

T-Store® Transport Media

Technical Summary

T-Store® (Tissue Store) is a chemically defined and optimised media developed to provide a stable storage and shipping environment for mammalian tissue samples. The product has been designed to maintain the integrity of tissue samples, thereby reducing necrosis and apoptosis. T-Store® utilises a robust buffering system, allowing its use over a wide temperature range (+2°C to +37°C). Simply put, T-Store can be considered a synthetic interstitial fluid.



Storage & Handling

Regular T-store® has a shelf life of 18 months from the date of manufacture when stored at +2 - 8°C under dark conditions.

Adding antibiotics of any variety to T-Store® reduces the shelf life up to one month from the date of manufacture when stored at +2 - 8°C under dark conditions.



At a glance

Mimics basic composition of interstitial fluid

Maintains PH Balance of tissues during storage and transport

Isosmotic, isotonic, and isoionic with human serum and interstitial fluid

Homeostatic environment with potential to store tissue for up to 72 hours

Alternative solution to standard cryopreservation methods.

FAQs

What are the recommended storage conditions for T-Store®?

Storing tissue samples using T-Store® allows the tissue to retain genetic and histological profiles for up to 72 hours.

Recommended long-term storage of T-Store® is +2°C to +8°C. To protect T-Store® from light exposure, it is recommended to store under dark conditions. When shipping tissue samples using T-Store® it is recommended to ship at ambient temperature.

What is the recommended volume needed for a sample?

The volume recommended will depend on the tissue size and size of the container requested. For optimal results, it is recommended that the tissue sample be fully submerged in T-Store® solution.

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

- T-Store® is a 'ready-to-use' transport and storage medium, suitable for collecting a wide range of cells and tissues.
- T-Store® provides flexibility to highly time-critical processes.
- T-Store® can be used at sub-normothermic (non-frozen) and/or normothermic temperatures.

- T-Store® offers stable pH-buffering of pH 7.15 – 8.2 for temperatures between +2°C to +37°C.
- T-Store® can be used in aerobic or anaerobic conditions.
- T-Store® is xeno-free i.e., free from serum and animal/human proteins.
- Endotoxin levels conform to EU standards (≤ 1.0 EU/mL) T-Store® is solvent free i.e., free from DMSO.
- T-Store® is aseptically produced and sterility tested.

Does T-Store® affect the quality of tissue for future assays?

T-Store® is a xeno-free product with no harsh chemicals that will penetrate and harm the integrity of the whole tissue for future analysis.

What are the certifications and regulations of T-Store®?

T-Store® is registered as a medical device with MHRA.

T-Store® is also UKCA and CE-marked.

What tests are carried out on T-Store®?

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 T-Store®?

Sample batch testing is available upon request.

What pack sizes are available for T-Store®?

T-STORE® is supplied and available as a ready-to-use solution in various volume sizes as mentioned in **Table 1**.

Product Code	Product Description	Pack Size
T-STORE-X	T-STORE® Tissue Storage and Transportation Medium	50mL, 100mL, 125mL, 250mL, 500mL, 1 L
T-STORE-X-AA	T-STORE® Tissue Storage and Transportation Medium with Antibiotic (Amphotericin B and Chloramphenicol) – antibiotic supplied separately	100mL, 125mL

Table 1

NOTE: 'X' in the product code denotes the pack size. Please state the pack size required at the time of ordering. Concentrations of antibiotic: Amphotericin B (5 µg/mL), Chloramphenicol (0.1 mg/mL). these will be supplied as separate vials for later addition

What type of documentation is supplied for T-Store® 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.

What is typical cell viability following dissociation of tissue stored in T-Store?

Typical cell recovery and viability is very high for cells isolated from tissues stored in T-Store. For splenocytes and bone marrow cell viability is typically in excess of 90%.

Benefits

Table 2. Benefits of using T-STORE® for tissue samples

Collection stage	Current Practices	T-STORE® Protocols
Collection and immediate holding	Biopsy delivered dry/soaked in saline/ wrapped in gauze/formalin fixed.	Biopsies can be simply immersed in requisite volume of T-STORE® at +2°C to +8°C.
Transportation	Snap frozen (SF), Formalin fixed (FFPE) processing or sent as fresh tissues. Long transport times may degrade fresh tissues.	Tissues can be maintained in TSTORE® over ice at 0°C to +4°C or room temperature (RT) for up to 72 hours before processing.
Processing	Fresh tissues may be utilised immediately otherwise availability is limited to SF or FFPE tissue samples	T-STORE® is suitable for use with a wide range of downstream analysis.
Analyses	Analytical choices are limited due to processing restrictions.	T-STORE® is suitable for wide range of tissues and analytical options.
Outcomes	Possibility of changes in molecular profiles within tissue samples.	T-STORE® retains the morphological and molecular structure of tissues.

How to use

1	Dissociate actively growing adherent cells or directly harvest suspension cells and calculate cell number and viability.
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2	At room temperature, Pellet cells at 180 x g for 5 minutes and discard the supernatant. Re-suspend the pellet in 3 mL of T-Store® and re-pellet as before. Discard the supernatant.
3	Re-suspend the cell pellet in 2 mL of T-Store®, and transfer to a 2 mL cryo-tube (or equivalent).
4	Tubes can be stored in the dark at room temperature for up to 72 h. Robust cell types may be stored for up to 96 h.
5	To recover the cells, gently re-suspend them before transferring them into an appropriate vessel containing a complete growth medium (there is no need to remove the T-Store® prior to recovery). Incubate cells under optimal conditions (e.g., humidified, 5% CO ² incubator at 37°C).
6	Full cell recovery should be seen within 48 h.

