MOUNT SINAI HOSPITAL
Joseph and Wolf Lebovic Health Complex
Zane Cohen Centre for Digestive Diseases

NETWORK
Ontario Pancreas Cancer Study

Volume 5 Summer 2010

ONTARIO PANCREAS CANCER STUDY UPDATE

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The Ontario Pancreas Cancer Study (OPCS) is being conducted to study causes of pancreas cancer, including genetic, environmental, and lifestyle factors, as well as what treatments are available to patients with this disease. The results from this study will help us better understand the risk factors, patterns of inheritance, and identify possible genetic and biochemical markers for pancreas cancer. In addition, we are interested in testing pancreas cancer screening techniques with the hope that, in the future, this disease may be detected at an early stage.

We identify patients from pathology reports received from the Ontario Cancer Registry or from clinics at Princess Margaret Hospital and the Toronto General Hospital, and contact these people with permission of their physician. We invite all patients with pancreas cancer even though many patients will have no other cases of cancer in the family.

The first stage of the study involves obtaining information about family history, treatment, and personal history/lifestyle from a questionnaire package that is mailed to patients. The second stage of the study involves collecting blood (or saliva), medical records, and any available tissue samples from previous surgeries. These samples will be used to investigate potential sources of genetic risk of pancreas cancer. Genetic counselling is available to every participant. If there is a family history of cancer, genetic counsellors can provide information and make referrals for further genetic assessment when appropriate.

The Ontario Pancreas Cancer Study team greatly acknowledges and appreciates the participation of everyone involved.

If you have any questions regarding the newsletter or would like to be involved with our research, please do not hesitate to contact us. You can also call our toll free number and leave a message. I will be happy to hear from you and answer your questions.

PANCREAS CANCER SCREENING STUDY

As for other types of cancers, early detection is associated with a better prognosis or outcome. Unfortunately, the majority of pancreas cancer cases are diagnosed at late stages. This is mainly because of the lack of symptoms or very non-specific symptoms. A number of American and European research groups have been studying various screening tools for detecting early stage pancreatic cancer, but there currently are no proven clinical screening recommendations.

The pancreas cancer screening program at Mount Sinai Hospital and the University Health Network in Toronto began in 2003. Our initial goal was to determine the effectiveness of MRI (magnetic resonance imaging) and abdominal ultrasound for early detection of pancreatic cancer. We are looking specifically for the most common type of pancreatic cancer, called adenocarcinoma. As of January 2009, we discontinued the use of abdominal ultrasound. This decision was based on our findings that abdominal ultrasound did not detect potentially important pancreas lesions (abnormal changes) that were identified on MRI.

To date, we have enrolled approximately 260 subjects from various high risk families. As of April 2010, we have identified two cases of pancreatic adenocarcinoma in families with more than one previous case of pancreas cancer. Other cancer types that have been found during the study include a pancreatic neuroendocrine tumour, an ovarian cancer, a stomach tumour, and three kidney cancers.

New enrollment is now closed. For more information about the pancreas cancer screening study, please e-mail fgicr@mtsinai.on.ca or call toll free at **1-877-586-1559**.

A generous donation was made by Pancreatic Cancer Canada to the Princess Margaret Hospital Foundation to support our continued research in the early detection of pancreatic cancer. For more information about the Pancreatic Cancer Canada foundation, please see the article on page 2 or go to **www.pancreaticcancercanada.ca**.

PANCREATIC CANCER CANADA

Laurie Ellies
Director, Pancreatic Cancer Canada

Pancreatic Cancer Canada is a national volunteer association dedicated to raising awareness of pancreatic cancer, while supporting innovative research into early detection methods. We provide Canadians with the best available information on the disease while offering a supportive forum for the exchange of thoughts and experiences. We are proud to be Canada's only foundation fighting for this cause! We encourage Canadians to make a difference through fundraising, advocacy and volunteering.

Through our fundraising arm, the *Dick Aldridge Pancreatic Cancer Foundation*, we have raised over $350,000 in support of early detection. The leading beneficiary of our fundraising efforts to date has been the Pancreas Cancer Screening Study at Toronto's Mount Sinai Hospital and Princess Margaret Hospital. It is our hope that information from this study will lead to the development of cost-effective screening tests that will enable doctors to diagnose this disease at an earlier and more treatable stage. For more information, please go to **www.pancreaticcancercanada.ca**.

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PANCREATIC CANCER – DOES IT RUN IN YOUR FAMILY?

