



# Neuroendocrine Cancer

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## Comments, Feedback?

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..."Medical students are taught when hearing hoofbeats, to think of horses, not zebras. Neuroendocrine tumours are rare, and therefore are considered to be zebras".



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## Radioisotope

A radioisotope is a radioactive substance. Nuclear Medicine Physicians use radioisotopes for special types of scans and to treat certain neuroendocrine tumours. These radioisotopes connect to certain receptors on the tumour cells. If the nuclear medicine scan shows that the tumour has the right type of receptors, the same radioisotopes will be used in much higher doses to treat it. The radioisotopes used at LRCP include Indium-111 Octreotide, MIBG (Metaiodobenzyl Guanidine), and Iodine-131 Lipiodol.

## Zollinger-Ellison Syndrome

Zollinger-Ellison Syndrome is a condition caused by some endocrine tumours in the pancreas. These tumours release large amounts of gastrin, a hormone which makes the stomach produce high amounts of acid and pepsin. People with Zollinger-Ellison Syndrome tend to have more ulcers of the stomach and small bowel.



## Acknowledgements

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### **Multiphasic CT Scan**

A multiphasic CT scan is a specialized CT scan that shows how blood flows through the liver. Before the scan is started, the patient will take a special drink and have an injection. Both these solutions help make sharper images for the CT scan. This scan is used to see if the patient is able to have a hepatic artery embolization.

### **Non-functional Tumour**

A non-functional tumour is one that does not make hormones and other biologically active products.

### **PICC**

PICC is an acronym for Peripherally Inserted Central Catheter. It is a long tube that is inserted into a vein in the arm and ends just before the heart. The purpose of the PICC is to give repeated medicine and fluids without having to use a needle at every visit. The PICC dressing needs to be changed every week and the site needs to be carefully cleaned to prevent infection. If the line is not in use, it will be flushed weekly to prevent it from plugging.

### **Portal Vein**

A large vein that brings 80% of the blood to the liver.

### **Pulmonary Embolism**

Pulmonary embolism is the term used to describe a blood clot that blocks an artery leading to the lungs. These clots can form in the leg before detaching and traveling through the bloodstream. They cause chest pain, severe shortness of breath, restlessness, anxiety and cough. It is also possible to have blood in the sputum (mucous from the lung) and a low grade fever.



## **Neuroendocrine Program of the London Regional Cancer Program**

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This booklet was written for patients with neuroendocrine tumours who are referred to the London Regional Cancer Program. It describes:

- How neuroendocrine tumours are diagnosed;
- Three of the more common types of neuroendocrine tumours;
- Therapies that are used at the London Regional Cancer Program (LRCP).

The Neuroendocrine Team at LRCP includes Medical Oncologists, Surgeons, Primary Nurses, a Nuclear Medicine Physician, and an **Interventional Radiologist**. In some cases, an Endocrinologist, Cardiologist, and a Cardiac Surgeon may be involved in your care.

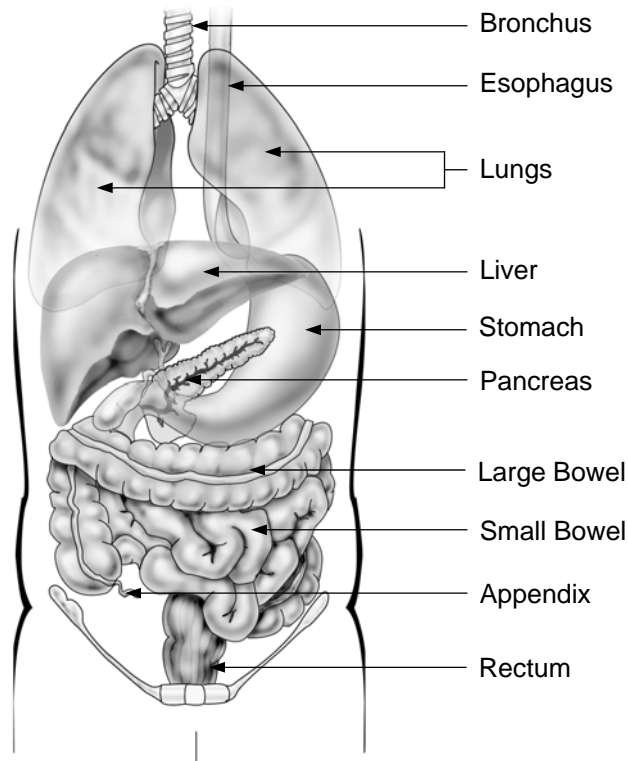
Words that are in **bold type** are further explained in the Glossary of Terms.

### **What is neuroendocrine cancer?**

Neuroendocrine cancer is formed in the diffuse neuroendocrine system. The diffuse neuroendocrine system is made up of cells found in the respiratory and digestive tracts. The respiratory tract includes the bronchial tubes and lungs. The digestive tract starts at the mouth and ends at the rectum.

Neuroendocrine cells are also located in endocrine glands, such as the adrenal glands, pancreas, thyroid and pituitary. These cells are also found in the ovaries and the testes.

### Sites where neuroendocrine tumours can appear.



The purpose of the diffuse neuroendocrine system is to provide chemical signals to control a number of body functions. These functions include the digestion of food, the movement of food and waste in the small and large bowel (peristalsis), the stress response, thyroid function and many other important processes.

