NorthShore University HealthSystem

COMPREHENSIVE PROSTATE CANCER CENTER

The Role of Molecular Diagnostics in the Treatment of Prostate Cancer

What is Molecular Diagnostics?

Before molecular diagnostics, clinicians categorized cancer cells according to their pathology, that is, according to their appearance under a microscope.

Borrowing from two new disciplines, genomics and proteomics, molecular diagnostics categorizes cancer using DNA, RNA, and proteins. Genomics is the study of all the genes in a cell or organism, while proteomics is the study of all the proteins. Molecular diagnostics detects changes in these genes and proteins and their functions in a cell, and provides clues to the differences between tumor and normal cells. These differences may allow laboratory scientists to detect cancer earlier, or better understand how tumors will behave or respond to treatment.

What is a sample bank?

Cancer research requires that scientists have access to samples of tissue, blood, or urine. These samples are extremely valuable for validating new diagnostic tests, studying cellular changes that may cause cancer, and identifying potential new targets for cancer treatment. Sample repositories have been developed to provide these valuable samples and thus speed the process of doing research studies. These samples are generally stored frozen at ultra-low temperatures, and can be accessed by those researchers whose projects have been approved by the appropriate review boards. Samples are also generally linked to clinical data, such as diagnosis, treatment, and results (such as tumor progression or remission) so that researchers can fully assess the results of their studies. All data are de-identified, and no identifiable personal medical information is included, so that participants' privacy can be fully protected.

How do I participate in a sample bank

Participation in a sample bank is offered prior to surgery or other treatment for your cancer; participation is entirely voluntary and is only done with your signed consent.

Will participation alter my treatment

Banking of your samples (such as tissue or blood) will not alter your treatment. Left over portions of tissue not needed for making a diagnosis are utilized. Information gained by researchers will be part of a clinical research study, and thus will not impact your treatment directly. Instead, these studies are done in an effort to improve the diagnosis and treatment of cancer patients in general.

What are biomarkers?

Biomarkers are molecules that can be detected in blood, urine, tissue, or other samples that can be indicative of cancer. Ideally, biomarkers will be present in easily obtainable samples such as blood or urine, and can be used to determine when more invasive procedures (such as a tissue biopsy) are needed. Prostate Specific Antigen (PSA) is one example of a biomarker that has been utilized to screen patients for possible prostate cancer.

Why do we need biomarkers?

Our laboratory is interested in identifying new biomarkers that may be more specific for prostate cancer than PSA, or that might tell us more about the potential for a cancer to progress and spread. Many biomarkers, including PSA, are not specific for cancer and can be elevated by other diseases involving the prostate gland, or by increasing age. PSA itself also provides little information regarding the aggressiveness of a patient's cancer, though various combinations of PSA and other markers or measurements can be helpful. However, there remains a significant clinical need for new biomarkers that would be more sensitive, more specific, and more predictive of the presence and clinical course of prostate cancer.

How are biomarkers tested?

Promising biomarkers are identified by a variety of methods, generally identifying proteins or genetic markers that are uniquely expressed by tumors. Once specificity for tumor tissue is confirmed, the markers then can be tested in other samples as appropriate, such as blood or urine. Such studies are greatly aided by the presence of established sample banks so that researchers can quickly obtain a sufficient number of high-quality, well characterized samples; otherwise, the clinical testing of new biomarkers could take many years to complete due to the lack of clinical samples. Sample banks, such as the one at NorthShore University HealthSystem, utilize leftover samples of tissue, blood, or urine from patients who give their consent to allow researchers to study these materials.

Will new biomarkers be useful clinically?

Eventually, the goal of such studies is to improve patient care, including diagnosis, treatment and monitoring through the use of new and better biomarkers.

How can I enroll to participate?

Your physician or surgeon may suggest that you consider permitting use of left over samples, such as tissue or blood, for future research studies.