CellShip® Transport Media

Technical Summary

CellShip® has been developed to provide an alternative to cryopreservation for the transport and short-term storage of mammalian cells.

To date, CellShip® has been validated for up to 120 h transport/storage at ambient temperatures, for a range of cell lines (Table 1) and for 72 h transport/storage of primary, canine mesenchymal stem cells (MSCs).

The protocol requires minimal cell manipulation, reducing the risk of contamination and improving efficiency within the laboratory.

At a glance

Sterile, xeno-free, and defined formulation

Protects cells against shear stress and helps maintain membrane integrity

Simple to use with minimal cell manipulation required

Manufactured under ISO13485 standards

Alternative solution to standard cryopreservation methods.

Storage & Handling

Recommended storage is +2˚C to +8˚C.

Protect CellShip® from exposure to light. Product ships at ambient temperature.

FAQs

What are the advantages and benefits of using T-Store®?

- CellShip® is a 'ready-to-use' transport and short-term storage medium, suitable for a wide range of cells.
- CellShip® provides flexibility to highly time critical processes.
- CellShip® removes the cost and logistic challenges associated with shipment on dry ice.
- CellShip® offers stable pH-buffering of pH 7.20 - 7.45 for temperatures between +2˚C to +37˚C.
- CellShip® can be used at ambient temperatures.
- CellShip® is xeno-free i.e., free from serum and animal/human proteins.
- Endotoxin levels conform to EU standards (≤ 1.0 EU/mL).
- CellShip® is solvent free i.e., free from DMSO.
- CellShip® is manufactured under ISO 13485.

What are the certifications and regulations of CellShip®?

CellShip® is registered as a medical device with MHRA.

CellShip® is also UKCA and CE-marked.

What tests are carried out on CellShip®?

There are several tests carried out such as pH measurements, osmolality, sterility conductivity as standard EP/USP testing methods, endotoxin screening, and in-house functionality testing.

Can I sample batches of CellShip®?

Sample batch testing is available upon request.

What pack sizes are available for CellShip®?

CellShip® is supplied as a sterile ready-to-use solution. CellShip® is available in the following formats.

Product Code	Product Description	Pack Size
SCS-004X	CellShip Cell Transport medium	50ml, 100ml

Table 1 *NOTE: 'X' in the product code denotes the pack size. Please state the pack size required at the time of ordering.*

What type of documentation is supplied for CellShip® before shipping?

The types of documentation will depend on the destination of the product. The types of documentation sent with the product are the Certificate of Analysis (CoA), Safety Data Sheet (SDS), Product information sheet, and standard shipping declaration of conformity depending on customs.

Data

As a direct comparison to cryopreservation, Jurkat cells (Figure 2) and HepG2 cells (Figure 3) were assessed. Stocks of cryopreserved cells were transferred from liquid nitrogen to dry ice for 72 h. Alternatively, cells were taken from growing stocks and were transported/stored for 72 h in CELLSHIP® at ambient temperature, using the protocol below.

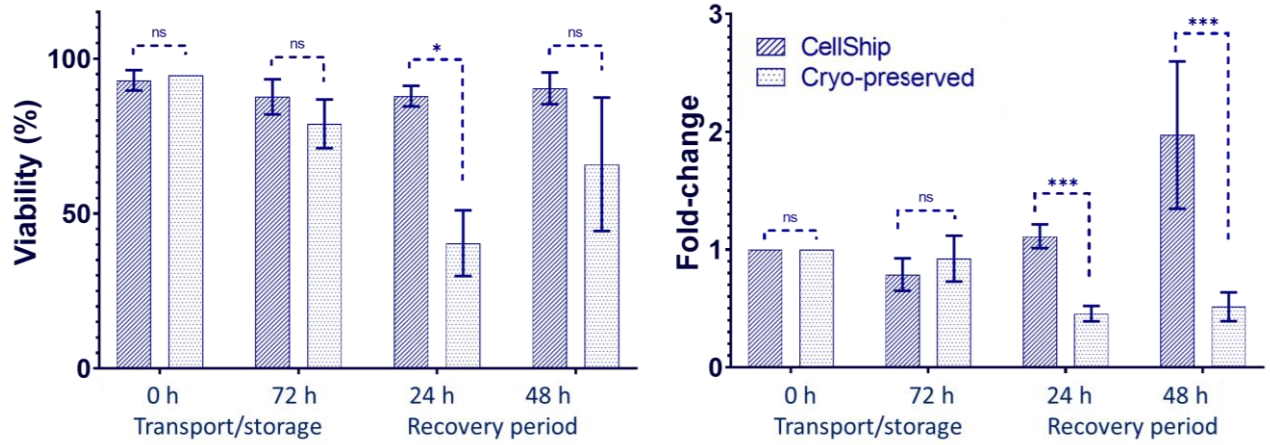

Figure 2. *Jurkat cells transported/stored in CellShip® at ambient had returned to pre-transport numbers within 24 h of recovery and showed a 2-fold increase by 48 h. Cell viability was well maintained throughout the experiment (n=3).*