We suspect that pancreatic cancer is strongly hereditary (passed on) in about 5-10% of patients. It is more likely to be hereditary in families where multiple relatives have had pancreatic cancer, in patients who are diagnosed at young ages, or in families where there is a strong family history of certain types of cancer.

Our registry is collaborating with several other pancreatic cancer registries in North America on a genetic study called PACGENE (Pancreatic Cancer Genetic Epidemiology).

The other registries include:

- Mayo Clinic (Rochester, Minnesota)
- Johns Hopkins University (Baltimore, Maryland)
- Karmanos Cancer Institute (Detroit, Michigan)
- MD Anderson Cancer Center (Houston, Texas)
- Dana-Farber Cancer Institute (Boston, Massachusetts)

The goal of this study is to learn about the causes of pancreatic cancer - both genetic and environmental. This information will be used to help develop better prevention strategies, and will provide information needed to better understand the biology of pancreas cancer and its effective treatment. As of April 2010, our centre has enrolled approximately 300 families across Canada for this research and recruitment continues.

How Can My Family Participate?
Any family with two or more biologically related family members diagnosed with pancreatic cancer is welcome to contact our registry. We recruit families where the cases of pancreatic cancer are living and/or deceased.

What Does Participation Involve?
All participants are asked to complete questionnaires asking about lifestyle and various environmental risk factors, in addition to the family history of cancer. We also ask participants to provide a blood or saliva sample and/or permission for us to obtain a stored tissue sample (from previous surgical procedures) for genetic studies. The most helpful samples for genetic studies are from relatives who have the disease. We obtain the medical records (where possible) for each diagnosis of cancer in the family. We are interested in enrolling both patients with the disease as well as their healthy relatives. All participants have an opportunity to speak with a genetic counsellor about their family history and details of the research. Participation in this study does not require a trip to Toronto. All of your information will remain confidential.

CONTROLS NEEDED!!
We are currently interested in recruiting controls for PACGENE. A control is defined as someone who is not blood-related to the pancreas cancer patient or to their other family members. There may be more than one married-in/unrelated control per family who could be eligible to participate (e.g., spouse, in-law). Controls cannot have a personal history of cancer (except non-melanoma skin cancer).

The purpose of control recruitment is to be able to compare information collected from people diagnosed with pancreas cancer with a control group that has not been diagnosed with cancer. The information gathered from this study may be helpful in the diagnosis and treatment of future patients with this disease. The genetic material (e.g., from blood or saliva samples) obtained from this study may be used in the future to identify genes involved in pancreas cancer and to develop treatments to target those genetic abnormalities that cause cancer.

What Does Participation Involve?
Participation involves completing a one-page questionnaire and providing a blood or saliva sample. Every participant will have an opportunity to speak with a genetic counsellor. If you are interested in participating or would like more information about this study, please call toll free at 1-877-586-1559 or email us at fgicr@mtsinai.on.ca.

RESEARCH FINDINGS

A recent study using data from our registry (Anderson LN, Cotterchio M, Gallinger S. Cancer Causes Control. 2009 Aug: 825-34) found that smoking, high BMI (body mass index), a family history of pancreatic cancer, and caffeine intake were statistically significantly associated with increased risk of pancreatic cancer, while fruit intake and allergies were associated with decreased risk.

Smoking
- Current smokers had 3 times higher risk of pancreatic cancer
- No increased risk was observed among former smokers

*Body Mass Index**
- Compared with individuals with a normal BMI (<25), individuals with a BMI ≥ 30 (obese) had 3 times higher risk of developing pancreatic cancer
- Overweight individuals (BMI: 25–29.9) had 2 times the risk

* see Glossary for information on how to calculate your BMI

Family History of Pancreatic Cancer
- A family history of pancreatic cancer (e.g., two or more related individuals with pancreas cancer) was associated with 4 times increased risk of pancreatic cancer

Allergies
- A history of allergies decreased the risk of pancreas cancer by 60%

Fruit Intake
- Individuals who ate more than 14 servings of fruit per week, compared to individuals who ate less than 7 servings/week, had a 50% lower risk of pancreatic cancer

Caffeine
- Individuals who drank ≥ 3 caffeinated beverages per day, compared to individuals who drank less than 1 per day, had double the risk of pancreatic cancer

WHERE IS THE PANCREAS CANCER GENE?

