MCF-7

300273

GENERAL INFORMATION

Description

MCF7 cells, a widely used research model in human breast cancer research, are utilized extensively as an in vitro model for hormone-dependent breast cancer. Originating from the breast tissue of a 69-year-old white female with metastatic adenocarcinoma, MCF7 cells are a widely used in vitro model for hormone-dependent breast cancer, reflecting the Luminal A subtype. This subtype is characterized by a lower grade and better prognosis compared to more aggressive forms of breast cancer.
In the realm of breast cancer research, MCF 7 cells are instrumental in evaluating the efficacy of breast cancer drugs and understanding the dynamics of breast cancer stem cells. They are central to cancer research, serving as a comparative model against more aggressive cell lines like MDA-MB-231.
The investigation of therapeutic agents, such as tamoxifen and doxorubicin, is critical in drug discovery efforts targeting hormone-dependent breast cancers and gaining insights into the mechanisms of action and resistance. Similarly, the role of estradiol in modulating the growth and characteristics of these cells is a subject of significant interest, given its relevance to hormone-responsive breast cancers.
Research employing the MCF7 breast cancer cell line often delves into the cellular processes of cytotoxicity and apoptosis, especially in response to cancer agents like curcumin, known for its potential in cancer prevention. The study of immune responses, including the action of tumor necrosis factor alpha (TNF alpha) and the impact of bacterial antigens, further enriches our understanding of the tumor microenvironment and potential therapeutic targets.
MCF7 cells are meticulously studied in both 2D cell culture and 3D cell culture systems, including spheroid culture, to mimic tumor microenvironments more closely. These methodologies enable a more profound exploration of cell spheroid growth and the behavior of cancer stem cells within microtissues in scaffold-based systems.
The MCF7 cell line, with its epithelial cell characteristics and resemblance to human adenocarcinoma cells, is a cornerstone of cancer research. It facilitates not only the exploration of breast cancer drugs and their mechanisms but also the broader implications for cancer treatment, including the potential role of mesenchymal stem cells and the efficacy of targeted therapies in vivo studies.

Tissue	Breast
Disease	Adenocarcinoma
Metastatic site	Pleural effusion

Synonyms

- MCF 7
- MCF.7
- MCF7
- Michigan Cancer Foundation-7
- ssMCF-7
- ssMCF7
- MCF7/WT
- MCF7-CTRL
- IBMF-7

CLASSIFICATION

Organism	Human
Sex	Female
Growth properties	Adherent
Biosafety level	1

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CHARACTERISTICS

Morphology	Epithelial-like
Tumourigenic	Yes, in nude mice

Karyotype

The stemline chromosome numbers ranged from hypertriploidy to hypotetraploidy, with the 2S component occurring at 1%. There were 29 to 34 marker chromosomes per S metaphase, 24 to 28 markers occurred in at least 30% of cells, and generally one large submetacentric (M1) and 3 large subtelocentric (M2, M3, and M4) markers were recognizable in over 80% of metaphases. No DM were detected. Chromosome 20 was nullisomic and x was disomic. Phenotype Frequency Product: 0.0154

Doubling time	24 hours

IDENTIFIERS

Citation

MCF-7 (Cytion catalog number 300273)

NCBI TaxID	9606
Cellosaurus	CVCL_0031

EXPRESSION AND SUSCEPTIBILITY

Receptors expressed

The cells express the wildtype and variant estrogen receptors as well as progesterone receptor.

Protein expression

P53 negative, pGP9.5 negative, CEA positive

Isoenzymes

PGM3, 1, PGM1, 1-2, ES-D, 1-2, AK-1, 1, GLO-1, 1-2, G6PD, B,

Oncogenes

Wnt7h +, Tx-4

Mutational profile

TP53 wt

Products

Insulin-like growth factor binding proteins (IGFBP) BP-2, BP-4, BP-5

HANDLING AND CULTURE

Culture medium

EMEM (MEM Eagle), w: 2 mM L-Glutamine, w: 2.2 g/L NaHCO3, w: EBSS (Cytion article number 820100a)

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

Supplements

Supplement the medium with 10% FBS and 1% NEAA

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.

Seeding density	3 x 10^4 cells/cm^2
Fluid renewal	2 to 3 times per week
Post-thaw recovery	Allow the cells to rest for 48 hours past thawing

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	69 years
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

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