Neuroendocrine tumours are classified as **functional** (hormone-producing) or **non-functional** (non-hormone producing). These tumours are rare. They represent less than 1% of all cancers. In Canada this means there are about 2 new cases of neuroendocrine cancer for every 100,000 people every year.

### Hormone

A hormone is a biologically active substance made by an organ. Its function is to tell other organs to increase or decrease an activity like digestion or growth. Sometimes hormones from one organ will make another organ produce or reduce a different hormone.

### Interventional Radiologist

The Interventional Radiologist is a specialist physician who is trained to perform highly skilled procedures, like inserting tubes into a person for feeding, drainage, special imaging and embolization.

### MEN Syndromes

MEN is an acronym for Multiple Endocrine Neoplasias. These are inherited syndromes. If one parent has MEN, his or her child will have a 50% chance of inheriting the syndrome.

There are two categories:

- MEN-I includes pituitary, parathyroid, and pancreatic endocrine tumours.
- MEN-II
  - MEN-II A includes medullary thyroid cancer, pheochromocytoma, and parathyroid hyperplasia (overgrowth of normal cells).
  - MEN-II B includes medullary thyroid cancer, pheochromocytoma, multiple tumours of the mucous membranes including the lips, tongue and eyelids.

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### Biologically Active

A 'biologically active' substance is one that is both made by the body and has an effect on a bodily function. These functions can include digestion or the control of blood sugar levels. The body makes hundreds of biologically active proteins, hormones and other substances.

### Catecholamines

Catecholamines (kat-eh-ko-luh-meens) are biologically active substances made by the adrenal gland. They can be measured in a 24-hour urine collection.

### Chromogranin A

Chromogranin A (CgA) is a substance made by tumour cells and is released into the bloodstream. The Neuroendocrine Team measures CgA levels to evaluate tumour growth. CgA is taken at regular intervals.

### Deep Vein Thrombosis

Deep vein thrombosis (DVT) is a blood clot or *thrombus* that develops in the arm or leg. Sometimes, a DVT can happen without any cause. However, it usually starts when the lining of a vein is injured or when there is inactivity like sitting for a very long time on an airplane. In some cases, a piece of the clot will break away and travel to the lung, causing a **pulmonary embolism**.

### Functional Tumour

A functional tumour is one that makes hormones and other biologically active products.

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### What causes neuroendocrine cancer?

Most neuroendocrine tumours have no known cause. Neuroendocrine tumours are usually, but not always, slow growing. They may be present in a person's body for many years before they cause problems.

It is rare that neuroendocrine tumours are genetic or inherited. The inherited cancers are referred to as **MEN syndromes** (MEN-I and MEN-II A+B).



## Diagnosing Neuroendocrine Tumours

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Neuroendocrine tumours can be difficult to diagnose. It is common for patients to make many visits to the doctor over several years before an actual diagnosis is made. Symptoms are often very vague and similar to more common health problems. They can come and go. Common symptoms may include:

- Diarrhea
- Abdominal cramps
- Flushing of the skin
- Wheezing or shortness of breath
- Pounding of the heart
- Skin rash
- Low or high blood sugar
- Stomach ulcers that return when ulcer medication is stopped
- Low or high blood pressure
- Headache

Your symptoms will depend on your type of tumour. A sample of tissue or biopsy from the primary tumour or the liver tumour is the best way to make the diagnosis. Tumours are often found by accident when surgery is done for some other reason.

### What kind of tests should I expect?

You often need a variety of tests to find out the exact type of neuroendocrine cancer. Some of these may be done close to your home. The tests that you may have include:

- CT scan
- Blood tests
- Echocardiogram
- 24-hour urine collection
- Bone scan
- MRI scan

Your doctors may also order different x-rays or scopes of the digestive tract. This is to see if the intestine is blocked or narrowed. This test will certainly be done if you have problems with severe abdominal pain, vomiting and bloating. You may also get an ultrasound to check for gallstones or blockage of the bile ducts. Many of these tests are repeated at various times during your treatment to evaluate changes in the tumours.

### What are nuclear medicine scans?

Two special nuclear medicine scans may be ordered. Nuclear medicine scans use **radioisotopes** to determine if your tumour cells have special receptors. If these special receptors are present and there are enough of them, you may be offered a type of treatment that targets these receptors. The tests are called:

- Indium-111 Octreotide scan or Octreoscan
- I-131 MIBG scan



These two nuclear medicine tests must be done in London.

### Q: It is expensive to stay in London for all my tests. Is there any financial support available?

A: You can contact your local Canadian Cancer Society to learn more about funding assistance. Our team's Social Worker can also help you with financial concerns and tell you about sources of financial support. If you come from Northern Ontario, you can apply for the Northern Travel Grant. Ask a member of your local health care team.

### Q: Are there any income tax allowances available?

A: You may be able to claim some medical expenses on your income tax return. These expenses include travel costs, drugs and a lot more. If you want to learn more about which items can be claimed, contact a chartered accountant, your financial advisor, or go to [www.cra-arc.gc.ca](http://www.cra-arc.gc.ca). You can also refer to a leaflet called "Claiming Medical Expenses on Your Income Tax Return" published by LRCP.



## Glossary of Terms

### Amino Acids

Amino acids are the building blocks of protein. They are used in many nutritional therapies for patients who cannot eat or drink. For Indium-111 Octreotide therapy, certain types of amino acids are used to stop special receptors in the kidney. The Indium-111 Octreotide naturally attaches to kidney receptors. This can damage the kidney and can make the therapy less effective.

