

The Australian Pancreatic Cancer Genome Initiative (APGI) Project Update 2018

Overview

All cancer is caused by genetic change; some of that genetic change is inherited, but most genetic damage that causes change occurs in cells as we go through life. A particular genetic change will affect the wrong gene in the wrong cell and that will push that cell along a path to cancer. Here at the APGI we are studying the genetic changes in cancer to learn about the reasons people develop Pancreatic Cancers, and particularly, how they may best be treated. This type of work is known as “genomics”. More specifically, we want to understand how patients may respond to different treatments and how the unique genetic makeup we are born with influences the risk of developing pancreatic cancer.

The APGI Mission

The APGI (www.pancreaticcancer.net.au) brings together the expertise of Pancreatic Cancer scientists and healthcare professionals across Australia, and is dedicated to accelerating the translation of scientific discoveries to improve outcomes for patients. The APGI has mapped the genetic underpinnings of Pancreatic Cancer in a landmark effort as part of Australia’s contribution to the International Cancer Genome Consortium (ICGC, www.icgc.org). Through this work of studying more than 700 Pancreatic patients in Australia we have shown that Pancreatic Cancer is a complex disease and is comprised of many subtypes with potential differences that may influence treatment.

Research Progress

Enabled by the funding from Avner’s Foundation over the last 3 years, we are looking closer at these subtypes of Pancreatic Cancer, and analysing further their genetics in an effort to understand the effects of specific genetic events on clinical outcomes. Secondly, we are enabling other research studies to address key outstanding questions in Pancreatic Cancer by providing access to high quality biospecimens coupled with clinical and genomic data. This is important as it means that researchers who want to test an early idea, or investigate if a particular genetic change they see in another cancer is present in Pancreatic Cancer, they can do so without having to invest years of work and resources into a project. To put this into perspective, amassing large numbers of patient’s tumours and studying their genomes typically takes 10 years or more to complete, and millions of dollars in funding.

Here at the APGI we have several flagship studies underway. These studies represent pivotal outstanding challenges remaining to be addressed; unanswered questions that are vital in our quest to defeat Pancreatic Cancer.

Examples of these studies are:

1. Investigating a cohort of **Long Term Survivors in Pancreatic Cancer**. Specifically looking at patients who have survived more than 5 years after surgery for Pancreatic Cancer. We are interested in the genetic make-up of these tumours and how they may be different to tumours where patients don't survive long term. In collaboration with colleagues at Memorial Sloan Kettering Cancer Centre in the USA we are looking specifically at the immune system in long term survivors, as early evidence tells us that these patients have unique qualities which contribute to longer survival.
2. Development of a new approach to **identify treatment-resistant regions within Pancreatic Cancer tumours** using world first imaging techniques. This resulted in an important publication recently (Vennin C *et al* 2017).
3. Understanding the **transition from pre-malignant tumours to invasive cancers**. This is being done by employing next generation sequencing techniques (whole genome sequencing) and defining changes between pre-malignant tumours and matched invasive cancers, and relating these to clinical data.

The Avner Pancreatic Cancer Foundation BioResource

We are enabling research all over the world through access to our world class APCF BioResource. We have supported over 36 projects gain access to research material such as tissue samples, data such as genetic and clinical data, scientific expertise through our wealth of experienced scientists. These projects are focused on a broad range of key research questions in Pancreatic Cancer. Examples such as investigating mistakes in our inherited material which puts us at risk of cancer, how our immune system responds and potentially evades cancer, looking at how to slow a cell that is genetically predisposed to cancer from actually progressing to cancer, and the way populations of cancer cells change as they develop. These are cutting edge research questions challenging us globally, and the APGI is a unique resource facilitating these collaborative studies.