GM12878

305439

GENERAL INFORMATION

Description

The GM12878 cell line is a well-characterized human lymphoblastoid cell line, transformed with Epstein-Barr virus (EBV). It has been used as a standard Tier 1 cell line in the Encyclopedia of DNA Elements (ENCODE) project, making it one of the most widely studied models for genetic and transcriptomic research. Originating from a female donor, GM12878 is known for its stable karyotype compared to more commonly used cell lines such as HeLa and HEK293, which have extensive chromosomal aneuploidy.
These cells are particularly valuable for understanding chromatin structure, gene regulation, and immune response due to their B-lymphocyte lineage. GM12878 cells have been employed in high-throughput studies, including ChIP-seq analyses to map transcription factor binding sites and histone modifications, MNase-seq for nucleosome mapping, and RNA-seq for transcriptome profiling. Studies involving GM12878 have elucidated aspects of transcription factor interactions, such as the binding of FOXM1 and its co-factors, and their roles in cell cycle and immune response pathways.
Furthermore, GM12878 has served as a platform for genome editing experiments aimed at creating reference materials for next-generation sequencing (NGS) validation. For example, CRISPR/Cas9-mediated genome modifications have been introduced into GM12878 to develop control materials for cancer mutation analysis, illustrating its application in precision medicine and genetic testing.

Tissue	Peripheral blood

Synonyms

- GM-12878

CLASSIFICATION

Organism	Human
Sex	Female
Growth properties	Suspension
Biosafety level	2

CHARACTERISTICS

Morphology	Lymphoblast-like

IDENTIFIERS

Citation

GM12878 (Cytion catalog number 305439)

NCBI TaxID	9606
Cellosaurus	CVCL_7526

EXPRESSION AND SUSCEPTIBILITY

Mutational profile

Mutation: CYP2C19, p.Pro227Pro (c.681G>A)

Viruses

Transformant: Epstein-Barr virus (EBV)

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HANDLING AND CULTURE

Culture medium

RPMI 1640, w: 2.0 mM stable Glutamine, w: 2.0 g/L NaHCO3 (Cytion article number 820700a)

Incubation atmosphere	37°C, 5% CO_2, humidified atmosphere.

Supplements

Supplement the medium with 15% FBS

Subculturing

Maintain cultures by periodically adding or replacing the medium. Initiate cultures with a density of 5 x 10^5 cells/ml and keep the cell concentration within the range of 3 x 10^5 to 1 x 10^6 cells/ml for optimal growth.

Post-thaw recovery	After thawing, allow the cells to recover from the freezing process 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

Donor age	Unspecified

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.

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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