**Q. Why can't I have more notice of therapy dates?**

A: Blood counts must be available and they must be above certain minimums for therapy to be given safely. Please make sure that blood results are faxed to LRCP at 519-685-8714. This number will be written on a Ministry of Health Requisition.

**Q: How much notice will I have for an Octreotide Scan or I-131 MIBG scan booking?**

A: Your scan appointments will often be done on short notice too. You must call back and tell us if you are able to come after you have been given dates.

**Q: Are there any support groups for people living with neuroendocrine cancer?**

A: A group of patients and families have an email address to which you can send questions or comments. We will give you this address if you wish. There are also some useful websites you can visit:

**www.naapnet.org** (checked February 11, 2008);  
**www.carcinoid.org** (checked February 11, 2008);  
**www.cnetscanada.org** (checked February 11, 2008).

**Q: Where can I stay in London when I come for tests or a clinic appointment?**

A: We have a list of hotels, motels and Bed and Breakfasts (B&B). The B&Bs are generally less expensive than large hotels. Ask a member of the Neuroendocrine Team for this list.



**Hawkeye  
Spect CT  
Scanner**



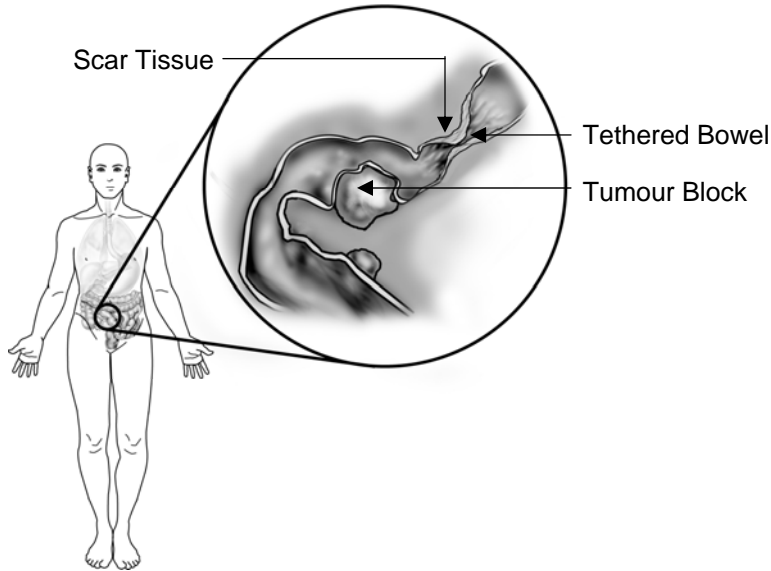
## Types of Neuroendocrine Tumours

Three common types of neuroendocrine tumours are discussed in this booklet. If the tumour that interests you is not in this booklet, a member of the Neuroendocrine Team will talk to you about it.

### Carcinoid Tumour

Carcinoid is the most common type of neuroendocrine cancer. It occurs most often in the small bowel and appendix, followed by the large bowel, rectum, stomach and lung. It is typically a slow-growing cancer. Carcinoid tumours are likely to spread to the liver. This often happens before your cancer is diagnosed.

**Examples of Bowel Blockage**



Carcinoid tumours of the bowel tend to produce a lot of scar tissue around the tumour. This may block the bowel because the scar tissue pushes directly on the wall of the bowel. This causes a bottleneck effect. The scarring may cause “tethering” or sticking down of the bowel or lining around the bowel. The scarring may also trap waste and narrow blood vessels.

**Carcinoid Tumour Symptom Chart**

Tumour	Hormone/Peptide	Major Symptoms
Carcinoid	Serotonin Substance P Histamine Bradykinin Kallikrein	Flushing, watery diarrhea, stomach cramps, asthma-like wheezing, heart palpitations, heart problems.

**Q: Can I go to work during treatment?**

A: Many people work during their treatment. However, they may need to discuss reduced hours or duties with their employer if fatigue is a problem.

**Q: Will I ever be able to stop taking Octreotide?**

A: Most people must use Octreotide for the rest of their life.

**Q: Why do my nuclear medicine scans have to be done in London?**

A: Nuclear medicine scans are specialized tests that need special machines. These machines are located in London. Highly trained and experienced nuclear medicine doctors read these scans.

**Q: Who will take care of me when I am not in London?**

A: Our team will have close contact with the Oncologist who referred you to London. Notes will be sent after each clinic visit or hospital admission. Your family doctor will also get copies of the notes. This way, both are kept informed of your progress. Your local oncologist and family doctor are your first resources if you feel sick or are having problems. However, we do like to be kept informed about how you are doing.

**Q: How far in advance will I be notified of my admission for therapy?**

A: You will often be given short notice for therapy dates. Sometimes this notice may be as little as one week.

The team in London will involve your doctor and specialists to provide the best possible care. Notes are sent to them every time you are seen in London. This will keep them informed of your progress.



London Regional Cancer Program



## Frequently Asked Questions

### Q: Will these treatments cure my cancer?

A: The treatments are designed to control your cancer's growth. The only cure is the complete surgical removal of the tumour. This may not be possible.

### Q: How often will I get treatments?

A: The number of times you get treatments depends on how your cancer responds. It also depends on your overall health. The radioisotope therapies are given in a series of 3 or 4 treatments.

