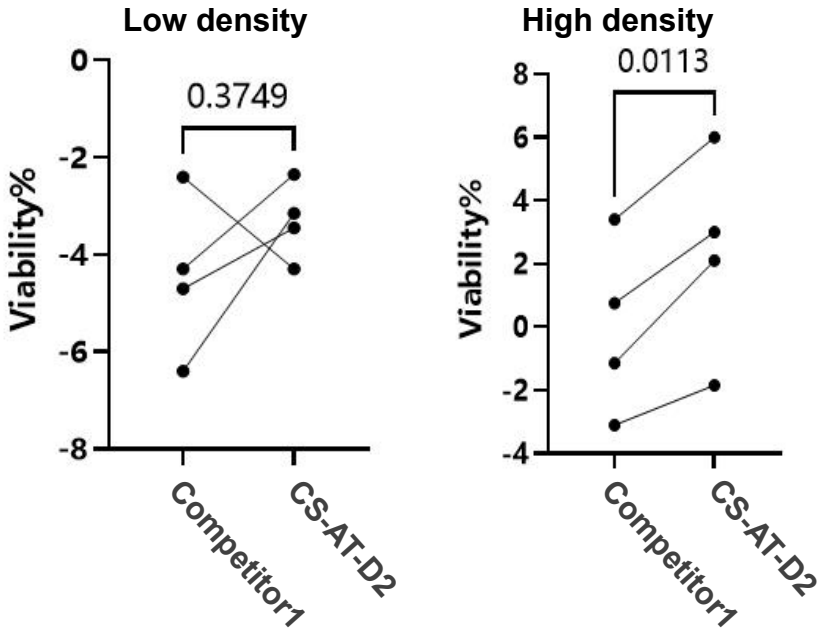
CAR-T Cryopreservation (Customer Data)

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: CAR-T

Comparison of post-thaw viability changes of CAR-T cells at different densities

Brand	Time	Batch 1		Batch 2	
		Low Density	High Density	Low Density	High Density
Competitor 1	Before	93.80%	90.65%	95.80%	93.55%
	After	89.10%	91.40%	93.40%	92.40%
	Before	92.45%	85.75%	95.75%	94.80%
	After	88.15%	89.15%	89.35%	91.70%
CS-AT-D2	Before	93.45%	86.45%	95.70%	87.10%
	After	90.00%	89.45%	91.40%	89.20%
	Before	91.00%	81.20%	95.30%	91.70%
	After	88.65%	87.20%	92.15%	89.85%

Note: Low density: 5×10^6 cells/mL; High density: 5×10^7 cells/mL



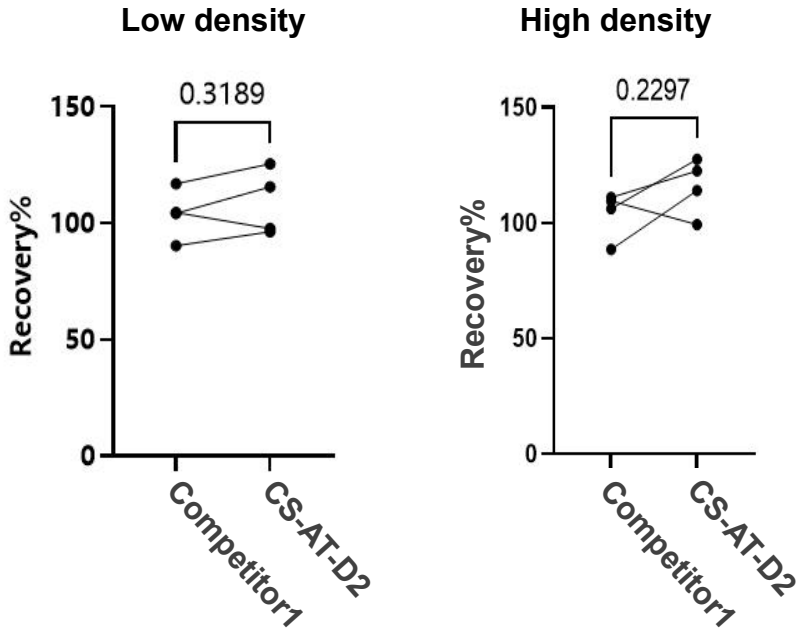
CAR-T Cryopreservation (Customer Data)