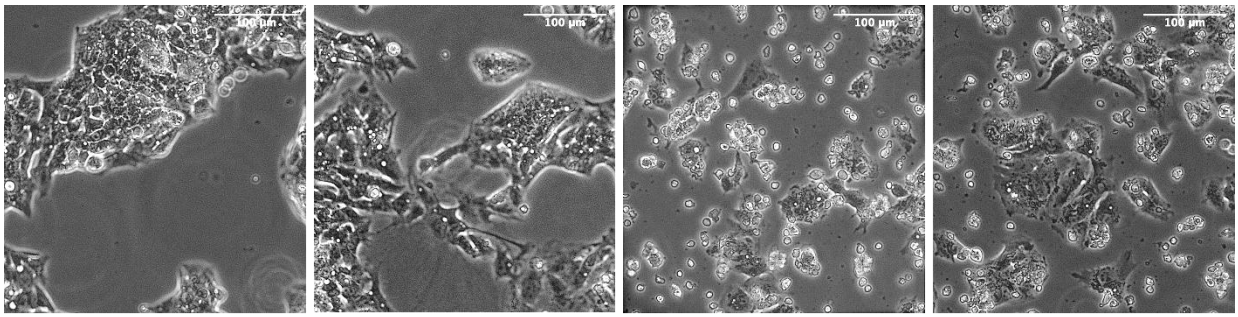

Figure 3*. HepG2 cells were imaged following a 48-h recovery period. Prior to recovery, cells had been transported/stored for 72 h either cryopreserved in dry ice or at ambient in CellShip®. Within 48 h of recovery, cells transported in CellShip® were fully adherent and were displaying typical growth morphology (A & B). Cells recovered from cryopreservation had started to adhere but had not yet re-established typical HepG2 growth morphology (C & D).*

Development Data: Primary Canine MSCs

Adipose derived MSCs from four individual donor animals were provided by our collaborator who is seeking an alternative to dry ice for the transport of canine MSCs for clinical application. MSCs were either transported/stored in CellShip® for 72 h or were cryopreserved and stored at -80°C to represent transport on dry ice. Following the transport storage period, cell viability was analysed by Annexin V/PI (Figure 4) and metabolic activity was analysed using a WST-1 assay (Figure 5). CD marker expression was also assessed following the 72-h storage/transport period (Figure 8) Cell morphology was observed after a six-day recovery period (Figure 6) and differentiation potential was also assessed (Figure 7).

Our data shows that canine mesenchymal stem cells transported/ stored in CellShip® for 72 h:

- Adhere and start proliferating more quickly than the cryopreserved controls
- Have increased viability compared to the cryopreserved controls
- Have the same differentiation potential as the cryopreservation controls
- Have slightly increased or comparable metabolic activity after transport