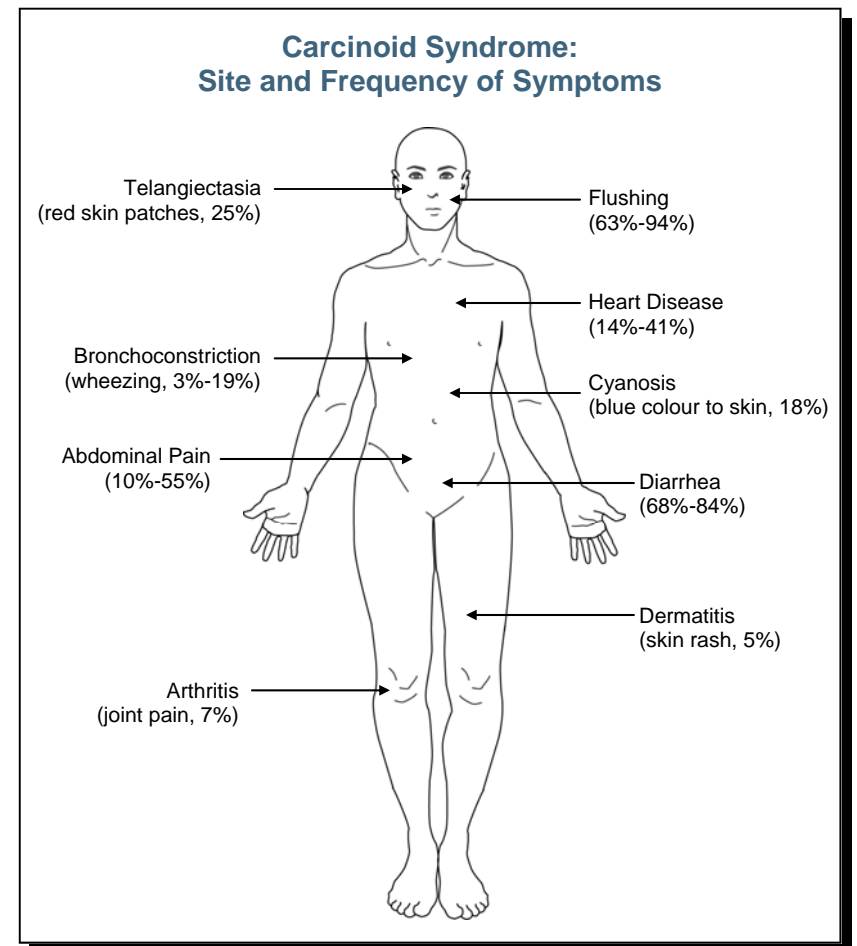
### Q: Are the radioisotope therapies painful?

A: There is no pain with the radioisotope injections. There may be some discomfort during and after embolization therapy.

## What is carcinoid syndrome?

Carcinoid syndrome occurs when a carcinoid tumour makes or secretes large amounts of **hormones** and **biologically active** substances like peptides. When this happens, it causes:

- Flushing of the face and upper body
- Watery diarrhea
- Cramps
- Heart palpitations



High amounts of hormones may also cause memory problems and make it difficult to think clearly. Generally, carcinoid syndrome happens when tumour cells spread to the liver. Lung carcinoids can also cause the syndrome even if the cancer has not spread to the liver.



Not everyone with carcinoid syndrome will have all of these symptoms. For example, some people may only have flushing.

Carcinoid syndrome may be triggered by certain foods, alcohol, stress, exercise and surgery. It can also happen for no reason.

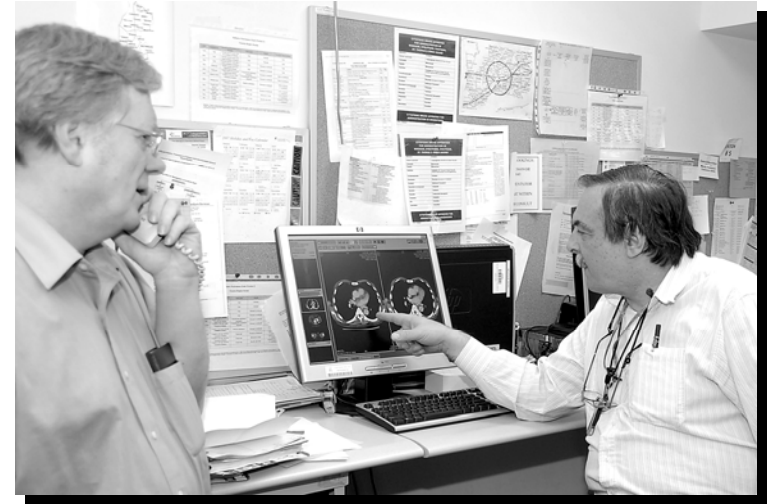
Over time, high hormone levels can damage the valves on the right side of the heart. High hormone levels may also thicken the lining of the heart muscle on the right side. This can lead to heart failure. It is important to lower hormone levels so that damage to the heart is delayed or prevented.

Carcinoid syndrome can be controlled with daily or monthly injections of a drug called Octreotide (awk-tree-oh-tide). The amount and timing of the injections are based on hormone levels and the severity of symptoms. Some people will need an intravenous infusion (IV) to help control carcinoid syndrome.



