HL-1

305264

GENERAL INFORMATION

Description

HL-1 is a cardiac muscle cell line derived from the atrial cardiomyocytes of an adult mouse. This cell line is unique in that it retains the ability to contract and maintain a differentiated cardiac phenotype over long-term culture, making it an invaluable model for cardiovascular research. HL-1 cells are widely used in studies focused on cardiac physiology, electrophysiology, and pharmacology. Their ability to undergo spontaneous and inducible contractions allows researchers to investigate the molecular mechanisms underlying cardiac muscle function, disease, and response to therapeutic agents.
HL-1 cells exhibit characteristics typical of cardiac muscle cells, including the expression of cardiac-specific markers such as troponin, myosin, and connexin 43. They are responsive to various physiological and pharmacological stimuli, enabling detailed studies of cardiac signal transduction pathways, ion channel function, and the effects of drugs on heart cells. This cell line is particularly valuable for modeling cardiac arrhythmias, hypertrophy, and other cardiac pathologies. Additionally, HL-1 cells are used in high-throughput drug screening assays aimed at identifying compounds that modulate cardiac function, which is crucial for the development of new treatments for cardiovascular diseases.

Tissue	Heart, left atrium
Disease	Normal atrial cardiomyocyte (SV40 large T antigen-immortalized via AT-1 lineage; spontaneously contracting; non-tumorigenic in standard use)

Applications

Cardiac physiology and electrophysiology; cardiomyocyte biology; cardiac arrhythmia modeling; ion channel function (IKr, INa, ICaL); cardiac hypertrophy and remodeling; cardiac ischemia/reperfusion injury; drug cardiotoxicity screening; connexin43 and gap junction biology; atrial-specific gene expression (ANF, α-MHC, α-actin); spontaneous contractility assays; high-throughput cardiac drug screening; multi-electrode array (MEA) electrophysiology

Synonyms

- HL1
- HL-1 F2 P76

CLASSIFICATION

Organism	Mouse
Sex	Female
Growth properties	Adherent
Biosafety level	1

CHARACTERISTICS

Morphology	Cardiomyocyte-like
Cell type	Cardiomyocyte
Doubling time	approx. 24 to 36 hours

IDENTIFIERS

Citation

HL-1 (Cytion catalog number 305264)

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NCBI TaxID	10090
Cellosaurus	CVCL_0303

EXPRESSION AND SUSCEPTIBILITY

Viruses

Transformant: Simian virus 40 (SV40)

HANDLING AND CULTURE

Culture medium

Claycomb medium, 2 mM glutamine, 10% FBS, 0.1 mM norepinephrine in L-ascorbic acid (We do not sell)
Prepare 0.1 mM norepinephrine in L-ascorbic acid:
Prepare a 100-fold stock solution = 10 mM norepinephrine.
1. Prepare a 30 mM L-ascorbic acid solution (50 mL)
2. Add 160 mg of norepinephrine to the ascorbic acid solution (50 mL) = 10 mM norepinephrine
3. Sterilely filter the solution through a 0.2-µm filter cartridge.
4. Fill 1-mL aliquots of the 100-fold norepinephrine stock solution into sterile vials and store at −20 °C. Wrap in aluminum foil; must be protected from light. The solution is stable for approximately 1 month at −20 °C.
5. Add 1 mL of this solution to 100 mL of Claycomb medium. The medium is stable for only 1 month.

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

Supplements

Supplement the medium with 10% FBS, 2 mM glutamine, 0.1 mM norepinephrine in L-ascorbic acid

Dissociation reagent	Accutase
Flask coating	The cell culture bottles must be coated with fibronectin and gelatin. 25 µg fibronectin, dissolved in 2 ml of 0.02% gelatin in water, are placed in a T25 and incubated overnight at 37°C

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.

Split ratio	1 to 3
Seeding density	2 to 4 x 10^4 cells/cm^2
Fluid renewal	Daily (Claycomb Medium changed every 24 hours to maintain contractile phenotype)
Post-thaw recovery	After thawing, plate cells onto fibronectin/gelatin-coated flasks (pre-coat with 12.5 µg/ml fibronectin and 0.02% gelatin; incubate 37°C for ≥1 hour, aspirate before seeding). Allow 24–48 hours for adherence and recovery before the first medium change. Feed daily with supplemented Claycomb Medium thereafter.

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	C3HeB/FeJ transgenic
Donor age	Unspecified
Ethnicity	Not applicable (C3HeB/FeJ transgenic mouse strain; breed in Q)

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

PRODUCT DETAILS

Composition table

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