- Express the same CD markers as the cryopreservation controls

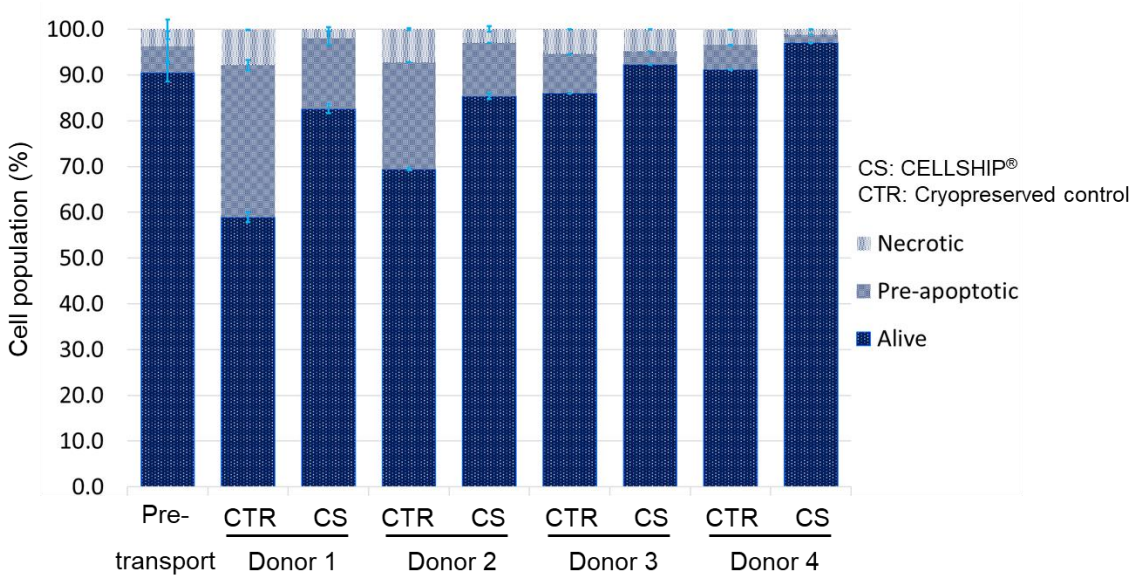

***Figure 4**. Following 72 h transport/storage in CellShip® canine MSCs maintained excellent viability. In each experiment, cells transported in CellShip® had increased viability, reduced numbers of apoptotic cells and reduced numbers of necrotic cells compared to the cryopreserved controls.*

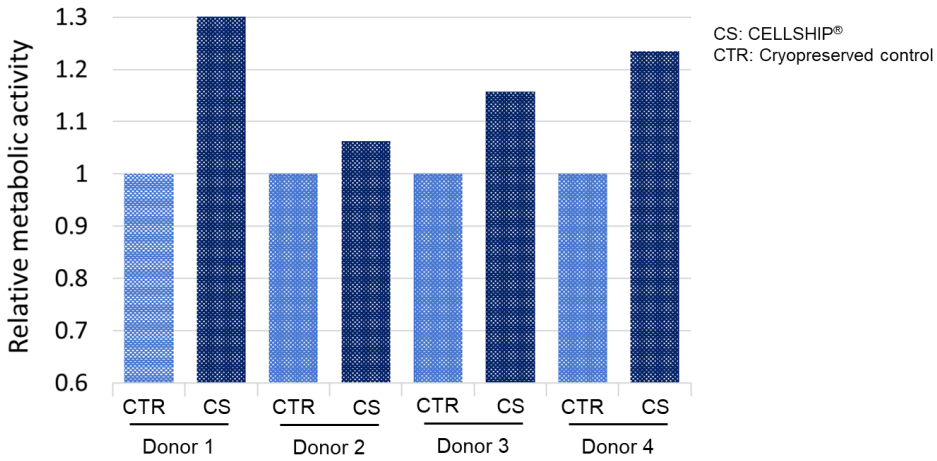

***Figure 5**. A WST-1 assay was used to assess metabolic activity. Cells were analysed following 72 h transport (cell numbers normalised). In each experiment, relative metabolic activity was slightly increased in cells transported in CellShip® compared to the cryopreserved controls.*

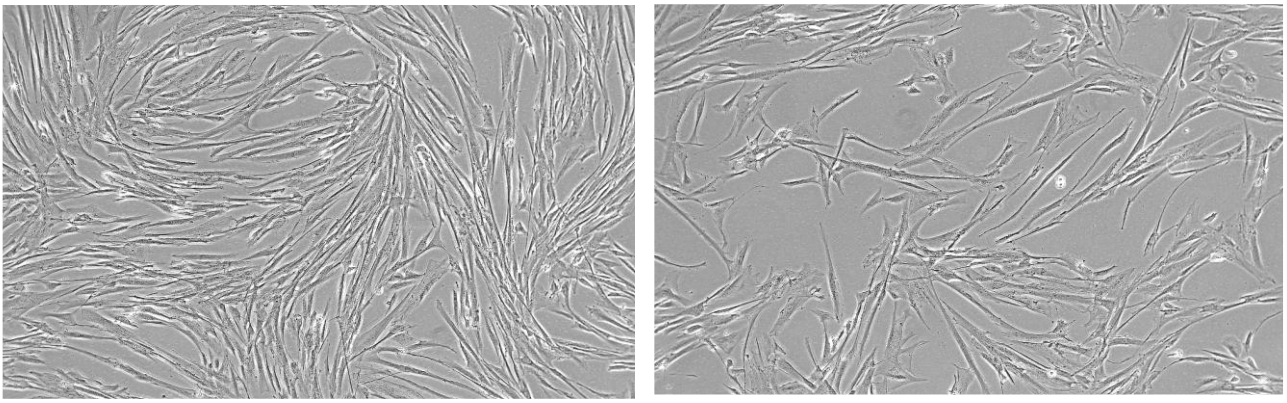

***Figure 6**. Following 72 h transport, cell numbers were normalised, and they were recovered for 6 days. Cell morphology was assessed. The increased confluency in flask A indicates that cells recovering from transport in CellShip re-enter the cell cycle more quickly than cells recovered from cryopreservation.*

