

Frost&Sullivan: Biobanking to see a huge surge

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Singapore: Frost and Sullivan has highlighted that the global proliferation of disease-based biobanks has triggered a massive interest in long-term sample storage in clinical research. This has spawned a requirement for good storage practices and standard operating procedures (SOPs).

Biobanks need to carefully evaluate complaint storage, sample shipment and data management procedures during the formulation of a strategic sample management plan. They are acknowledging the need to maintain sample integrity and viability by adopting new storage methodologies and solutions that will guarantee better sample quality to the research community.

Traditional methods of storage include storing samples in laboratory freezers at -20 degrees C, -80 degrees C and liquid nitrogen. These processes are being largely automated with the help of radio frequency identification (RFID) and micro electromechanical systems (MEMS) technologies. However, in recent times, there has been a perceptible shift in preference towards room temperature storage. Vendors such as Biomatrica and IntegenX, are developing reagents to stabilise the DNA and RNA so they last long under ambient temperature. This process effectively eliminates the need for freezer units and extra storage space.

Over time, it becomes difficult for biobanks and biorepositories to track and retrieve samples stored at ultra-low temperatures. Traditional methods of storage involve barcoding microplates, wherein the retrieval of a single sample from a microplate would involve thawing the entire plate, which will affect the freeze-thaw cycles of other samples. Therefore, under the new system, sample storage is carried out in microtubes and individual vials.

Earlier, equipment and robotic arms were designed to handle microplates; now, systems are flexible enough to cherry pick individual microtubes. For instance, TTP LabTech provides high-capacity storage for automated biobanking at -80 degrees C; this system is capable of selecting a sample within 60 seconds. Other notable mentions are Hamilton Storage, which provides a scalable and flexible third-generation automated system for biobanking; and Matrical Bioscience, which provides automated sample storage management and retrieval systems. Most of the storage systems today offer robotic interfaces inside a chilled atmosphere to prevent the disturbance of unused samples.

"Biobanks' interest in dry-state storing and eliminating freeze-thaw cycles has led to the introduction of many patented automated biobanking storage platforms for the samples requiring -20 degrees C and -80 degrees C. These platforms have the facility to store samples in both microplates and micro-tube format," noted Frost & Sullivan healthcare senior research analyst, Mr Divyaa Ravishankar. "They ensure the continuous monitoring of samples even during picking."

"However, many challenges still lie ahead for solution vendors. Given that no two biobanks function similarly, it is tough to generalise a technology platform," said Mr Ravishankar. "A lot of custom work is required to suit the workflow processes of a biobank. At the same time, obtaining funding and ensuring financial maintenance of the biobanking infrastructure will become tougher in the long run."

Biobanking comes with the inherent challenges of continuous monitoring of clinical samples and associated sample information, which requires a highly integrated set up. In addition, an exponential increase in the volume of samples is leading to issues with storage capacity and duration.