DI TNC1

305343

GENERAL INFORMATION

Description

The DI TNC1 cell line is an immortalized astrocyte model derived from primary type-1 astrocytes taken from the diencephalon of a neonatal rat. The cells were immortalized using the polyomavirus middle T-antigen, granting them the ability to proliferate indefinitely while maintaining several characteristics of primary astrocytes. DI TNC1 cells are widely used in neuroinflammation and neuroprotection studies, particularly for exploring astrocytic energy metabolism, response to oxidative stress, and the regulation of inflammatory pathways. These cells express key astrocytic markers, such as glial fibrillary acidic protein (GFAP) and S100β protein, and are involved in metabolic processes, including glycogen storage and energy provision to neurons.
One of the hallmark features of DI TNC1 astrocytes is their involvement in energy metabolism studies. Research has demonstrated that these cells respond to various neurotransmitters, such as noradrenaline and vasoactive intestinal peptide (VIP), by undergoing glycogenolysis and modulating cyclic AMP (cAMP) levels. Additionally, DI TNC1 cells have been shown to utilize glucose and produce lactate, which are crucial for supporting neuronal functions. However, certain responses seen in primary astrocytes, like glutamate-stimulated glycolysis or significant long-term glycogen resynthesis, are not as robust in DI TNC1 cells. This highlights the utility of DI TNC1 cells in dissecting specific aspects of astrocyte physiology that are relevant to energy dynamics in the central nervous system.
Another significant area of study using DI TNC1 cells involves the investigation of oxidative stress and inflammatory signaling pathways. For example, DI TNC1 cells have been used to analyze the regulation of the nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB) and the nuclear factor erythroid 2-related factor 2 (Nrf2) pathways. Experiments with botanical polyphenols like quercetin and extracts from plants such as Ashwagandha have shown that these compounds can modulate the NF-κB and Nrf2/ARE (antioxidant response element) pathways in DI TNC1 astrocytes. Specifically, quercetin has been found to inhibit lipopolysaccharide (LPS)-induced NF-κB activity and enhance Nrf2-mediated antioxidant defenses, illustrating the potential of these cells for screening anti-inflammatory and neuroprotective agents.

Tissue	Brain, diencephalon
Disease	Normal

Synonyms

- DITNC1
- DI-TNC1
- DI TNC-1

CLASSIFICATION

Organism	Rat
Sex	Unspecified
Growth properties	Adherent
GMO status	GMO-S1

GMO status details

GMO-S1: This rat astrocyte cell line (DI TNC1) contains an SV40 early-region construct under GFAP promoter control delivered via plasmid transfection, enabling immortalization. The insert is stable in primary astrocyte-derived cells. This classification applies only within Germany and may differ elsewhere.

Biosafety level	2

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CHARACTERISTICS

Morphology	Fibroblast
Cell type	Astrocyte, type II
Tumourigenic	No, tested in immunosuppressed mice, but did form colonies in semisolid medium

IDENTIFIERS

Citation

DI TNC1 (Cytion catalog number 305343)

NCBI TaxID	10116
Cellosaurus	CVCL_0247

EXPRESSION AND SUSCEPTIBILITY

Protein expression

Genes expressed: alpha 2 macroglobulin, transferrin

Viruses

Transformant: Simian virus 40 (SV40)

HANDLING AND CULTURE

Culture medium

DMEM, w: 4.5 g/L Glucose, w: 4 mM L-Glutamine, w: 3.7 g/L NaHCO3, w: 1.0 mM Sodium pyruvate (Cytion article number 820300a)

Incubation atmosphere	37°C, 5% CO_2, humidified atmosphere.

Supplements

Supplement the medium with 10% FBS

Dissociation reagent	Accutase

Subculturing

Remove the old medium from the adherent cells and wash them with PBS that lacks calcium and magnesium. For T25 flasks, use 3-5 ml of PBS, and for T75 flasks, use 5-10 ml. Then, cover the cells completely with Accutase, using 1-2 ml for T25 flasks and 2.5 ml for T75 flasks. Let the cells incubate at room temperature for 8-10 minutes to detach them. After incubation, gently mix the cells with 10 ml of medium to resuspend them, then centrifuge at 300xg for 3 minutes. Discard the supernatant, resuspend the cells in fresh medium, and transfer them into new flasks that already contain fresh medium.

Fluid renewal	2 to 3 times per week

Thawing and culturing

Confirm that the vial remains deeply frozen upon delivery, as cells are shipped on dry ice to maintain optimal temperatures during transit.
Upon receipt, either store the cryovial immediately at temperatures below -150°C to ensure the preservation of cellular integrity, or proceed to step 3 if immediate culturing is required.
For immediate culturing, swiftly thaw the vial by immersing it in a 37°C water bath with clean water and an antimicrobial agent, agitating gently for 40-60 seconds until a small ice clump remains.
Perform all subsequent steps under sterile conditions in a flow hood, disinfecting the cryovial with 70% ethanol before opening.
Carefully open the disinfected vial and transfer the cell suspension into a 15 ml centrifuge tube containing 8 ml of room-temperature culture medium, mixing gently.
Centrifuge the mixture at 300 x g for 3 minutes to separate the cells and carefully discard the supernatant containing residual freezing medium.
Gently resuspend the cell pellet in 10 ml of fresh culture medium. For adherent cells, divide the suspension between two T25 culture flasks; for suspension cultures, transfer all the medium into one T25 flask to promote effective cell interaction and growth.
Adhere to established subculture protocols for continued growth and maintenance of the cell line, ensuring reliable experimental outcomes.

QUALITY CONTROL AND CRYOPRESERVATION

Sterility

Mycoplasma contamination is excluded using both PCR-based assays and luminescence-based mycoplasma detection methods.
To ensure there is no bacterial, fungal, or yeast contamination, cell cultures are subjected to daily visual inspections.

Freeze medium	As a cryopreservation medium, we use complete growth medium (including FBS) + 10% DMSO for adequate post-thaw viability, or CM-1 (Cytion catalog number 800100), which includes optimized osmoprotectants and metabolic stabilizers to enhance recovery and reduce cryo-induced stress.

Storage conditions

For long-term preservation, place vials in vapor-phase liquid nitrogen at about −150 to −196 °C. Storage at −80 °C is acceptable only as a short interim step before transfer to liquid nitrogen.

Shipping conditions

Cryopreserved cell lines are shipped on dry ice in validated, insulated packaging with sufficient refrigerant to maintain approximately −78 °C throughout transit. On receipt, inspect the container immediately and transfer vials without delay to appropriate storage.

DONOR

Breed / subspecies	Sprague Dawley
Donor age	1 day

LEGAL AND SAFETY

Safety precautions

When planning to store a cryovial in liquid nitrogen for future thawing, it is mandatory to adhere to stringent safety measures. Appropriate protective gloves and clothing are essential, and the use of a face mask or safety goggles is required during the transfer of frozen samples to or from the liquid nitrogen tank. This is to mitigate the risk of injury from potential cryovial explosions upon removal, which can result in the projection of sharp fragments.

Warranty

At Cytion, we stand behind the quality and viability of our products.
We guarantee that our cells will be viable at the start of culture for
60 days after shipment from our facilities.
We assure that all materials conform to the specifications described in the
Certificate of Analysis and/or Product Sheet.
For full details, please refer to our
Warranty Statement.

Material Transfer Agreement required	Yes