MSN.com

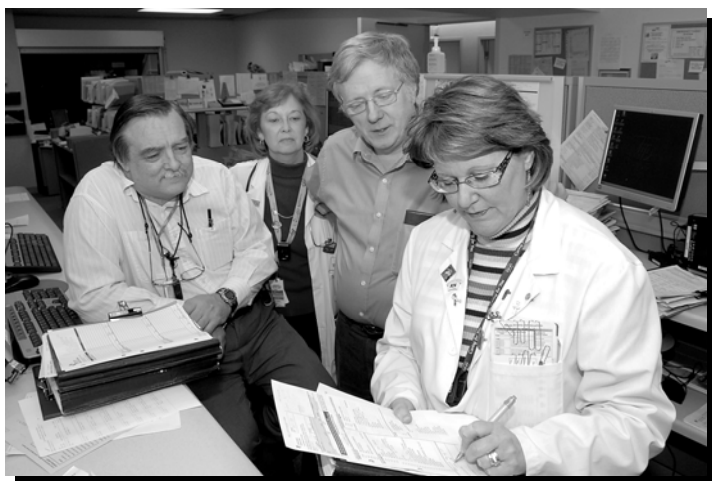
CT scans will be done at regular intervals to measure tumour size. It will be compared to the baseline CT done before treatment. Sometimes these can be done at your home hospital, especially if the original CT scan was done there.



**Physicians reviewing CT scans.**

At various times you will need an In-III Octreotide Scan and/or an I-131 MIBG scan. These specialized scans must be done at London Health Sciences Centre. When they are scheduled, it is important to keep these appointments. Only 16 of these scans are done each month.

If you have a carcinoid tumour you will have a yearly echocardiogram, either in London or somewhere closer to your home. You may be referred to a cardiologist. Frequent 24-hour urine collections to measure 5-HIAA may be needed as part of your follow-up care.



**Members of the LRCP Neuroendocrine Team in Clinic**

Many people with carcinoid and pancreatic tumours need an adjustment of Octreotide after leaving the hospital. It is not unusual to need short-acting Octreotide for a period of time after embolization.

Ontario patients are referred to a Community Care Access Centre (CCAC) for monitoring in the community. If needed, home nurses will care for the weekly PICC dressings. Many people will already be using CCAC services.

### **What happens after the treatment ends?**

When you finish your treatment, you will have blood tests and x-rays at different times to see how the tumour responds to the therapy. You will also need a Serum **Chromogranin A** blood test to give information about the size and activity of the tumour. This test must be done in London.

### **What is carcinoid crisis?**

A carcinoid crisis is a severe form of the carcinoid syndrome. It is a medical emergency. Sometimes it is called malignant carcinoid syndrome.

Carcinoid crisis causes low or high blood pressure, a fast or slow heartbeat, or the narrowing of the breathing passages. It should be treated with high doses of the drug Octreotide. This will quickly relieve these symptoms.

### **Why are 24-hour urine samples collected?**

People who have a carcinoid tumour need regular urine collections to measure their hormone levels. The 24-hour urine sample measures the amount of a substance called 5-hydroxyindoleacetic acid (5-HIAA). This substance is a breakdown of the hormone serotonin, which is made by the tumour cells. The doctor uses the 5-HIAA results to adjust your dose of Octreotide.

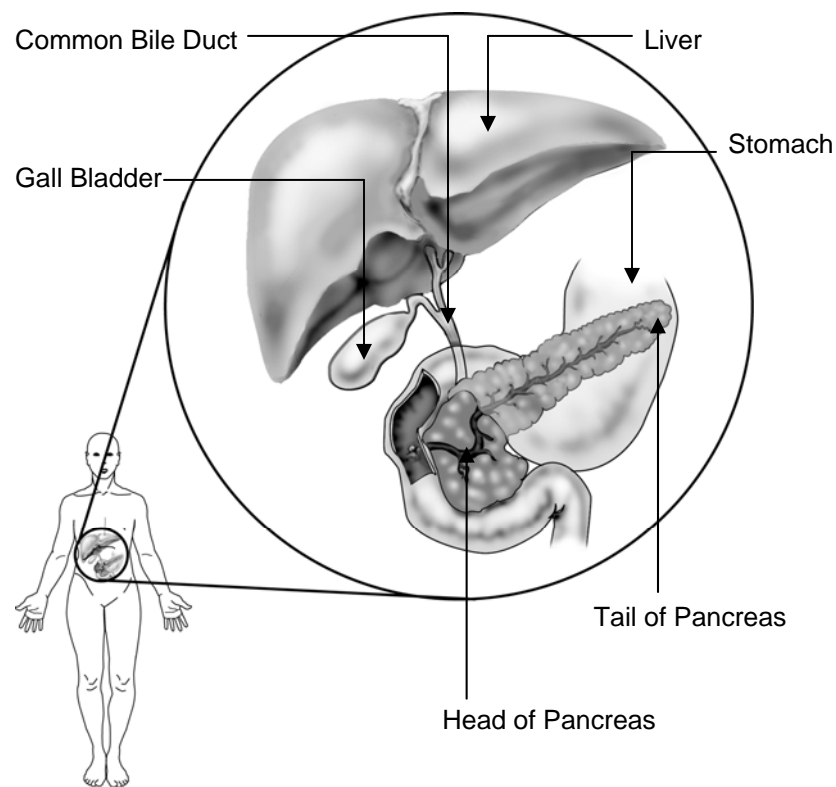
### **Pancreatic Endocrine Tumours**

Pancreatic endocrine tumours are the second most common neuroendocrine tumours. These tumours start in the pancreas from specialized cells that make hormones like insulin, gastrin, glucagon, and vasoactive intestinal polypeptide (VIP).

