**Product sheet**

# MDCK (NBL-2) Cells | 602280

## General information

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| **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.<br><br>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.<br><br>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.<br><br>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.<br><br>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. |
| **Organism** | Canine |
| **Tissue** | Kidney |
| **Synonyms** | MDCK, NBL-2, Madin-Darby Canine Kidney, Madin Darby Canine Kidney |

## Characteristics

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| **Age** | Adult |
| **Gender** | Female |
| **Morphology** | Epithelial-like |
| **Cell type** | Epithelial |
| **Growth properties** | Monolayer, adherent |

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## Identifiers / Biosafety / Citation

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| **Citation** | MDCK (NBL-2) (Cytion catalog number 602280) |
| **Biosafety level** | 1 |

## Expression / Mutation

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| **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

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| **Culture Medium** | DMEM:Ham's F12, w: 3.1 g/L Glucose, w: 1.6 mM L-Glutamine, w: 15 mM HEPES, w: 1.0 mM Sodium pyruvate, w: 1.2 g/L NaHCO3 (Cytion article number 820400a) |
| **Medium supplements** | Supplement the medium with 10% FBS |
| **Passaging solution** | 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. |
| **Split ratio** | A seeding density of 10,000 cells/cm2 is recommended If the cells are being split without cell counting, a split ratio of 1:4 is tolerated by the MDCK cells |
| **Seeding density** | 1 x 10^4 cells/cm^2 |

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| **Fluid renewal** | Every 3 days |
| **Freezing 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. |
| **Freeze medium** | CM-1 (Cytion catalog number 800100) or CM-ACF (Cytion catalog number 806100) |
| **Handling of cryopreserved cultures** | 1. Confirm that the vial remains deeply frozen upon delivery, as cells are shipped on dry ice to maintain optimal temperatures during transit.<br>2. 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.<br>3. 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.<br>4. Perform all subsequent steps under sterile conditions in a flow hood, disinfecting the cryovial with 70% ethanol before opening.<br>5. 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.<br>6. Centrifuge the mixture at 300 x g for 3 minutes to separate the cells and carefully discard the supernatant containing residual freezing medium. Optionally, skip centrifugation but remove any remaining freezing medium after 24 hours.<br>7. 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.<br>8. Adhere to established subculture protocols for continued growth and maintenance of the cell line, ensuring reliable experimental outcomes. |

## Quality control / Genetic profile / HLA

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| **Sterility** | Mycoplasma contamination is excluded using both PCR-based assays and luminescence-based mycoplasma detection methods.<br><br>To ensure there is no bacterial, fungal, or yeast contamination, cell cultures are subjected to daily visual inspections. |

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| **STR profile** | **Amelogenin**: X,X |