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: CAR-T

Post-thaw recovery of CAR-T cells cryopreserved at different densities

Brand	Time	Batch 1		Batch 2	
		Low Density	High Density	Low Density	High Density
Competitor 1	Before	5.27E+06	4.56E+07	5.56E+06	5.24E+07
	After	5.49E+06	4.84E+07	5.81E+06	4.64E+07
	Before	5.50E+06	4.86E+07	5.92E+06	5.23E+07
	After	6.43E+06	5.40E+07	5.35E+06	5.73E+07
CS-AT-D2	Before	4.69E+06	4.53E+07	5.30E+06	4.49E+07
	After	5.42E+06	5.78E+07	5.18E+06	5.12E+07
	Before	5.27E+06	4.73E+07	5.40E+06	5.38E+07
	After	6.61E+06	5.80E+07	5.20E+06	5.34E+07

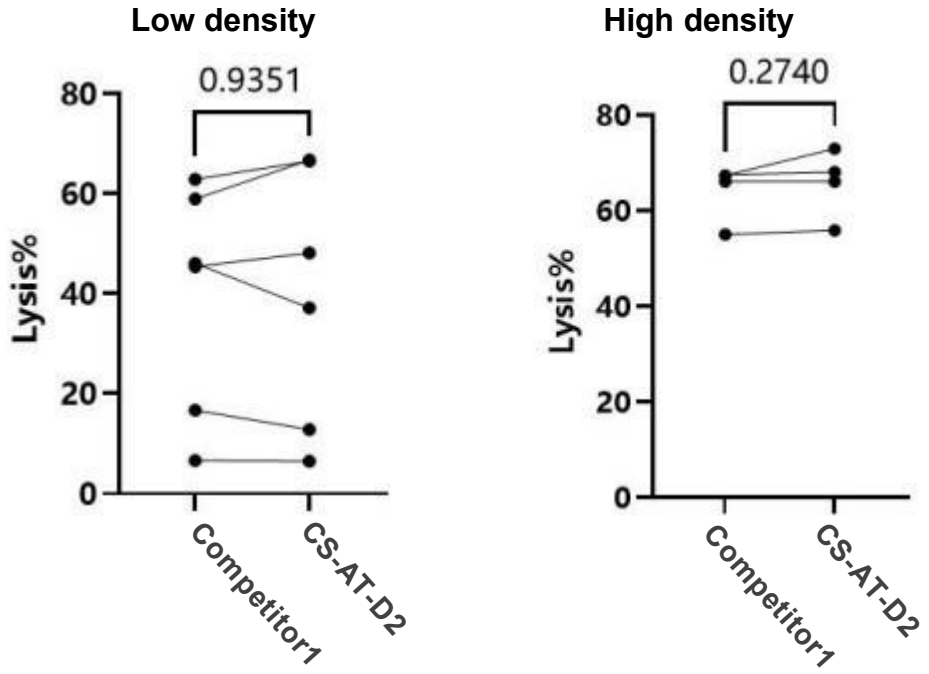
Note: Low density: 5×10^6 cells/mL; High density: 5×10^7 cells/mL



CAR-T Cryopreservation (Customer Data)

