

Pancreatic Cancer

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The pancreas is an eggplant-shaped gland about 20 cm long located behind the stomach and sits close to the first section of the small intestine, known as the duodenum. The pancreas is an organ of the digestive system and has both exocrine and endocrine functions:

1. The endocrine cells of the pancreas, the Islets of Langerhans (pictured above), are responsible for the production and secretion of the hormones, insulin and glucagon. These hormones regulate blood sugar levels.
2. The exocrine cells of the pancreas, the acinar cells, secrete pancreatic juice into the duodenum. Pancreatic juice contains digestive enzymes that help digest food, particularly protein.

Pancreatic cancer is an abnormal uncontrolled growth of cells in the pancreas. The cancer begins in the pancreatic ducts and spreads into the body of the pancreas. The surrounding nerves and blood vessels may also be infiltrated with cancerous cells. The cancer can spread to other organs via the lymphatic system.

Pancreatic cancer is often referred to as a 'silent disease' as it is frequently diagnosed in the later stages of growth. This is because the pancreas is located behind the stomach and the cancer can remain undetected until it grows large enough to affect nearby organs. Treatments and survival rates for pancreatic cancer have not changed for almost 50 years. Prognosis is poor for patients with pancreatic cancer.

What are the causes and symptoms?

Unfortunately little is known about the causes of pancreatic cancer, so it can be difficult to explain why some people develop the disease and others don't. Pancreatic cancer is fundamentally a genetic disease. It can be caused by mutations or changes in a person's DNA. These mutations may be due to inheriting a faulty gene or these changes can be acquired as we age.

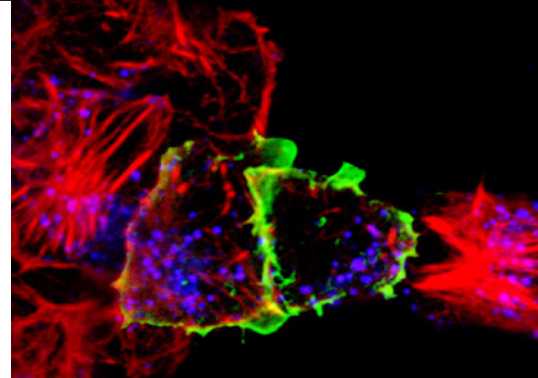
Early stages of pancreatic cancer often remain undetected due to lack of significant signs or symptoms. Symptoms are often not noticed until the cancer is large enough to affect nearby organs.

Some earlier signs and symptoms associated with pancreatic cancer include:

- pain in the upper abdomen
- loss of appetite and weight loss
- nausea and vomiting
- change in bowel motions - either diarrhoea or severe constipation
- yellowish skin and eyes, and dark urine, which are caused by a condition known as jaundice, which occurs when the tumour blocks the bile duct into the digestive system.

What are the risk factors?

- Age: 80% of cases are diagnosed in people over 60. Pancreatic cancer is uncommon in people under 40
- Smoking: doubles your risk
- Chronic pancreatitis: long-term inflammation of the pancreas can increase your risk 5-fold
- Diabetes: the association between pancreatic cancer and diabetes is not well understood. It is possible that the cancer causes some cases of diabetes, rather than diabetes causing the cancer
- Genetics: there may be a genetic link in up to 1 in 10 cases of pancreatic cancer. A number of gene mutations can increase your risk: Breast cancer gene 2 (BRAC2), Peutz-Jeghers Syndrome, Familial Atypical Mole Melanoma (FAMM), Hereditary Non-Polyposis Colorectal Cancer (HNPCC) and Familial Adenomatous Polyposis (FAP)
- Other minor risk factors may include a diet with a high intake of red meat and/or saturated fat, and a reduced intake of fruits and vegetables; and frequent exposure to certain pesticides and petroleum products



Insulin

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Treatment options for pancreatic cancer

Treatment options for pancreatic cancer patients differ from patient to patient, and are based on several factors, including stage and location of cancer, the age of the patient and general health. Advanced pancreatic cancer can only rarely be treated with the aim of curing the cancer. However, a combination of therapies can be used to prevent the tumour from spreading, to relieve symptoms and to maintain a better quality of life.

There are several treatment options for pancreatic cancer, including surgery, endoscopic treatment, radiotherapy and chemotherapy.

- **Surgery** - The most common surgical procedure is the ‘Whipple Procedure’. In this procedure, the head of the pancreas is removed, along with some part of the duodenum, gall bladder and bile duct. Enough of the pancreas is left to maintain some function. Surgery can also involve the removal of the head and tail of the pancreas, or complete removal of the pancreas
- **Endoscopic treatment** - If the tumour is blocking the bile duct, a stent may be inserted to allow bile to drain from the liver
- **Radiation therapy** - Radiation therapy uses high-energy x-rays which shrink or destroy cancer cells in the tumour. This therapy may be used to treat cancer that has not spread but cannot be removed with surgery. It may also be used to relieve symptoms. The most common form used to treat pancreatic cancer is external beam radiation therapy
- **Chemotherapy** - Chemotherapy, often used in combination with radiotherapy, involves the use of anti-cancer drugs to prevent the cancer cells from dividing

What research is Garvan doing in this area?

Established in 2008, the International Cancer Genome Consortium (ICGC) brings together leading cancer researchers across the world, through 11 funding organisations in 12 countries, and aims to catalogue the genetic changes of the 50 most common cancers. The Garvan is making a substantial contribution to the ICGC by tackling pancreatic cancer.

The Australian Pancreatic Cancer Genome Initiative (APGI) is the Australian arm of the international consortium. Together with collaborators from the Institute of Molecular Biosciences in Brisbane, and other specialists, Garvan researchers are looking to examine genes from 400 pancreatic tumour samples with the aim of determining the exact genetic aberrations in each tumour. This information will help us determine why some drug treatments work and why others do not, and will help researchers to design new drug therapies to specifically target the genetic aberrations in each tumour.

The information from this study, and in all of the ICGC projects, will be made freely available on the internet and will help the development of new diagnostic tools and targeted therapies for pancreatic cancer patients.

Further sources of information

Australian Pancreatic Cancer Genome Initiative	www.pancreaticcancer.net.au
Cancer Institute of NSW	www.cancerinstitute.org.au
The Cancer Council NSW	www.cancercouncil.com.au

Garvan Institute of Medical Research – how you can get involved

The Garvan Institute of Medical Research was founded in 1963. Initially a research department of St Vincent’s Hospital in Sydney, it is now one of Australia’s largest medical research institutions with approximately 500 scientists, students and support staff. Garvan’s main research programs are: Cancer, Diabetes & Obesity, Immunology, Osteoporosis & Bone Biology, and Neuroscience.

Your support makes it possible for the Garvan scientists to continue their great work. You can help by making a donation or a bequest, holding a community fundraiser or volunteering your time for Garvan. For details on how to get involved, please visit www.giving.garvan.org.au or contact the Garvan Research Foundation on (02) 9295 8110.

Education is one of Garvan’s top priorities. Our Public Engagement Coordinator (PEC) can visit your community group or school to give a talk on a number of science and health related topics. Garvan also offers regular tours of our facilities. For further details, visit our website or call our PEC on (02) 9295 8108.

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