Product sheet

C2C12 Cells | 400476

General information

Description	The C2C12 cell line, an immortalized mouse myoblast cell line derived from the thigh muscle of a 2-month-old mouse of the C3H mouse strain, is extensively utilized in biomedical research for its unique cell differentiation properties. C2C12 myoblast cells proliferate rapidly and exhibit typical myoblast characteristics under high serum conditions. Upon shifting to low serum conditions or starvation, C2C12 cells initiate myogenic differentiation, transitioning into myotubes, which are precursors to contractile skeletal muscle cells. C2C12 cells incorporate exogenous cDNA and nucleic acids through transfection easily, making them a good choice for gene expression studies and investigations into myoblasts and myotubes differentiation. The differentiation process is marked by the expression of myogenic markers such as Myf5, MyoD, Myogenin, and Mrf4, alongside muscle-specific markers like Csrp3 and Mef2a, which are essential in studying different muscle phenotypes and skeletal muscle regeneration. The unique shape of C2C12 myoblasts and their transformation into myoblast cell rings and subsequently into mature myotubes in serum-supplemented media underscore the dynamic nature of these cells and their potential in skeletal muscle research. Researchers use substrates like gelatin hydrogels for C2C12 cell cultures to simulate in vivo muscle conditions, enabling detailed studies of muscle cell development and extracellular matrix effects. Metabolic profiling reveals key insights into the pathways involved in muscle formation and recovery, focusing on essential proteins and calcium's role in contraction. Gene silencing techniques further illuminate the differentiation process, highlighting the significance of SMAD1 phosphorylation in muscle regeneration, crucial for understanding recovery in muscle wasting and injury. In summary, the C2C12 cell line serves as a critical tool in the realm of biomedical research, offering a versatile platform for exploring the intricacies of muscle formation, differentiation, gene expression, and the profound impact of various factors on the skeletal muscle cell lineage, including the pivotal role of myofilaments, intermediate filament proteins, and the overall organismal context in which these cellular processes unfold.
Organism	Mouse
Tissue	Muscle
Applications	Transfection host
Synonyms	C2c12, C2-C12, C12

Characteristics

Age	2 months
Gender	Female
Morphology	Myoblast-like

Cell type	Myoblast
Growth properties	Adherent

Identifiers / Biosafety / Citation

Citation	C2C12 (Cytion catalog number 400476)
Biosafety level	1

Expression / Mutation

Handling

Culture Medium	RPMI 1640, w: 2.1 mM stable Glutamine, w: 2.0 g/L NaHCO3 (Cytion article number 820700a)
Medium supplements	Supplement the medium with 10% FBS
Passaging solution	Accutase
Doubling time	24 hours
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 split ratio of 1:3 to 1:5 is recommended
Seeding density	1 x 10^4 cells/cm^2 will yield in a confluent layer in about 4 days
Fluid renewal	Every 3 to 5 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	C2C12 cells are shipped in a deep-frozen state on dry ice. Upon receipt, confirm that the vial remains frozen. For storage, place the cryovial immediately at temperatures below -150 degrees. If you plan to culture the cells immediately, swiftly thaw the vial by shaking it in a 37 degrees water bath with clean water and an antimicrobial agent for 40-60 seconds. Remove the vial once a small ice clump persists, ensuring it remains cold. Proceed with all subsequent steps under aseptic conditions. In a sterile flow hood, disinfect the cryovial with 70% ethanol. Then, gently open the vial and transfer the cell suspension into a 15 ml centrifuge tube pre-filled with 8 ml of room temperature culture medium. Gently mix the cells. For cell separation, centrifuge at 300 x g for 3 minutes and dispose of the supernatant. Skipping centrifugation is optional, although any residual freezing medium should be removed after 24 hours. Resuspend the pellet gently in 10 ml of fresh culture medium and divide between two T25 culture flasks. Follow the subculture protocol for subsequent steps.

Quality control / Genetic profile / HLA

Sterility	Mycoplasma contamination is rigorously 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.
STR profile	**M_18-3**: 16 **M_4-2**: 19.3 **M_6-7**: 12 **M_3-2**: 14 **M_19-2**: 12 **M_7-1**: 26 **M_1-1**: 10 **M_8-1**: 17 **M_2-1**: 9 **M_15-3**: 25.3 **M_6-4**: 18 **M_11-2**: 16 **M_1-2**: 16 **M_17-2**: 15 **M_12-1**: 16 **M_5-5**: 15 **M_X-1**: 25,26 **M_13-1**: 17 **Human D4/D8**: -