

Singapore

Singapore Tissue Network: Laying the Foundation

It is widely recognized that a key limiting factor in biomedical discovery is the availability of well-characterized tissue samples for analysis. Large-scale national tissue collection and banking have become a necessary infrastructure for success in biomedicine," said Prof Edison Liu, Executive Director of the Singapore Tissue Network (STN).

The STN was launched in March 2002, as an initiative between the Biomedical Research Council and the Ministry of Health. This organization acts as a national repository for tissue, sera and DNA collection. Through collecting, processing, archiving and distributing quality biological samples, the STN supports the conduct of the highest quality translational and population research in Singapore and improves healthcare for mankind.

The samples are processed, stored and archived at STN's 500m², state-of-the-art facility at the Biopolis. This facility has two types of storage; the first is liquid nitrogen storage for cell lines and tissues; and the second is -80°C and -20°C for the storage of DNA, plasma and serum. STN's core team of five staff is able to tap upon a strong supporting infrastructure from a wider network of research institutes in Singapore.

"We have a laboratory information management system (LIMS) that links and tracks all the tissue and DNA samples. Kits used for sample collection are pre-bar coded preventing human transcription error often seen in sample labeling. The whole process is tracked from the time the kits go out for collection, through DNA extraction and laboratory processes until the time of distribution. Because of this, we can see at any time which process a certain sample is at with corresponding quality control data records. The records of the entire inventory of tissue and DNA samples are also updated real time by the LIMS system," said Theresa Chow, Deputy Director of the STN.

The STN provides the resources and know-how to harmonize the tissue collection process. This is done under best-practice international standards and follows stringent regulatory guidelines. Researchers have to apply to a Steering Committee for the use of samples, and have to demonstrate that the study has been approved by an Ethics Review Committee. It also handles the complex issue of patient confidentiality, through using a trusted third party system.

"The STN seeks to put an operational and ethical framework around the collection of tissue on a national scale," said Prof Liu. "We need to provide the most innovative systems for data security through the introduction of a Trusted Third Party system which holds the identity of the contributing donor. This is essential as we move into population and clinical studies where information security and privacy is of great importance. Samples that are sent out from the STN to the researchers contain medical information with a coded reference sample number. Patient identity is never revealed to the researchers. Few such systems are in place around the world."

The STN works together with the medical and research community by collecting, processing or dispensing tissue samples for specific research projects. One such project is with the National Cancer Center (NCC) and the National University Hospital (NUH), to collect cancerous tissues and non-cancerous control tissues. These are generally tissues which have been removed from diagnostic or therapeutic purposes and would otherwise be discarded. Another is the long-term Twin registry project, where investigators try to decipher whether genes are involved in the susceptibility to particular diseases. The STN will also be collecting samples for the Singapore Prospective Program. Blood samples will be collected from a large number of Singaporeans to look for the development of diseases such as diabetes, high blood pressure or heart diseases.

“What might be the fruits of the STN?” asked Prof Liu. “First, the STN will provide better medical knowledge of who we are as a country that can be converted into advanced medical delivery and medical care. Secondly, the STN will assist Singaporean scientists make faster medical discoveries that can support the development of Singapore’s Biomedical Sciences initiative. And finally, the STN will distinguish Singapore as a leader in the new biology of integrative sciences. In all cases, Singaporeans will benefit in health, recognition, and jobs.”