Introduction

The conduct of state-of-the-art translational research, using new developments in molecular biology, genomics, proteomics, nanotechnology, and information technology, requires validation of experimental models using human materials. A centralized Biosample Repository for cancer research will help accomplish the HCRI mission to combat cancer and serve as a platform for active interchange of ideas, expertise and resources between basic or translational researchers and clinicians during collaborative studies. The samples at the HCRI Biosample Repository may be used for research including, but not limited to: isolation of nucleic acid (RNA, DNA), analysis of gene and/or protein expression, generation of primary cell lines, and construction of tissue microarrays. Because research will be conducted in the future, it is not presently possible to identify all potential uses of banked tissue. Quality management at the Biosample Repository will ensure that properly preserved and annotated specimens are available for study as new research ideas and measurement technologies emerge.

Specific aims

- Provide centralized and uniform collection, processing, and storage of tissues and fluids (blood, urine, saliva, ascites)
- Maintain a de-identified database of clinical information relevant to the samples
- Make samples available to HCRI investigators (with IRB approval for individual use projects) to examine relevant properties at the molecular, cellular and tissue level
- Provide tissue related service in cancer research

1. Tissue and cell repository

The main storage for fresh specimens at our repository is 2 MVE 815P-190 High Efficiency liquid nitrogen freezers, holding up to 31200 specimens, equipped with MVE TEC3000 controller and sensaphone 400 for automatic refill, and full time live monitoring via internet and telephone. Additional equipment for the repository includes a -80 freezer and CryoMed controlled-rate freezer from Thermo scientific. The later is applied when we need to maximize the tissue/cell viability after the storage phase.

2. Tissue microarray (TMA) construction

The advantage of TMA includes: Higher throughput staining; economizes use of reagents; expands tissue use; uniform reaction conditions; built-in controls; facilitates data recording and linking to clinical data.

3. Histopathology

The core provides access to basic histo-technological equipment: cryostat, semi-automatic tissue processor, embedding center, manual rotatory microtome, microscope with camera. Everything you may need from the moment a tissue is removed to histopathological image acquisition. Routine H&E staining and immunohistochemistry are provided in collaboration with NDIIF; in situ hybridization, DNA, RNA and protein extraction from tissues or cells, and cancer pathology consultation are provided to individual projects through the Biorepository.

4. Laser Capture Microdissection (LCM)

Do you worry about the fact that your DNA or RNA samples from a cancer tissue specimen may actually be contaminated by those from adjacent or interwoven non-cancerous cells? LCM is your solution. Our latest model of laser capture microdissection equipment Arcturus XT is versatile in accurate sampling from tissue slides and even live cell culture petri dishes. Both traditional IR laser capture dissection and UV cutting can be performed on this system. Stained, unstained (via phase contrast) and even fluorescent stained specimens can all be accommodated.

5. Whole slide scanning

Digital pathology in cancer research is already a reality. With whole slide scanning, you may:
1) Archive your slides in digital format. Save hours of time by not having to take photomicrographs of your slides with a digital camera. 2) Produce publication quality bright field images any time at any magnification up to 40X. 3) Hold digital slide conferencing with colleagues via Web-based Spectrum plus and Aperio ImageScope. 4) Image analysis in your preferred software with exported files.

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