AC16 Cardiomyocyte Cell Line

305215

GENERAL INFORMATION

Description

The AC16 cell line, derived from human ventricular cells fused with SV40-transformed, showcases characteristics typical of cardiomyocytes, including the expression of transcription factors such as GATA4, MYCD, NFATc4, and contractile proteins like alpha- and beta-myosin heavy chain. AC16 cells also express gap junction proteins connexin-43 and connexin-40, with functional gap junctions confirmed by dye-coupling studies, underscoring their utility in cardiomyocyte research. When the SV40 oncogene is silenced, AC16 transitions towards a more differentiated state, marked by the expression of BMP2, indicative of cardiac differentiation and developmental regulation.
In general, scientists employ various techniques, including stem cell differentiation, animal models, molecular analysis, and biomarker discovery, to advance knowledge and potential therapies for heart-related conditions. The involvement of mitogen and senescence pathways, along with thymidine kinase induction, further elucidates the complex nature of human cardiomyocytes and their response to pathological conditions.
The AC16 human cardiomyocyte cell line's ability to mimic the behavior of mature cardiomyocytes makes it a valuable model for cardiac research. It closely resembles the genetic makeup of primary cardiomyocytes, allowing for studies on cardiac development, pathology, and the implications of histone loss in vitro, however, the cardiomyocyte behavior and genetic complexity might not fully match that of primary or stem cell-derived cardiomyocytes. In the context of toxicology and cardiovascular disease research, AC16 cells serve as a vital tool for understanding cardiomyocyte development, inflammation, injury, regeneration, and toxicological effects.
The unique properties of the AC16 human cardiomyocyte cell line, including its response to developmental cues and the ability to simulate the physiological conditions of human cardiomyocytes, make it an indispensable asset in the quest to unravel the mysteries of heart diseases and devise novel therapeutic interventions.

Tissue	Heart, ventricle

Applications

Research in toxicology and cardiovascular disease focuses on understanding cardiomyocyte development, inflammation, injury, regeneration, and toxicological effects. Scientists use various techniques, including stem cell differentiation, animal models, molecular analysis, and biomarker discovery, to advance knowledge and potential therapies for heart-related conditions.

Synonyms

- Human hybrid cardiomyocyte

CLASSIFICATION

Organism	Human
Growth properties	Adherent
GMO status	GMO-S1

GMO status details

GMO-S1: This AC16-derived human cardiomyocyte cell line contains an SV40 T-Antigen construct introduced by transfection, supporting conditional immortalization. The construct is stably integrated into uridine-auxotrophic fibroblast-derived cells. This classification applies only within Germany and may differ elsewhere.

Biosafety level	1

CHARACTERISTICS

Morphology	Epithelial
Cell type	Cardiomyocyte

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IDENTIFIERS

Citation

AC16 Cardiomyocyte Cell Line (Cytion catalog number 305215)

NCBI TaxID	9606
Cellosaurus	CVCL_4U18

EXPRESSION AND SUSCEPTIBILITY

Viruses

Transformed by the SV40 large T-antigen

HANDLING AND CULTURE

Culture medium

Culture medium:DMEM:Ham's F12 (1:1), w: 3.1 g/L Glucose, w: 2.5 mM L-Glutamine, w: 15 mM HEPES, w: 0.5 mM Sodium pyruvate, w: 1.2 g/L NaHCO3 (Cytion article number 820400a). Supplement the culture medium with 12.5% FBS and add 0.9 mM L-Glutamine to achieve a final concentration of 2.5 mM L-Glutamine.
Differentiation medium: DMEM:Ham's F12 (1:1), w: 3.1 g/L Glucose, w: 2.5 mM L-Glutamine, w: 15 mM HEPES, w: 0.5 mM Sodium pyruvate, w: 1.2 g/L NaHCO3 (Cytion article number 820400a). To prepare the complete differentiation medium, add 1x ITS+ (Gibco, catalog number 41400045) and 2% Horse Serum (Gibco, catalog number 16050130).

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

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

Ethnicity	Caucasian

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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