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: CAR-T

Comparison of tumor killing efficacy of CAR-T cells post-thaw

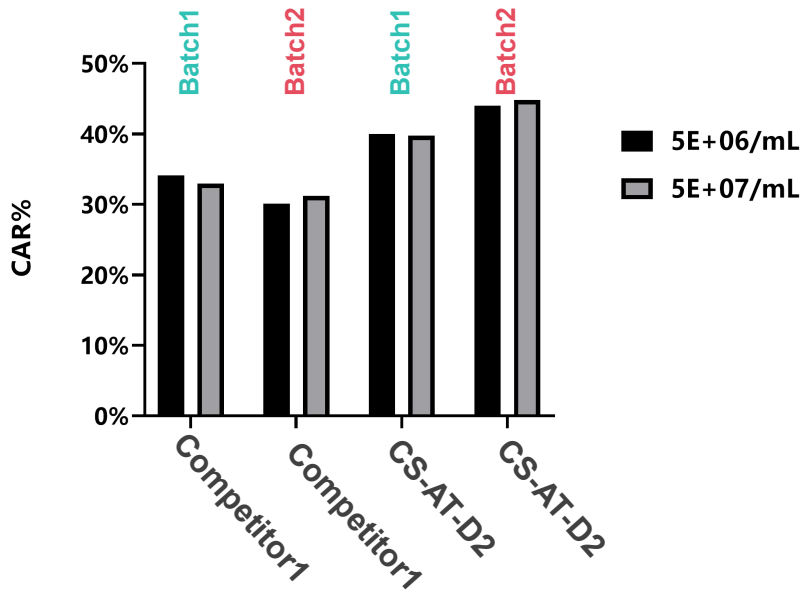


Note: Low density: 5×10^6 cells/mL; High density: 5×10^7 cells/mL

CAR-T Cryopreservation (Customer Data)

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: CAR-T

Comparison of post-thaw CAR expression rates of CAR-T cells at different densities



Note: The CAR expression rate before cryopreservation was approximately 60%.

CAR expression rate showed no significant difference among different cryopreservation densities;

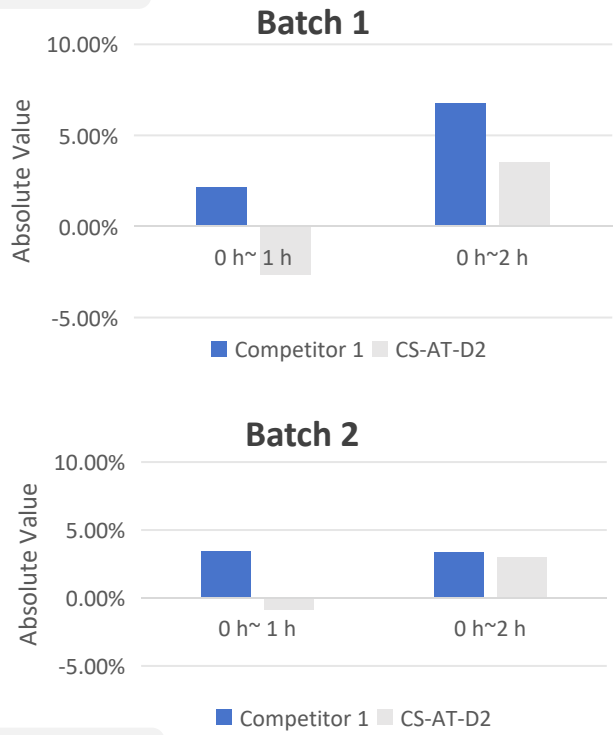
CS-AT-D2 resulted in hight post-thaw CAR% than competitor 1

CAR-T Cryopreservation (Customer Data)

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: CAR-T

Room temperture extended storage at 0 h, 1 h, and 2 h post-thaw

Leukapheresis	Cryopreservation Medium	Reduction in viable cell density		Reduction in cell viability	
		0 h~ 1 h	0 h~ 2 h	0 h~ 1 h	0 h~2 h
Batch 1	Competitor 1	-4.60E+05	3.60E+05	2.15%	6.80%
	CS-AT-D2	4.50E+04	5.45E+05	-2.65%	3.55%
Batch 2	Competitor 1	-2.55E+05	-7.00E+04	3.40%	3.35%
	CS-AT-D2	1.95E+05	-1.80E+05	-0.85%	3.00%



CS-AT-D2 provides superior stability for post-thaw CAR-T cells compared to competitor.

