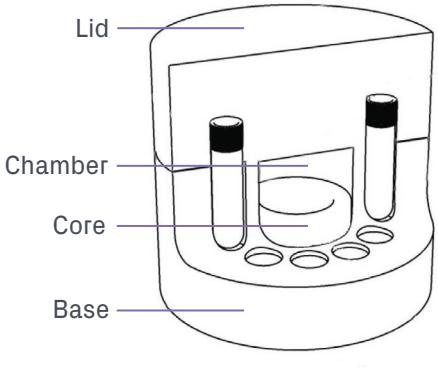
Alcohol-Free Cell Freezing Containers: How it Works

Controlled Rate Alcohol-Free Cell Freezing

Alcohol-free cell freezing containers ensure standardized controlled-rate -1°C/minute cell freezing in a -80°C freezer - without alcohol or fluids. Proven for use with a variety of cell types including stem cells, primary cells, PBMC cell lines, insect cells, yeast and others. The patent-pending alcohol-free cell freezing container technology utilizes a thermo-conductive alloy core and highly-insulative outer material to control the rate of heat removal and provide reproducible cell cryopreservation. The units are easy to use and deliver results comparable to expensive programmable freezers.

How it Works:



Cell Freezing Containers for 12 x 1mL or 2mL Cryo Tubes in combination with a -80°C freezer, will provide the freezing rate of -1°C/minute that is ideal for cryopreservation of most cells and cell lines. Using a combination of uniform-density crosslinked polyethylene foam, a solid state core, and radial vial symmetry, freezing profiles are consistent and reproducible. It is important to fully load the alcohol-free cell freezing containers prior to freezing. Foam is non-absorbent and will impose negligible change in the freezer environment; thereby protecting nearby frozen samples. The low heat content also ensures that Cell Freezing Containers for Cryo Tubes will rapidly return to room temperature when removed from the freezer.

Standardized Biobanking Workflow for Cold Chain Integrity

Biobanks potentially hold the key to the future of breakthroughs in scientific research, drug discovery, and clinical and translational medicine. It is, therefore, no wonder that biobanks are one of the top ten ideas changing the world right now.[1]

Biological material and related data have become an important resource for medical research, and for the industrial development of diagnostics and therapeutics.[2]

Biobank collections can originate from human, animal or plants, be small or large-scale, contain various different sample types such as cells, tissues, blood, cord blood, DNA, etc. and can be from healthy or affected donors.

As a consequence, researchers from all scientific realms are becoming increasingly reliant on biobanks to provide samples. Sometimes diseases are associated with very small changes in the DNA (single-nucleotide polymorphisms), and using reliable samples to study such biomarkers becomes crucial. Without proper protocols and the use of advanced technologies, the integrity and viability of these samples can often be at risk.[3]

Small variations in sample handling and temperature can affect the reproducibility of basic and clinical research, particularly in rapidly advancing fields like cell therapy. Azenta products enable consistent, reproducible and standardized sample handling and temperature through innovative advanced thermal management technologies.

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Controlled-Rate Cell Cryopreservation

Cell cryopreservation is often a challenging and critical step in the biobanking workflow. Azenta's alcohol-free cell freezing containers have become the new standard for passive controlled-rate cell freezing, replacing outdated methods that require isopropanol-filled chambers or cumbersome programmable freezers.

The alcohol-free cell freezing containers deliver results that are similar or better than programmable freezers and IPA containers. They are available in a variety of formats and sizes to complement different workflows and commonly used cryopreservation vessels. Recently, the freezing containers were cited in a publication for cryopreserving biobanked blood in the development of a novel measure of sample quality.[4] The container ensured all blood samples started on an equal footing before being subjected to variable sample handling.

Cell Cryopreservation

Cryopreservation is the use of low temperatures to preserve structurally intact living cells. Cells are cryopreserved to avoid loss by contamination, to minimize genetic change in continuous lines and to avoid transformation in finite lines. Successful cryopreservation of cells depends on optimal freezing conditions, storage, and proper cell thawing techniques. A standardized and reproducible protocol must be followed, although each protocol may require optimization for a given cell type or line, to achieve maximum viability upon thaw. Mammalian cells that are cryopreserved include immortalized cell lines, primary cells isolated from tissues and stem cells. Mammalian cells are best frozen in the presence of a cryopreservant such as DMSO or glycerol, with a freeze rate of 1°C/minute to avoid detrimental ice crystal formation as water within the cell is frozen. Azenta solutions for cell cryopreservation include ice-free cooling workstations for temperature controlled sample preparation, alcohol-free cell freezing containers for reproducible controlled-rate freezing, cryogenic vials and hinged cryoboxes for sample storage.

Cell Freezing

Optimal cell cryopreservation requires a controlled freezing rate of -1°/minute for most types of cells and choosing the right freezing method is crucial. Alcohol-free cell freezing containers provide controlled rate freezing in a -80°C freezer. Current methods that utilize isopropanol-based freezing containers and styrofoam boxes do not provide uniform freezing rates to all vials and/or may not be reproducible. Alcohol-free cell freezing containers provide a cost effective means of reproducibly conducting the cell freezing process in a -80°C freezer or with a portable dry ice temperature stability system. The freezing containers provide uniform, consistent and reproducible cell cryopreservation.

Solution

Alcohol-free cell freezing containers do not require any alcohol or other fluids to control the -1°C/minute freeze rate. Insulative outer materials and inner alloy core, combined with radiallysymmetric vial placement regulate a uniform heat removal rate for all vials. Freeze runs are consistent and highly reproducible.

References

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