HeLa

300194

GENERAL INFORMATION

Description

HeLa cells, derived from the cervical cancer cells of Henrietta Lacks, are an immortal cell line widely employed in biomedical research. The human cell line Hela has significantly contributed to significant research advances and continues to play a pivotal role in laboratories worldwide.
In 1951, Henrietta Lacks, a young mother of five, sought medical attention at The Johns Hopkins Hospital for vaginal bleeding, where Dr. Howard Jones identified a significant malignant tumor on her cervix. At that time, the Johns Hopkins Medicine Institute was among the few institutions offering medical care to impoverished African Americans. Henrietta Lacks underwent radium treatment for her cervical cancer, the leading therapy available then. During her treatment, a biopsy was conducted, and a sample of her cancerous cells was sent to Dr. George Otto Gey's lab. Dr. Gey had been attempting to cultivate cells from cervical cancer patients of diverse backgrounds, but without success until Henrietta's cells, which were the first cells to proliferate continuously, a discovery that set them apart from all previous samples.
Henrietta Lacks' cervical carcinoma was later found to have been caused by the Human papillomavirus (HPV). HPV is a common virus that can lead to cervical cancer among other diseases. Research on HeLa cells has significantly contributed to understanding the role of HPV in cervical cancer, leading to the development of preventive HPV vaccines, which have had a profound impact on reducing the incidence of HPV-related cancers.
These extraordinary cells, termed "HeLa" cells after Henrietta Lacks' initials, have since become instrumental in medical research. They have enabled scientists to investigate cancer cell growth, the impact of various substances, and the workings of viruses, significantly contributing to medical advancements, including the development of vaccines for polio and COVID-19, without the ethical concerns of direct human experimentation.
HeLa cells are widely used for gene function studies, recombinant protein production, and gene therapy due to their high transfection efficiency and susceptibility to viral infections. They are pivotal in researching viral behaviors, including replication and pathogenesis, and have played a key role in Hepatitis B research by expressing viral proteins and aiding in the development of diagnostic tests and vaccines, thereby significantly advancing global health measures.
HeLa cells continue to be an invaluable resource for ongoing research in medicine and science. The significance of HeLa cells and other immortal cell lines cannot be overstated, as they continue to shape the field of medicine and infectious disease research, and they represent a lasting legacy of Henrietta Lacks and her contributions to scientific advancement.

Tissue	Cervix
Disease	Adenocarcinoma

Applications

Transfection host

Synonyms

- HELA
- Hela
- He La
- He-La
- Henrietta Lacks cells
- Helacyton gartleri

CLASSIFICATION

Organism	Human
Sex	Female
Growth properties	Adherent
Biosafety level	1

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CHARACTERISTICS

Morphology	Epithelial-like

Karyotype

The HeLa cell line, with its complex karyotype featuring a high degree of aneuploidy and structural rearrangements, is known for its rapid growth and longevity in culture. HeLa cells typically exhibit 82 chromosomes, although the range can vary from 70 to 164. Notably, 98% of HeLa cells possess a small telocentric chromosome, and 100% exhibit aneuploidy in a substantial number of cells examined. These chromosomal abnormalities underpin their fast growth and immortality, along with their association with cervical cancer and other cancerous cells.

Doubling time	28 to 36 hours

IDENTIFIERS

Citation

HeLa (Cytion catalog number 300194)

NCBI TaxID	9606
Cellosaurus	CVCL_0030

EXPRESSION AND SUSCEPTIBILITY

Isoenzymes

G6PD, A

Virus susceptibility

Human adenovirus 3, Encephalomyocarditis virus, Human poliovirus 1, Human poliovirus 2, Human poliovirus 3

Reverse transcriptase	Negative

Products

Keratin, Lysophosphatidylcholine (lyso-PC) induces AP-1 activity and c-jun N-terminal kinase activity (JNK1) by a protein kinase C-independent pathway

HANDLING AND CULTURE

Culture medium

EMEM (MEM Eagle), w: 2 mM L-Glutamine, w: 2.2 g/L NaHCO3, w: EBSS (Cytion article number 820100a)

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

Supplements

Supplement the medium with 10% FBS and 1% NEAA

Dissociation reagent	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.

Seeding density	1 x 10^4 cells/cm^2
Fluid renewal	2 to 3 times per week

Post-thaw recovery	After thawing, plate the cells at 2 to 3 x 10^4 cells/cm^2 and allow the cells to recover from the freezing process and to adhere for at least 24 to 48 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	30 years
Ethnicity	African American

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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