Pancreatic tumours that are functional or secreting cause changes in your blood values, which can make you feel sick. Octreotide can be used to block these hormones. When the hormones are blocked, people tend to feel better. Ongoing changes of these medicines is often needed.

Pancreatic tumours can change your blood sugar levels. You may need medicine to help control your levels. If part of your pancreas has been removed, you may need to take pancreatic enzyme capsules to help you digest food. Octreotide may also block pancreatic enzymes that help digest fat. This can result in your stools becoming pale, foul smelling and floating in the toilet. This cancer is very different from the more common pancreatic cancer that comes from the digestive enzyme producing cells.

### Pancreas and nearby Organs



### Interventional Radiology Suite



### Holding Area in Radiology Department



### Will I have to go to London for all my treatments?

All radioisotope treatments must be given in London. At times your local oncology team will assist in giving you chemotherapy. The goal is to minimize the number of trips you have to make, especially if you live far from London. It is very important for our team to follow your progress. Weekly blood work is needed after all therapies. This can be done at your cancer centre or a local lab. The results are then sent to London for review.

### How will I feel after chemoembolization?

Most people feel some discomfort during the procedure. This might include feelings of warmth, flushing, pain, and nausea. You will be able to manage your pain during and after the procedure by using an intravenous pain pump. Antinausea drugs will be given before, during and after the treatment. When the treatment is done, you will be cared for in a recovery room for at least 2 hours. Nurses will watch for bleeding from the catheter site and they will check your blood pressure and pulse. They will also watch for any carcinoid symptoms.

A few days after treatment, you may feel some discomfort in the area of your liver or have increased carcinoid symptoms, such as flushing. You may not feel hungry and you may feel tired. Your nurses and doctors will order medicine to help manage these symptoms.

Some people cannot have this treatment because of certain conditions. Embolization is not safe if you have had any of the following:

- Previous surgery that has changed the bile system (such as stents or shunts);
- Too much tumour growth in the liver;
- Abnormal liver tests;
- Not enough blood flowing through the **portal vein**;
- Excess fluid in the abdomen (ascites).

If you receive this treatment, more information will be given to you before the treatment.

About 33 to 50% of pancreatic tumours are non-functional. This means they do not secrete hormones. Over time, however, they can change and become hormone secreting.

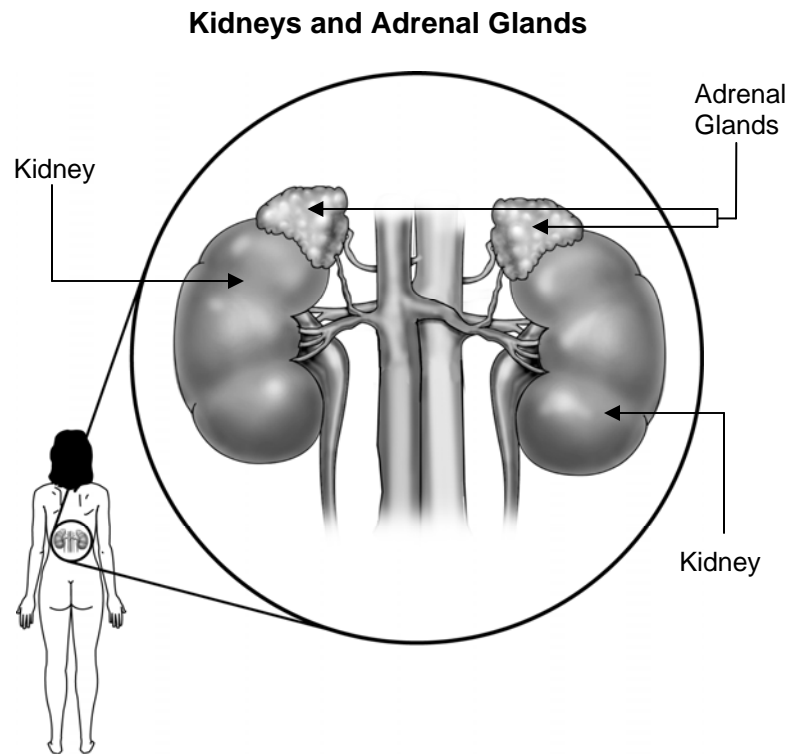
**Pancreatic Tumour Symptom Chart**

Tumour	Hormone/Peptide	Major Symptoms
Insulinoma	Insulin	Low blood sugars which can cause confusion, visual disturbances, sweating, weakness, seizures, very high levels of insulin, occasional neurological or psychiatric disturbances.
Gastrinoma	Gastrin	Recurrent stomach ulcers and multiple ulcers, diarrhea, high stomach acid, abdominal pain, <b>Zollinger-Ellison Syndrome</b> with MEN.
Glucagonoma	Glucagon	High levels of glucagon, mild glucose intolerance, itchy rash, weight loss, diarrhea, anemia, tendency to form clots in the veins (e.g., <b>Deep Vein Thrombosis</b> ).
VIPoma	Vasoactive Intestinal Polypeptide	Watery diarrhea, low potassium, low salt, anemia, dehydration, weight loss.

