PRECISION MEDICINE

Precision medicine is an emerging field in cancer treatment. The goal of precision medicine is to identify specific treatments that may be more beneficial for a specific patient or type of tumor by analyzing the tumor's biological makeup (genes and proteins within the tumor).

Treating pancreatic cancer can be challenging. A treatment that works well for one person may not work as well for a different person. Many factors influence a person's response to treatment, including age, type of pancreatic cancer, stage of diagnosis, and the tumor's biological makeup.

All pancreatic cancers are different. Research has shown that different changes in cancer cells (genetic mutations or proteins) play a role in the development and spread of cancers. Precision medicine allows researchers to analyze the biological makeup of tumors to better understand how those differences influence how tumors work and how to prevent them from growing.

Cancer begins within one cell in the body. Every cell in the body has genes and proteins that provide the instructions necessary for the proper function of that cell. They are responsible for telling cells to grow, to divide or to stop growing. If a cell has genetic mutations (damage to genes) or altered proteins, the cell may not work properly, allowing it to grow uncontrollably and form a tumor.

Genetic mutations in cells happen two different ways: a mutation may be inherited from a person's parent (known as a germline mutation) or it may be acquired during a person's lifetime (known as a somatic mutation). Most cancers arise from an accumulation of somatic mutations. These mutations may result from exposure to cancer causing agents that people may encounter in their environment or from random errors that occur during normal cell growth and division. Therefore, these mutations can spontaneously arise in any cell in the body, including cells in the pancreas. These are known as tumor-specific mutations. Tumor-specific mutations contribute to the growth and survival of cancer cells.

CURRENT STATE OF PRECISION MEDICINE

Discovery of certain genetic mutations has already shown to be beneficial when choosing treatments for people with breast, lung, colon and other cancers. In pancreatic cancer, studies have shown that people with certain germline (inherited) mutations may respond better to specific cancer treatments.

Drugs that target tumor-specific genetic mutations and proteins, called targeted therapy, are being studied in clinical trials. Targeted therapies target unique aspects of cancer cells, and only tumors with that specific mutation or protein are likely to respond. To determine if a certain targeted therapy drug is effective, the tumor being treated must have that specific mutation. To identify if a tumor has a specific mutation, a tissue sample from the tumor is collected through a biopsy, and an analysis of the tissue is performed. This process is known as “molecular profiling.”

HOW DOES MOLECULAR PROFILING WORK?

Molecular profiling may identify genetic mutations and protein changes in tumors. If a treatment option that targets those mutations or changes exists, knowing the mutations in a patient’s tumor may help select treatment options that might otherwise not have been explored. **As every pancreatic tumor is different, the Pancreatic Cancer Action Network strongly recommends molecular profiling of your tumor to determine the best treatment options.**

The process to test for germline (inherited) mutations is different than the process used to test for somatic (acquired) tumor-specific mutations. Only about 5 to 10 percent of cancers involve germline (inherited) mutations. To test for inherited mutations, people can undergo genetic testing by analyzing blood, saliva and/or tissue samples. Most tumors, however, are caused by somatic (acquired) mutations. In these tumors, somatic mutations are likely responsible for how a tumor behaves or responds to treatment. Identifying these mutations in order to customize treatment is the main principle of precision therapy. In order to determine which mutations are driving the development and growth of a tumor, a sample of the tumor must go through genetic analysis.

While this is a promising field, there isn’t enough information available to find all of the genetic mutations that may play a role in cancer development or response to treatment. Additionally, while a mutation may be identified, drugs that target that specific mutation may not be available yet.

THINGS TO CONSIDER

The use of precision medicine through genetic testing and tumor analysis can be time consuming and costly, and might not yield any information that doctors can use to target or treat the cancer. Talk to your doctor to determine if precision medicine is right for you.

THE FUTURE OF PRECISION MEDICINE

The increased understanding of the role that a tumor’s biological makeup plays in its response to treatment has highlighted the importance of learning more about the mutations and proteins that are involved in the development and survival of pancreatic tumors. There isn’t currently enough information to determine all of the genetic mutations or proteins that may play a role in pancreatic cancer development or its response to treatment. Precision medicine research is still in early stages, and it may take many years before identifying all relevant mutations or developing drugs that target the mutations that are already known. Research in this area is critical.

In the meantime, most patients will continue to receive standard treatments for their cancer, such as chemotherapy or radiation. However, as doctors learn more about the role of genetics and precision medicine, this may become part of routine medical care for patients with pancreatic cancer.

PRECISION MEDICINE COMPANIES

Please see below for information on some of the private companies that we are aware of, which offer personalized medicine services for pancreatic cancer. Please note that the Pancreatic Cancer Action Network does not recommend or endorse any of the companies or services below. Also, please note that this is not a comprehensive list. Precision medicine services may also be available at hospitals or medical institutions near you. Please speak with your healthcare team to determine which service is most appropriate for you.

Company Name	Information	Approximate Cost	Approximate Time to Complete	Sample Accepted	Financial Assistance for Eligible Patients	Used in Know Your Tumor®
Caris Life Sciences www.carislifesciences.com 866.771.8946	Testing lab that analyzes tumor tissue and provides report with results.	Varies, depending on the analysis requested.	10 business days from tissue acquisition.	Surgical resection, core biopsy.	Yes	No
Foundation Medicine www.foundationone.com 888.988.3639	Testing lab that analyzes tumor tissue and provides report with results.	$5,800	21 days from tissue acquisition.	Surgical resection, core biopsy, or fine needle aspiration	Yes	Yes
NeoGenomics www.neogenomics.com 866.776.5907	Testing lab that analyzes tumor tissue and provides report with results.	Varies, depending on the analysis requested.	Varies	Surgical resection, core biopsy.	Yes	Yes
Personal Genome Diagnostics www.personalgenome.com 443.602.8833	Testing lab that analyzes tumor tissue and provides report with results.	$15,000	12 weeks	Blood sample, 100mg tumor tissue	Contact for more information.	No
Perthera www.perthera.com 877.827.7893	Private company that coordinates molecular profiling with testing labs and the patient's healthcare team, provides personalized report with findings.	$5,000 to cover logistics; does not include molecular profiling analyses	About 30 days from tissue acquisition.	Surgical resection, core biopsy, or fine needle aspiration	Yes	Yes

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