MDBK (NBL-1)

600396

GENERAL INFORMATION

Description

MDBK cells, short for Madin-Darby Bovine Kidney cells (also known as NBL-1), are an exceptional biological resource derived from the kidneys of apparently healthy adult Bos taurus, specifically male individuals. These cells grow adherently and possess an epithelial-like morphology.
One of the remarkable applications of MDBK cells lies in their ability to facilitate in vitro studies on the expression of Eimeria bovis-derived antigens on the host cell surface membrane.
Additionally, MDBK cells have been employed in investigations centred around the ubiquitination and degradation of signal transducer and activator of transcription 1 and 2 (STAT1 and STAT2) by the V proteins of paramyxoviruses, such as simian virus five and human parainfluenza virus type 2.
With an average doubling time ranging from 24 to 35 hours, MDBK cells exhibit a moderate proliferation rate. The establishment of the MDBK cell line dates back to February 18, 1957, when S.H. Madin and N.B. Darby successfully derived it from the kidney of a healthy adult steer. Since then, these cells have become a cornerstone in biological research, enabling numerous breakthroughs in various scientific fields.
The karyotype analysis of MDBK cells reveals a modal chromosome number of 51, indicating a hypodiploid state. Within the cell population, the hypodiploid condition manifests as a stemline chromosome number of 2n = 60, with a 2S component occurring in approximately 5% of the cells. Moreover, 11-14 marker chromosomes are typically present, comprising a combination of metacentric, submetacentric, and acro-telocentric chromosomes. Notably, the x chromosome appears monosomic, while no HSR chromosomes or DM's (double minutes) are observed.
MDBK cells exhibit an array of applications in the realm of biological research. Their utility extends to 3D cell culture, enabling scientists to recreate complex tissue-like structures for advanced studies. Furthermore, MDBK cells are invaluable in high-throughput screening, facilitating the rapid and efficient screening of compounds or agents for various purposes. Additionally, these cells play a crucial role in toxicology studies, essential for evaluating the safety and potential adverse effects of substances on living organisms.
Regarding viral susceptibility, MDBK cells demonstrate receptiveness to several pathogens, including Vesicular stomatitis Orsay (Indiana) virus, infectious bovine rhinotracheitis virus, bovine rhinotracheitis virus, bovine parvovirus, bovine adenovirus 2 and 3, bovine viral diarrhoea virus 1, and parainfluenza three virus. This susceptibility to a diverse range of viruses makes MDBK cells invaluable for investigating viral pathogenesis and evaluating antiviral strategies.

Tissue	Kidney

Synonyms

- MDBK (NBL-1)
- NBL-1
- Madin-Darby Bovine Kidney
- Madin Darby Bovine Kidney

CLASSIFICATION

Organism	Bovine
Sex	Male
Growth properties	Adherent
Biosafety level	1

CHARACTERISTICS

Morphology	Epithelial-like

Cytion GmbH
Nikola-Tesla-Str. 3
69124 Heidelberg
Tel: +49 (0)6221 405780
info@cytion.com
cytion.com

Registered office Heidelberg
VAT ID: DE283292917
Local court Mannheim - HRB 714394
CEO / Geschäftsführer: Jonathan Steubing

Banking information
Sparkasse Heidelberg
IBAN: DE35 6725 0020 0009 2076 86
BIC: SOLADES1HDB

IDENTIFIERS

Citation

MDBK (NBL-1) (Cytion catalog number 600396)

NCBI TaxID	9913
Cellosaurus	CVCL_0421

EXPRESSION AND SUSCEPTIBILITY

Viruses

The line was tested and shown to be free of bovine diarrhoea virus (BVD).

Virus susceptibility

The cells are susceptibled to bovine diarrhea virus, vesicular stomatitis (Indiana strain), infectious bovine rhinotracheitis virus, bovine parvovirus, bovine adenovirus I and III, and parainfluenza virus 3.

Virus resistance

Poliovirus 2

Reverse transcriptase	Negative

Products

Keratin

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	1 x 10^4 cells/cm^2
Fluid renewal	Every 3 days
Post-thaw recovery	Fast

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	Bos taurus
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

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