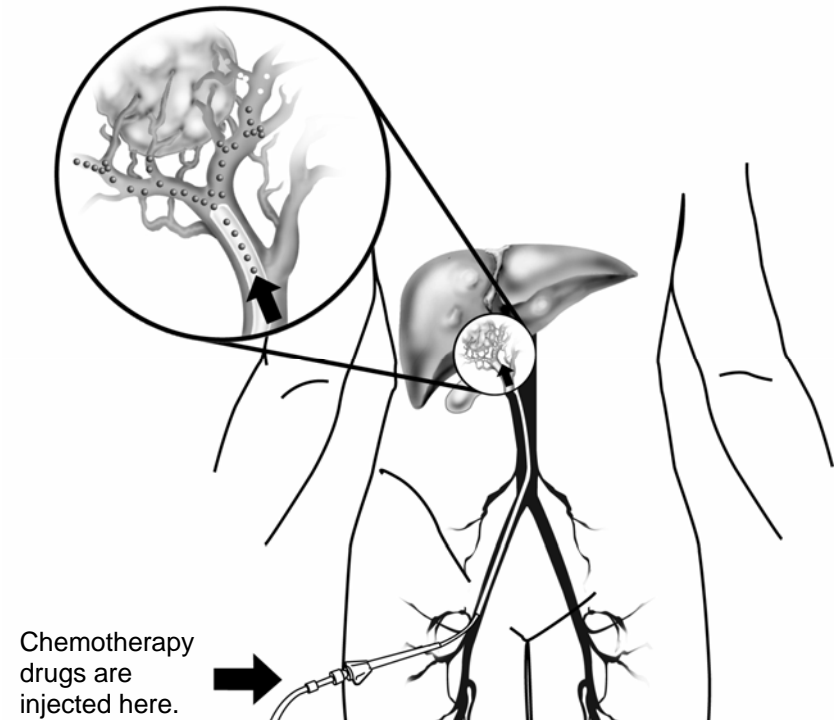
## Pheochromocytoma & Paraganglioma

Pheochromocytoma (fee-oh-kro-mo-sie-toh-ma) and paraganglioma (pa-ra-gang-gee-oh-ma) are very rare tumours that start in the central part of the adrenal glands or in specialized nerve cells called the paraganglia. The adrenal glands sit on top of the kidneys. Paraganglia are found throughout the body. In some cases these tumours are part of the MEN-II hereditary syndrome.

The hormones made by these tumours are called **catecholamines**. They include epinephrine (epp-uh-nef-rin) and norepinephrine. These hormones help with the "fight or flight" reaction to stress or threats.



## Hepatic Artery Chemoembolization



If you get this treatment, you will stay in the hospital for at least 6 days.



If you are having chemoembolization, the following tests must be done in London:

- **Multiphasic CT scan**
- Blood tests

### Will I have side effects from radioisotope therapy?

Normally patients do not feel any side effects from radioisotope therapy. In very few cases, some people feel nauseous for 2 to 3 days after this therapy.

Radioisotope therapy does suppress the bone marrow. This means that your body is slower to make blood cells.

Your kidneys also need protection when you receive Indium-111 Octreotide. This is done by giving you an infusion with **amino acids** a few hours before and after the radioisotope.

Radioisotopes tend to collect in the thyroid gland. To prevent damage to your thyroid, you will get tablets of Potassium Iodide right before the treatment. You will also need to take these tablets for 9 to 10 days after the radioisotope treatment ends. The prescription must be filled at the LHSC or LRCP Pharmacies because Potassium Iodide tablets are not available in most pharmacies.

### Hepatic Artery Chemoembolization

Hepatic artery chemoembolization is a treatment that delivers chemotherapy directly to the liver. This may be the best therapy when the tumours are mostly found in the liver. In this procedure, a skilled radiologist inserts a small tube called a catheter into a large artery located in the groin. The tube is threaded up into the artery leading to the liver. Once in place, the Radiologist injects the chemotherapy into the artery where it targets the tumours in the liver. The artery is then blocked with a substance (gelform) that will dissolve after a short period of time.

### What are the symptoms of pheochromocytoma and paraganglioma?

Very high blood pressure is a symptom that occurs in 90% of people with this cancer. It may be constant or it may come and go. In some people, the blood pressure drops to very low levels when they stand up.

Exercise, emotional upset, drinking alcohol, urination, or a physical exam in the area of the tumour may cause these symptoms to happen.

Medicines for high blood pressure and anxiety may be prescribed. You may also be referred to an endocrine specialist.

### Pheochromocytoma and Paraganglioma Symptom Chart

Tumour	Hormone/Peptide	Major Symptoms
Pheochromocytoma Paraganglioma	Epinephrine Norepinephrine	Headache, high blood pressure, sudden changes in blood pressure, rapid heart beat, sweats, paleness, nausea, feelings of impending death.

### Why are 24-hour urine samples collected?

People who have a pheochromocytoma and paraganglioma need regular urine collections to measure hormone levels (epinephrine, norepinephrine, and vanillylmandelic acid). This is an indirect measure of tumour activity. Hormone levels in the urine show how active the tumour cells are and when you need treatment.



## Treating Neuroendocrine Tumours

The Neuroendocrine Team uses many different methods to treat these types of cancer. Some of these methods are unique to the London Regional Cancer Program. You may have one or more of these treatments depending on where the cancer is located, and how far it has spread. More information will be given to help you decide which treatment is best for you.