UCAR-T Cryopreservation (Customer Data)

CELLSTORE

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: UCAR-T

Evaluation of UCAR-T viability and 72h proliferation post-thaw

Group	Difference in cell viability (%) compared with the control group					
CS-AT-D2	At the formulation stage	Post-thaw	0h	24h	48h	72h
	-1.74	-3.95	-3.38	**2.10**	-0.55	0.45

Group	Ratio of total expansion at 72 h vs. control group
CS-AT-D2	**1.10**

Note:

1. Freezing density: 1×10^7cells/mL;

2. Control Group: CS10;

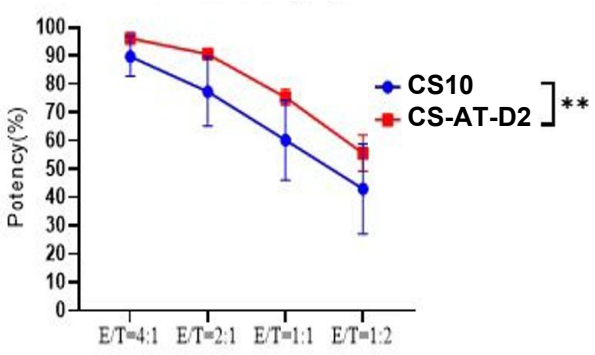
3. Fresh cells were mixed with normal saline at a ratio of 1:1, supplemented with 2%(w/v) HSA. Cell suspensions were aliquoted into cryovials and subjected to controlled-rate freezing.

CAR-NK Cryopreservation (Customer Data)

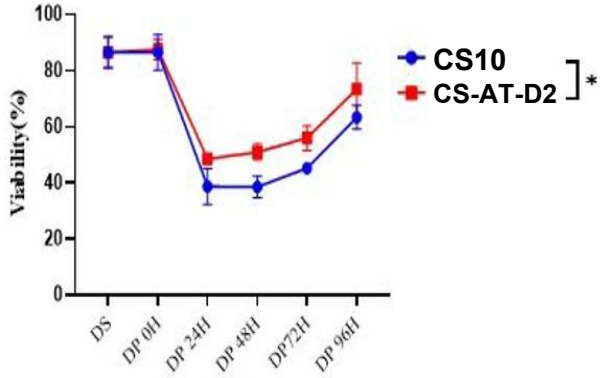
Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell type: CAR-NK

Post-thaw Functional Performance and CAR-positive rate of CAR-NK Cells

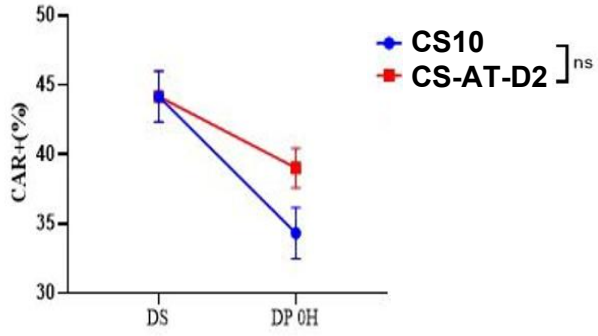
Tumor-killing activity



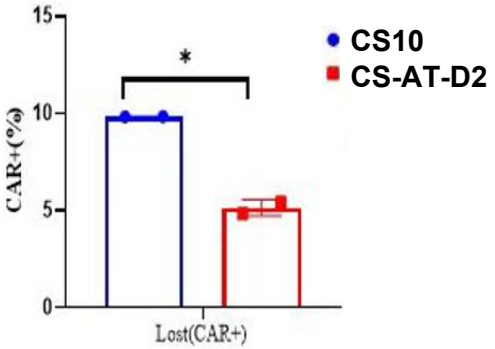
Viability during 96-hour post-thaw culture



CAR-positive rate: pre-freeze vs post-thaw



Loss of CAR-positive cells after thaw



Notes:

