Product sheet

GM12878 Cells | 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.
Organism	Human
Tissue	Peripheral blood
Synonyms	GM-12878

Characteristics

Age	Unspecified
Gender	Female
Morphology	Lymphoblast-like
Growth properties	Suspension

Regulatory Data

Citation	GM12878 (Cytion catalog number 305439)
Biosafety level	2

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NCBI_TaxID	9606
CellosaurusAccession	CVCL_7526

Biomolecular Data

Viruses	Transformant: Epstein-Barr virus (EBV)
Mutational profile	Mutation: CYP2C19, p.Pro227Pro (c.681G>A)

Handling

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

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 300 x g for 3 minutes to separate the cells and carefully discard the supernatant containing residual freezing medium. 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. 8. Adhere to established subculture protocols for continued growth and maintenance of the cell line, ensuring reliable experimental outcomes.
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

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.