MDCK (NBL-2)

602280

GENERAL INFORMATION

Description

MDCK (Madin-Darby Canine Kidney) cells serve as a pivotal vitro model in pharmaceutical sciences, particularly in the study of epithelial transport, epithelial permeability, and as a tool for membrane permeability evaluation. These cells, originally derived from renal tubule cells of a canine, exhibit properties akin to enterocytes, making them an excellent absorption screening model and a reliable cell line for evaluating drug transport mechanisms.
MDCK cells are used to explore branching morphogenesis, a process crucial for understanding organ development and cellular differentiation. This capacity for complex organization underscores their relevance in studying epithelial tissue architecture and cellular accumulation.
MDCK cells are well-regarded for their ability to form tight, polarized epithelial layers, making them a valuable model for studying epithelial barrier function and cell polarity, making them an indispensable model for drug carrier systems and the study of intrinsic membrane permeability. The presence of apical membranes and well-defined cell junctions in MDCK cell monolayers facilitates detailed permeability experiments, enhancing our understanding of transepithelial secretion and the transport and metabolic functions inherent to epithelial cells.
In virology, MDCK cells are pivotal for studying human influenza viruses, such as the H3N2 strain, because they express receptors compatible with those viruses. This makes them a key resource for investigating the intricacies of viral infections, examining how epithelial cells react to viral challenges. Their utility extends to evaluating antiviral agents and vaccines, further emphasizing their significance in infectious disease research and therapeutic development.
In summary, MDCK cells are invaluable in pharmaceutical and virological research for their epithelial characteristics, transport studies, and utility in viral infection models, particularly for influenza viruses, making them indispensable in advancing our understanding of drug delivery, epithelial biology, and infectious diseases.

Tissue	Kidney

Synonyms

- MDCK
- NBL-2
- Madin-Darby Canine Kidney
- Madin Darby Canine Kidney

CLASSIFICATION

Organism	Dog
Sex	Female
Growth properties	Adherent
Biosafety level	1

CHARACTERISTICS

Morphology	Epithelial-like
Cell type	Epithelial

IDENTIFIERS

Citation

MDCK (NBL-2) (Cytion catalog number 602280)

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NCBI TaxID	9615
Cellosaurus	CVCL_0422

EXPRESSION AND SUSCEPTIBILITY

Virus susceptibility

Vesicular stomatitis (Indiana), vaccinia, coxsackievirus B5, reovirus 2, 3, adenovirus 4, 5, vesicular exanthema of swine, infectious canine hepatitis

Virus resistance

Poliovirus 2, coxsackievirus B3, B4

Reverse transcriptase	Negative

Products

Keratin

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 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	1 x 10^4 cells/cm^2
Fluid renewal	Every 3 days
Post-thaw recovery	After thawing, plate the cells at 5 x 10^4 cells/cm^2 and allow the cells to recover from the freezing process and to adhere for at least 24 hours.

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	Cocker Spaniel
Donor age	Adult

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