Up to 10% of pancreatic cancer cases are hereditary (passed on in families), but the genes responsible in most of these cases remain unknown. A new approach to identifying disease associated genes is to look for large segments of DNA (genetic material) that are missing or duplicated. These DNA segments are called Copy Number Variants, or CNVs. Although CNVs have only been recently described, we know that a proportion of CNVs are common and benign (not cancer causing), but others are associated with various diseases. Some individuals may carry more than the expected "two" copies of some genes, while others may have only one or even zero copies of some genes.

Current Research

Our group compared DNA from 124 high-risk pancreas cancer patients (e.g., individuals with multiple cases of pancreas cancer in the family and young individuals affected with pancreas cancer) with healthy individuals (e.g., controls). We found 220 regions of the genome that were present in either a greater number or smaller number in the people with pancreas cancer, compared to healthy individuals. The genes that are in these 220 regions may become expressed differently in people with pancreas cancer. We think that one or more of those genes may lead to the development of pancreatic cancer. We are planning on investigating those genes, using various molecular techniques, to determine their role in the development of pancreatic cancer. Certain genes will then be tested for genetic changes (mutations) in all of our high-risk pancreatic cancer patients. This will help us identify the mutations that may be inherited and increase the risk of pancreas cancer.

Advances in pancreatic research are made possible through granting agencies and from charitable donations. For more information, please feel free to contact us.

THE INTERNATIONAL CANCER GENOME CONSORTIUM (ICGC)

What Is The International Cancer Genome Consortium?

Cancer can result from changes in a person's genetic material (DNA). By studying the genetic changes, researchers can learn what causes cancer. This will lead to new ways to prevent, detect and treat cancer. The International Cancer Genome Consortium (ICGC) was created to coordinate and develop a catalogue of the genetic mutations (changes) in 50 of the most common types of cancer.

Scientists around the world are participating in the ICGC. The Ontario Institute for Cancer Research (OICR) in Toronto is leading the study on the genetics of pancreatic cancer in collaboration with our team at Mount Sinai Hospital and other scientists and clinicians at the Toronto General Hospital. The OICR is also hosting the Data Coordination Centre for the ICGC. The aim is to recruit 500 people with pancreatic cancer for this study. This effort is also being done in parallel with our collaborators in Australia and the United States to increase the speed of sample collection.

What Does Participation Involve?

Patients are asked to donate unused tissue at the time of their surgery and to provide a blood sample. Anonymous data will be gathered and will be made rapidly and freely available to qualified researchers, which will allow scientists to use the new information to develop better ways of diagnosing, treating and preventing pancreatic cancer. We are currently recruiting patients at the Toronto General Hospital and plan on expanding to Sunnybrook Hospital in the near future.

For more information, please go to www.icgc.org.

PAST NEWSLETTERS

For more information about our research, please refer to previous volumes of this newsletter, which may be requested by contacting us and can also be found on our website:

www.zanecohencentre.ca

KEEP US INFORMED

Please keep us informed of any changes in your family history of cancer or other conditions. We are interested in this information for all blood relatives in the family. If you are participating on behalf of someone with pancreas cancer, please update us with changes to his/her family history. It is helpful to track this information for research purposes, but it is also important in our assessment of the family history and can help guide clinical recommendations for family members. Please also notify us with changes to your contact information.

If there are any changes, please take a moment to leave us a phone message at 1-877-586-1559 or contact your genetic counsellor directly.

GLOSSARY

Abdominal Ultrasound - A safe and non-invasive imaging technique performed by placing an electrical device on the abdominal skin surface. Images of the body organs are created with the use of high frequency sound waves.

Adenocarcinoma - Cancer that begins in cells which line certain internal organs, such as the pancreas, and have secretory properties.

BMI - Body Mass Index (BMI) is a measure of someone's weight in relation to height. The calculation for BMI = body weight in kilograms/height in meters squared. To calculate your BMI, you can go to www.bmi-calculator.net

Controls - Individuals that are not affected with the disease in question and not related to other family members with the disease.

DNA - A complex protein arranged as two long chains twisted around each other; the chemical basis for heredity and the carrier of genetic information.

Gene - A specific unit of DNA which contains instructions for the body to grow, develop and function.

Genome - A person's genetic makeup.

Hereditary - Passed on in families.

MRI - Magnetic Resonance Imaging (MRI) is a safe and non-invasive technique used to obtain images of the body organs. The patient lies on a table that is surrounded by a cylindrical scanner that takes images with the use of a magnetic field.

Mutation - A change in a gene capable of being passed on from parent to child.

CONTACT INFORMATION

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