Functionality results

Assessment of T-Store® functionality following 12 months storage at -20°C

Following 12 months storage at -20°C, four batches of T-Store® were thawed, and the functional test method was performed.

Functional test method

HEK293F cells were harvested from growing stocks, cultured under optimal conditions (in complete MEM 37°C, 5% CO₂, ~80% humidity). Cells were dissociated, counted and viability assessed (Corning Cytosmart™ cell counter and trypan blue exclusion). Cells were pelleted at ~180xg for 5 min at room temperature and the medium was discarded. Cells were resuspended in 3 mL of the test T-Store®, pelleted at ~180xg for 5 min at room temperature and the test T-Store® was discarded. The cells were then resuspended in 2 mL of the test T-Store®, once resuspended, cell number and viability were confirmed (Corning Cytosmart™ cell counter and trypan blue exclusion) before transferring to a 2mL cryovial for storage.

Cells were stored for 72 h, in the dark at room temperature (recorded using a Tinytag data logger).

Following the 72-h storage period, cell recovery was performed in duplicate. Cells were counted, and viability calculated (Corning Cytosmart™ cell counter and trypan blue exclusion), 500 mL of the T-Store® cell suspension was plated in 5 mL complete MEM in a T25 flask and recovered under optimal conditions (37°C, 5% CO₂, ~80% humidity).

Following the 48-h recovery period, cells were dissociated from the T25 flasks, counted and viable cell count was calculated (Corning Cytosmart™ cell counter and trypan blue exclusion).

The functionality test is considered a pass when the viable cell number post recovery is greater than the original number of viable cells stored (fold change > 1). Results are displayed as a fold change.



Results

These experiments were conducted in February 2020 (following 12 months at -20°C), at the time of the functionality test, all batches tested had exceeded the date of expiry (DOE). All batches tested passed the functionality test.

Table 3. Data from functionality tests performed on T-Store® stored at -20°C.

All batches of T-Store® had been stored at -20°C for 12 months.

Batch	*DOM	**DOE	Viability 72 h storage	Viability 48 h recovery	Fold change post storage	Fold change post recovery
A60918	Sep-18	Jun-19	99%	96%	0.75	1.04
A40518	May-18	Feb-19	99%	95%	0.74	1.06
A70618	Jul-18	Apr-19	99%	93%	1.01	1.3
B40418	May-18	Feb-19	99%	95%	1.11	1.21

*Date of manufacture, **date of expiry.

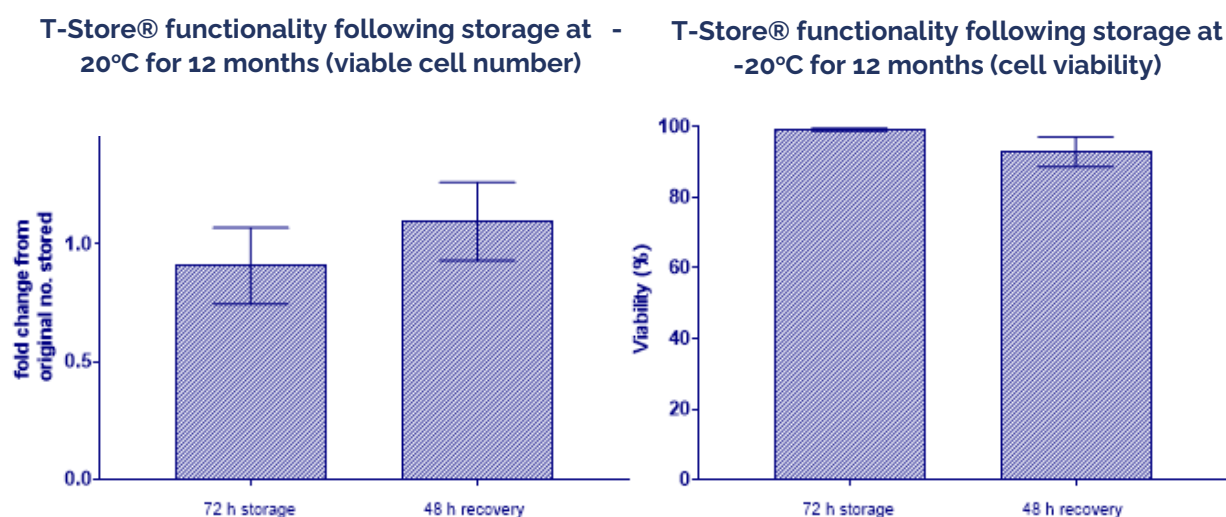


Figure 1. Following assessment of T-Store® functionality after being stored at -20°C for 12 months. Mean fold change for cells following 72 h at ambient was 0.91, following the 48-h recovery period the mean fold change in viable cell number was 1.1. Mean cell viability following storage was 99% and following the recovery period mean viability was 93% ($n=5$).

Conclusion

All batches of T-Store® tested passed the functionality test, they were able to maintain cell viability for 72 h storage at ambient temperature and following recovery, the viable cell numbers were all greater than the original number stored (fold change = >1). All batches had past the DOE at time of testing (range 8 – 12 months).

This data indicates that storage for 12 months at -20°C does not have a detrimental effect on T-Store® functionality.