THP-1

300356

GENERAL INFORMATION

Description

THP1 cells, a spontaneously immortalized monocyte-like cell line derived from the peripheral blood of a 1-year-old monocytic leukemia patient, serve as a critical model in immunological and cancer research. The THP-1 monocyte cell line, known for its ability to differentiate into mature macrophage and dendritic cells, is essential for studying the functions and properties of these immune cells in vitro, including adipose tissue macrophages and M2 mononuclear phagocytes.
THP-1 differentiated macrophages are instrumental in exploring monocyte and macrophage functions, mechanisms, signalling pathways, including cytokine activation and immune modulation, and studying nutrient and drug transport. Further, THP-1 macrophages can be polarized into M1 or M2 macrophages, crucial for studies on immunity and inflammation, innate immunity, and inflammatory responses.
In the context of metabolic and inflammatory diseases, THP-1 cells help explore cytokine profiles, including inflammatory cytokines, and their impact on conditions like human adipocyte apoptosis, illustrating the interplay between inflammation and metabolic health.
Notably, the THP-1 cell line allows for comparative studies with other monocytic leukemia cells and cell lines like U937, facilitating a deeper understanding of monocyte and macrophage biology across different models.
In summary, the THP-1 human monocytic leukemia cell line stands as a valuable tool for a myriad of research avenues, from investigating the intricate mechanisms of the immune system and its role in cancer to understanding the cellular and molecular underpinnings of immune modulation, cytokine activation, and cell proliferation. Its ability to mimic human macrophages and dendritic cells, combined with the ease of manipulation and fast growth rate, cements its status as a widely used cell line in biological and medical research, offering insights into the cellular basis of immunity and inflammation, the response of cancer cells, and the potential for therapeutic intervention.

Tissue	The tissue of origin is peripheral blood
Disease	Leukemia

Applications

THP1 cells are a multifacted model with applications in Immune response modeling, Monocyte/macrophage differentiation, Phagocytosis mechanisms, Inflammatory signaling pathways, Drug transport assays

Synonyms

- THP1
- THP 1
- THPI
- O-THP-1
- Tohoku Hospital Pediatrics-1

CLASSIFICATION

Organism	Human
Sex	Male
Growth properties	Suspension
Biosafety level	1

CHARACTERISTICS

Morphology	Round cells
Cell type	Monocyte

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Karyotype

THP-1 cells are near-diploid and contain two related subclones with genetic aberrations.

Doubling time	The population doubling time of human THP-1 cells ranges from 19 to 50 hours, with an average of around 35 hours.

IDENTIFIERS

Citation

THP-1 (Cytion catalog number 300356)

NCBI TaxID	9606
Cellosaurus	CVCL_0006

EXPRESSION AND SUSCEPTIBILITY

Receptors expressed

HLA haplotypes: HLA-A2, -A9, -B5, -DRw1, -DRw2Fc, C3b

Isoenzymes

The human THP-1 cell line expresses low levels of CD4, CCR5, and CxCR4, making it relevant to HIV infection studies. However, they express low levels of CD14 and not CD80, CD86, CD11b, CD11c, Mertk, or CD1a, making them a poor model for primary monocytes regarding LPS responses.

Products

Lysozyme

HANDLING AND CULTURE

Culture medium

RPMI 1640, w: 2.0 mM stable Glutamine, w: 2.0 g/L NaHCO3 (Cytion article number 820700a)

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

Supplements

Supplement the medium with 10% heat-inactivated FBS

Subculturing

Gently homogenize the cell suspension in the flask by pipetting up and down, then take a representative sample to determine the cell density per ml. Dilute the suspension to achieve a cell concentration of 1 x 10^5 cells/ml with fresh culture medium, and aliquot the adjusted suspension into new flasks for further cultivation.

Seeding density	0.5 x 10^6 cells/mL
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

Donor age	1 year

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