P19

400416

GENERAL INFORMATION

Description

The P19 cell line, a type of pluripotent embryonal carcinoma, was initially obtained from a teratocarcinoma in a C3H/He strain mouse. This epithelial-like cell line exhibits the capability to clone at high proficiency when grown in a medium infused with 0.1mM β-mercaptoethanol. A notable feature of P19 cells is their adaptability to differentiate into neuronal and glial cells when exposed to retinoic acid. Simultaneously, they have the potential to transform into cardiac and skeletal muscle when exposed to dimethyl sulfoxide (DMSO). When subjected to both retinoic acid and DMSO, they predominantly show characteristics of retinoic acid-induced differentiation.
The P19 cell line has its origin in the mouse (Mus musculus) and belongs to the broad classification of Eukaryota, Animalia, Metazoa, Chordata, Vertebrata, and Tetrapod. The cells embody the morphology of an epithelial tissue type derived from the embryo and are associated with the disease teratocarcinoma. They are primarily utilized in 3D cell culture applications within the product category of animal cells.
While cancer cells pose a significant health threat due to their rapid and aggressive growth, they also offer an invaluable resource for researchers studying cancer cell development and seeking more targeted treatments. In 1982, the P19 cell line was created when a 7.5-day mouse embryo was transplanted into a testis to induce tumour growth by McBurney and Rogers. They successfully isolated cell cultures from the primary tumour containing undifferentiated stem cells, termed embryonal carcinoma P19 cells. These cells demonstrated rapid growth without the need for feeder cells and were easy to maintain. Subsequent injection into blastocysts of another mouse strain confirmed the multipotency of P19 cells, as tissues from all three germ layers grew in the recipient mouse.
Several subtype cell lines have been derived from the original P19 cells, including P19S18, P19D3, P19RAC65, and P19C16. Each of these subtypes possesses unique differentiation capabilities into neuronal cells or muscle cells when treated with retinoic acid or DMSO, respectively. More recent studies have generated cell lines derived from differentiated P19 cells, which, owing to the pluripotency of P19 cells, can transform into ectoderm, mesoderm, and endoderm-like cells.
P19 cells are known for their sustained growth in serum-supplemented media. Their differentiation can be effectively controlled using nontoxic drugs such as retinoic acid, leading to the development of neurons, astroglia, and microglia. On the other hand, aggregates of P19 cells exposed to DMSO differentiate into endodermal and mesodermal derivatives, including cardiac and skeletal muscle. P19 cells are also amenable to transfection with DNA encoding recombinant genes, and stable lines expressing these genes can be conveniently isolated. This malleability and versatility make P19 cells an excellent resource for exploring the molecular mechanisms that govern the developmental decisions of differentiating pluripotent cells.

Tissue	Testis
Disease	Teratocarcinoma

Synonyms

- P-19

CLASSIFICATION

Organism	Mouse
Sex	Male
Growth properties	Adherent
Biosafety level	1

CHARACTERISTICS

Morphology	Fibroblast-like

Karyotype

N = 40, xY

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IDENTIFIERS

Citation

P19 (Cytion catalog number 400416)

NCBI TaxID	10090
Cellosaurus	CVCL_2153

HANDLING AND CULTURE

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)

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

Supplements

Supplement the medium with 10% FBS

Dissociation reagent	Accutase

Subculturing

Remove medium and rinse the adherent cells using PBS without calcium and magnesium (3-5 ml PBS for T25, 5-10ml for T75 cell culture flasks). Add TrypleExpress (1-2ml per T25, 2.5ml per T75 cell culture flask), the cell sheet must be covered completely. Incubate at 37 degree Celsius for 10 minutes. Carefully resuspend the cells, the addition of medium is optional but not necessary, and dispense into new flasks which contain fresh medium. Do not allow the cells to remain confluent. Subculture at least every 48 hours.

Seeding density	Subculture at least every 48 hours
Fluid renewal	Every 2 days

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.

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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	C3H/He

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.

Disclaimer

Our cells are provided for in vitro laboratory research purposes exclusively and are not intended for clinical or diagnostic use, nor are they to be administered to humans or used for veterinary purposes. Users must adhere to all applicable guidelines and regulations for the handling and use of these cells in a research setting.

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