### Surgical Treatment of Neuroendocrine Tumours

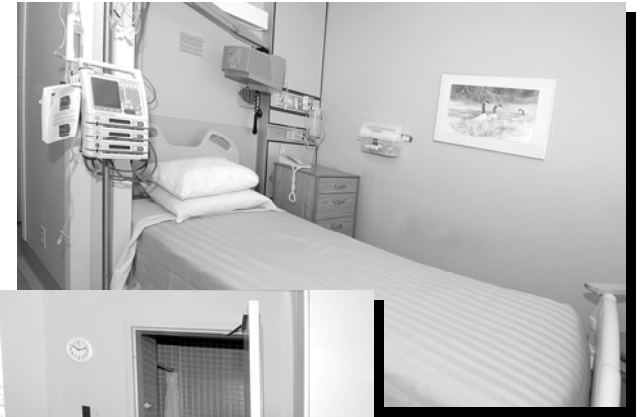
Surgery can be very important in the treatment of neuroendocrine tumours. Surgery is used to:



- Remove the primary tumour;
- Reduce tumour size (debulking);
- Reduce symptoms.

Surgery is also helpful in the relief of blocked, scarred, and tethered (sticking down) bowels. In these cases, surgery can improve the quality of a person's life by decreasing bouts of pain and vomiting.

If the surgeon finds that the cancer has spread, sometimes the secondary tumours or metastases can be reduced.



**Private Room**

harmful to you. It can, however, be harmful to others, especially pregnant women and children.

If this treatment is suggested, you must be able to care for your own needs. You will have an IV running much of the time during your hospital stay. This might make going to the bathroom a little difficult. It is important to tell staff if you need help.

More detailed instructions will be given to you at the time of treatment. Visitors are allowed, but there will be some restrictions, which will be explained to you when you are admitted.

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## What are the side effects of chemotherapy?

Some people may feel side effects from the chemotherapy. Nausea will be managed with special anti-nausea drugs. You may also have mouth sores and diarrhea and these will be with medicines. Fatigue is the side effect most people feel from this therapy.

If you have chemotherapy, the Team will talk to you about the side effects you can expect.

## Radioisotope Therapy

A radioisotope is sometimes called a radiopharmaceutical. When injected into the bloodstream, the radioisotope attaches to special parts of the tumour called receptors. When attached, they deliver damaging radiation to the tumour cells. In a way, it is a “targeted therapy”.

The radioisotopes used at the London Regional Cancer Program are Indium-111 Octreotide and Iodine-131 MIBG. A nuclear medicine scan will show which radioisotope is right for you. Your radioisotope treatment will use the same radioisotope as the scan, but with a much higher dose.

## How are radioisotope treatments given?

Radioisotope treatments are considered “systemic” treatments. This means that the treatment is given into the bloodstream, through an IV. The radioisotopes attach to the tumours where they deliver the radiation. If you receive this type of therapy, you will be admitted to a special private room in the Inpatient Oncology unit at Victoria Hospital, LHSC. You will be isolated because you will be radioactive for 1 to 5 days, depending on the radioisotope used. This may sound scary, but it is not

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## What is radiofrequency ablation (RFA)?

RFA is a procedure that uses radio waves to destroy liver tumours. It is done on a small number of patients in very select cases. RFA depends on the location, size and number of liver tumours. Only very specialized surgeons do this procedure. If appropriate, a referral to a liver surgeon will be arranged by the Neuroendocrine Team.

## Medical Treatment of Neuroendocrine Tumours

### What does Octreotide do?

Somatostatin is a hormone that our body makes. It plays an important role in many of our body’s internal processes. It also blocks the hormones made by certain tumours. The over-production of hormones makes a person to feel sick.

Octreotide is a man-made form of somatostatin. Octreotide helps control the hormones that cause diarrhea, flushing, low blood sugar, pounding of the heart, and changes in blood pressure. Octreotide can also protect the heart from damage even if you have no symptoms of carcinoid syndrome. You will likely need Octreotide injections for the rest of your life.

Octreotide is available in short-acting and long-acting forms. These may be prescribed as subcutaneous (under the skin) injections, intramuscular (in the muscle) injections or intravenous (in the vein) infusions.

The team may arrange to have injections given to you in your home by a nurse. In some cases, you may be taught how to give injections to yourself by a home care nurse.

## Is chemotherapy helpful?

Chemotherapy drugs are often given to treat cancer. Like a recipe, there are many combinations of drugs used to treat different types of cancer. The type of chemotherapy used depends on how the tumour looks under a microscope.



Some neuroendocrine tumours respond well to chemotherapy, but for others chemotherapy has a limited effect.

For neuroendocrine tumours that do not respond well, chemotherapy is usually combined with radioisotope therapy. The Neuroendocrine Team has noted that up to 75% of patients may have some kind of response with these two therapies combined. A response means that tumours either decrease in size or stop growing.

Your treatment schedule will depend upon the type of therapies you are getting. These drugs are given each time a person is admitted to hospital for the radioisotope. If you receive chemotherapy, more detailed information will be given to you.

Before getting your treatment, you may need a central line called a **PICC** put in. The PICC is a long intravenous line that is inserted into a vein in your arm. It is then threaded up until it reaches the large vein over the heart. It is similar to having an IV inserted into you. This procedure is done in the radiology department.

## PICC LINE