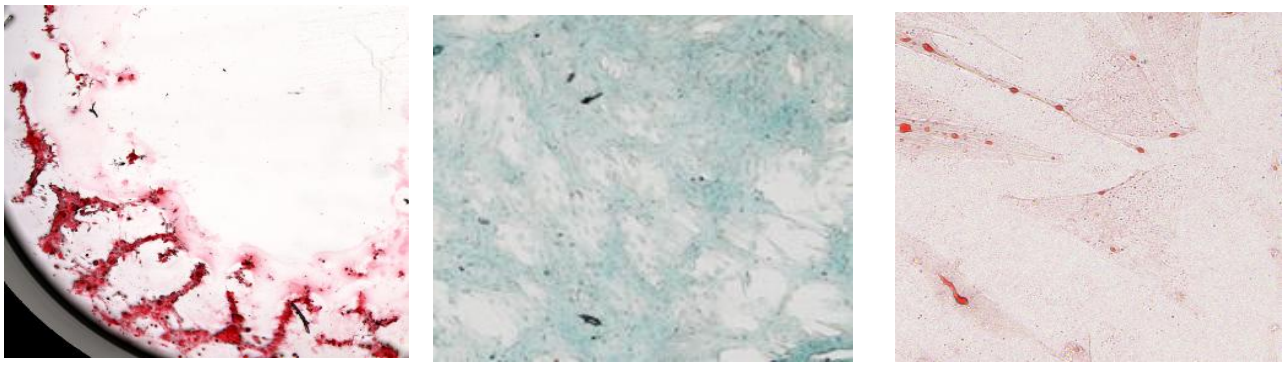

***Figure 7.** Cells transported in CellShip® maintain their differentiation potential and are able to undergo osteogenesis (A), chondrogenesis (B) and adipogenesis (C).*

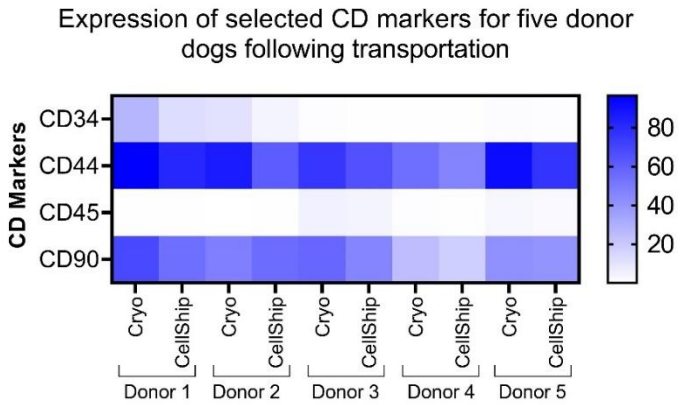

***Figure 8.** Following 72 h transport/storage, CD marker expression was assessed via flow cytometry and was comparable between cells transported in CellShip® and the cryopreserved controls.*

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Technical Info and FAQs

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Results

This data demonstrates a novel, viable and cost-effective method of transporting both cell lines and primary MSCs and provides a simple alternative to cryo-preservation (using dry-ice). Efficacy over 120 h increases the number of applications for CellShip® including biomanufacturing and the medical sciences.

How to use

1	Culture cells using standard growth media and conditions.
2	Harvest cells* using your standard method for sub-culturing and centrifuge at room temperature for 5 min at 180 x g. Discard the supernatant, without disturbing the cell pellet.
3	Gently resuspend cells in in 2-3 mL of CellShip® and centrifuge as before. Discard the supernatant, without disturbing the cell pellet.
4	Gently resuspend cells in 2 mL of CellShip® and transfer to a 2 mL cryotube*.
5	For transport, cryotubes should be placed horizontally in protective packaging.**
6	Gently resuspended the cells* in the cryotube and transfer the cell suspension to the appropriate volume of complete growth medium. Culture using standard conditions for 24 h to 48 h*. There is no need to remove CellShip before recovery.

** Viability and cell number calculated.*

***Canine MSCs were transported using a cold pack as per our collaborator's protocol. Typical temperature ranges that MSCs were exposed to was 5°C - 13°C.*

The protocol has been specifically developed to be simple, requiring minimal cell manipulation. A range of cell concentrations have been successfully tested from < 1 x 10^6 to > 10 x 10^6 per mL. We recommend that you optimise the cell concentration according to your requirements.

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