Product sheet

VSC4.1 Cells | 305887

General information

Description	VSC4.1 is a hybrid motor neuron-like cell line generated by somatic fusion of embryonic rat ventral spinal cord neurons with the mouse neuroblastoma cell line N18TG2. The resulting hybridoma retains morphological and biochemical properties of spinal motor neurons while exhibiting the proliferative capacity conferred by the neuroblastoma partner. VSC4.1 cells grow adherently and display neuron-like morphology with phase-bright cell bodies and extending neurite-like processes under appropriate culture conditions. The line has been widely adopted as an in vitro model of lower motor neurons. Molecular characterization demonstrates that VSC4.1 cells express multiple motor neuron-associated markers, including choline acetyltransferase (ChAT), confirming their cholinergic phenotype. They also express neurofilament proteins and other neuronal cytoskeletal components consistent with differentiated neuronal identity. Under differentiating conditions, such as serum reduction or treatment with cyclic AMP analogs or retinoic acid, VSC4.1 cells exhibit enhanced neurite outgrowth and increased expression of neuronal markers, supporting their utility for studying neuronal differentiation and axonal biology. VSC4.1 cells are extensively used to investigate mechanisms of motor neuron injury and degeneration, including oxidative stress, excitotoxicity, mitochondrial dysfunction, and apoptosis. They serve as a commonly employed in vitro model for amyotrophic lateral sclerosis (ALS)-related research, particularly in studies examining SOD1-associated toxicity, calcium dysregulation, and neuroprotective interventions. The combination of motor neuron-like phenotype and robust in vitro growth makes VSC4.1 a valuable system for mechanistic studies of spinal motor neuron pathology and therapeutic screening.
Organism	Rat
Tissue	Spinal Cord Ventral Horn Motor Neuron
Disease	Hybridoma (rat ventral spinal cord motor neuron × mouse N18TG2 neuroblastoma fusion; motor neuron-like cell line)
Metastatic site	Not applicable (somatic cell fusion hybrid; not a clinical tumor sample)
Applications	Motor neuron biology; ALS/MND research; oxidative stress; excitotoxicity; calcium dysregulation; SOD1 toxicity; ChAT activity; apoptosis; neuroprotection screening; spinal motor neuron degeneration

Characteristics

Ethnicity	Not applicable (rat × mouse hybrid cell line)
Morphology	Bipolar/multipolar neuron-like
Cell type	Hybrid motoneuron

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Growth properties	Adherent

Regulatory Data

Citation	VSC4.1 (Cytion catalog number 305887)
Biosafety level	1
NCBI_TaxID	10116
CellosaurusAccession	CVCL_D630
GMO Status	No genetic modification; somatic cell fusion hybrid (rat spinal cord neurons × N18TG2 neuroblastoma). No introduced transgene.

Biomolecular Data

Handling

Culture Medium	DMEM, w: 4.5 g/L Glucose, w: 4 mM L-Glutamine, w: 3.7 g/L NaHCO3, w: 1.0 mM Sodium pyruvate (Cytion article number 820300a)
Supplements	Supplement the medium with 10% FBS
Dissociation Reagent	Accutase
Doubling time	approx. 24 to 36 hours
Split ratio	1 to 3 (recommended 1:6 to 1:8 per existing protocol)
Seeding density	1 to 3 × 10^4 cells/cm^2
Fluid renewal	2 to 3 times per week
Freeze medium	As a cryopreservation medium, we use complete growth medium + 10% DMSO for adequate post-thaw viability.

Thawing and Culturing Cells	1. Confirm that the vial remains deeply frozen upon delivery, as cells are shipped on dry ice to maintain optimal temperatures during transit. 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. 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. 4. Perform all subsequent steps under sterile conditions in a flow hood, disinfecting the cryovial with 70% ethanol before opening. 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. 6. Centrifuge the mixture at 200 x g for 5 minutes, carefully discard the supernatant containing freezing medium. 7. Follow the procedure described under Post-Thaw Recovery
Incubation Atmosphere	37°C, 5% CO_2, humidified atmosphere.
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.
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.

Quality Control & Molecular Analysis