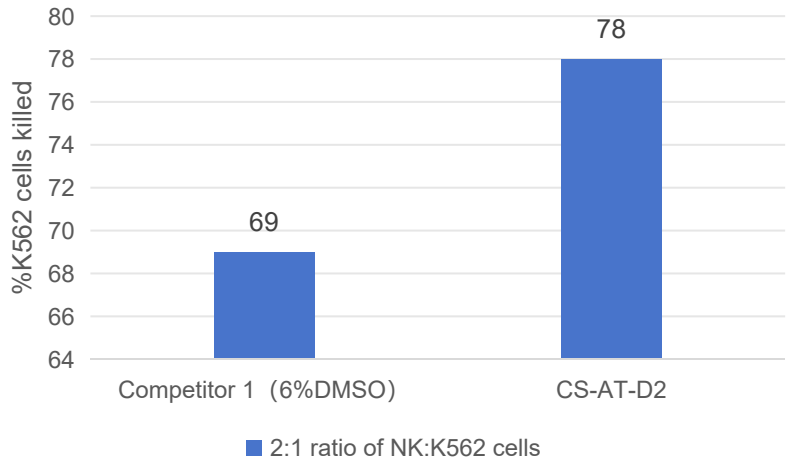
1. Freezing density: 1 × 10^8 cells/mL.
2. For both groups, the cryopreservation medium was mixed with normal saline at a 3:1 ratio, supplemented with 2%(w/v) HSA before controlled-rate freezing.

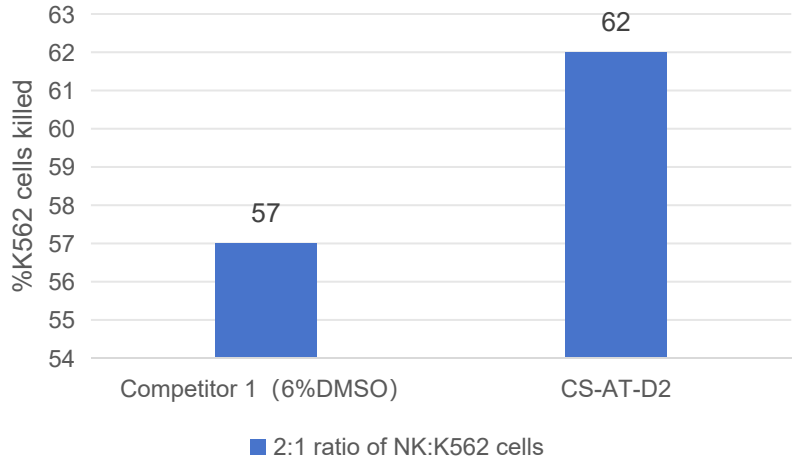
Key takeaway: Compared with CS10, CS-AT-D2 showed better post-thaw functional performance and less reduction of CAR-positive cells under the tested conditions.

CAR-NK Cryopreservation (Customer Data)

Product Name: Immune Cell Cryopreservation Medium
Cat.: CS-AT-D2
Cell Type: NK
Clinical Situation: IIT stage, IND application 2026 (China)

Comparison of Tumor Killing Efficacy of CAR-NK Cells post-thaw





Note: Freezing density: 5×10^7 cells/mL
CS-AT-D2 is used as undiluted；CS10 is formulated to a final DMSO concentration of 6%

ES-NK Cryopreservation (Customer Data)

Pepline: AXA-NK02

Product: ES-NK

Company: Asoarx Therapeutics Co., Ltd. (transfered from Vitalgen)

Indication: Refractory lupus nephritis

Current Stage: IND filed with NMPA (Dec, 2025)

Current Brand Used: CS10

Process: 5-50L reactor (Alternating Tangential Flow)

A/B Solution Preparation:1part A (Cell in Saline/HSA) + 3part B (Cryopreservation media)

Result: CS-AT-D2 comparable with CS10 (data not released)