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News Release

Market launch of fully-automated cryopreservation system for iPS cells

Taiyo Nippon Sanso Corporation (TNSC; President: Shinji Tanabe) announces the development and market launch of its new CryoLibrary® (CAPS-i3000) fully-automated cryopreservation system featuring technology optimal for cryopreservation of iPS cells.

1. Background of Development

Industrial applications for iPS cells call for technologies enabling highly-efficient, large-volume cryopreservation of high-quality cultured cells. Conventional means of freezing human iPS cells, however, yield post-thaw survival of around only 10%, as a consequence of challenges inherent in freezing such cells along with varying skill levels of lab technicians. Though it is possible to achieve a higher rate of cell survival by gradually freezing cells overnight in a -80°C cryogenic freezer, this technique is not practical for mass automated production.

Accordingly, TNSC has developed technology optimal for cryopreservation of iPS cells on the basis of TNSC-developed technologies such as ultra-low-temperature equipment utilizing liquid nitrogen and fully-automated cryopreservation equipment designed to prevent the possibility of wrong vial selection. Development of the technology represents the culmination of TNSC's joint research with laboratories of the National Center for Child Health and Development under the guidance of Kyoto University's Center for iPS Cell Research and Application (CiRA) involving participation in the Development of Core Technologies for Industrial Applications of Human Stem Cells Project through the Stem Cell Evaluation Technology Research Association (SCETRA) commissioned by the New Energy and Industrial Technology Development Organization (NEDO), an incorporated administrative agency.

2. Overview of the Device

Currently-available CryoLibrary automated cryopreservation systems have gained a solid reputation as safe and secure devices that prevent instances of wrong vial selection thanks to features that include a robotic handling apparatus for automated transfer of specimens to freezing and storage units, and bar code technology for computerized tracking of frozen specimens.

Development of the new cryopreservation system entailed use of a commercially-available cryoprotectant agent, free of animal substances that can be used in regenerative medicine and other such applications in order to bring about a higher rate of frozen iPS cell survival (post-thaw cell viability). .

The new device delivers a higher iPS cell thaw survival rate thanks to its cell-freezing functionality, whereby the unit maintains optimal temperature control of iPS cells using a liquid-nitrogen spray, rather than merely soaking the cells in liquid nitrogen, which enables it to store the cells in a supercooled state while still in liquid form even at sub-freezing point temperatures, before their subsequent release from the supercooled state. This freezing method enables the device to freeze iPS cells in one-fifth the time conventionally required (TNSC comparisons), while raising the cell viability from 50% to over 80%.

These product features enable highly-efficient, mass-volume cryopreservation and yield of increasingly higher quality cultured iPS cells.

3. Future Development

Progress is anticipated in the wake of the current phase of practical iPS cell research toward developing applications in drug discovery screening and other realms in pharmaceuticals in such areas as efficacy assessment and drug safety trials, thereby giving rise to expectations that this could greatly contribute to life sciences and advanced medicine through applications in fields such as regenerative medicine involving transplanting tissues of organs grown from iPS cells.

Safe and reliable iPS cell cryopreservation systems are essential at every stage of that process. Meanwhile, TNSC envisages increasing demand for cell cryopreservation technology, and is accordingly considering potential applications such as those involving 10-year storage of cells used in clinical trials. TNSC has set its sights on achieving total sales of one billion yen by 2016, four years from now.

External view of the CryoLibrary® (CAPS-i3000) fully-automated iPS cell cryopreservation unit