



## LUNG CARCINOID TUMOR

### What Is Cancer?

Cancer develops when cells in a part of the body begin to grow out of control. Although there are many kinds of cancer, they all start because of out-of-control growth of abnormal cells.

Normal body cells grow, divide, and die in an orderly fashion. During the early years of a person's life, normal cells divide more rapidly until the person becomes an adult. After that, cells in most parts of the body divide only to replace worn-out or dying cells and to repair injuries.

Because cancer cells continue to grow and divide, they are different from normal cells. Instead of dying, they outlive normal cells and continue to form new abnormal cells.

Cancer cells often travel to other parts of the body where they begin to grow and replace normal tissue. This process, called metastasis, occurs as the cancer cells get into the bloodstream or lymph vessels of our body. When cells from a cancer like breast cancer spread to another organ like the liver, the cancer is still called breast cancer, not liver cancer.

Cancer cells develop because of damage to DNA. This substance is in every cell and directs all its activities. Most of the time when DNA becomes damaged the body is able to repair it. In cancer cells, the damaged DNA is not repaired. People can inherit damaged DNA, which accounts for inherited cancers. Many times though, a person's DNA becomes damaged by exposure to something in the environment, like smoking.

Cancer usually forms as a tumor. Some cancers, like leukemia, do not form tumors. Instead, these cancer cells involve the blood and blood-forming organs and circulate through other tissues where they grow.

Remember that not all tumors are cancerous. Benign (non-cancerous) tumors do not spread to other parts of the body (metastasize) and, with very rare exceptions, are not life threatening.

Different types of cancer can behave very differently. For example, lung cancer and breast cancer are very different diseases. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their particular kind of cancer.

Cancer is the second leading cause of death in the United States. Half of all men and one third of all women in the United States will develop cancer during their lifetimes. Today, millions of people are living with cancer or have had cancer. The risk of developing most types of cancer can be reduced by changes in a person's lifestyle, for example, by quitting smoking and eating a better diet. The sooner a cancer is found and treatment begins, the better are the chances for living for many years.

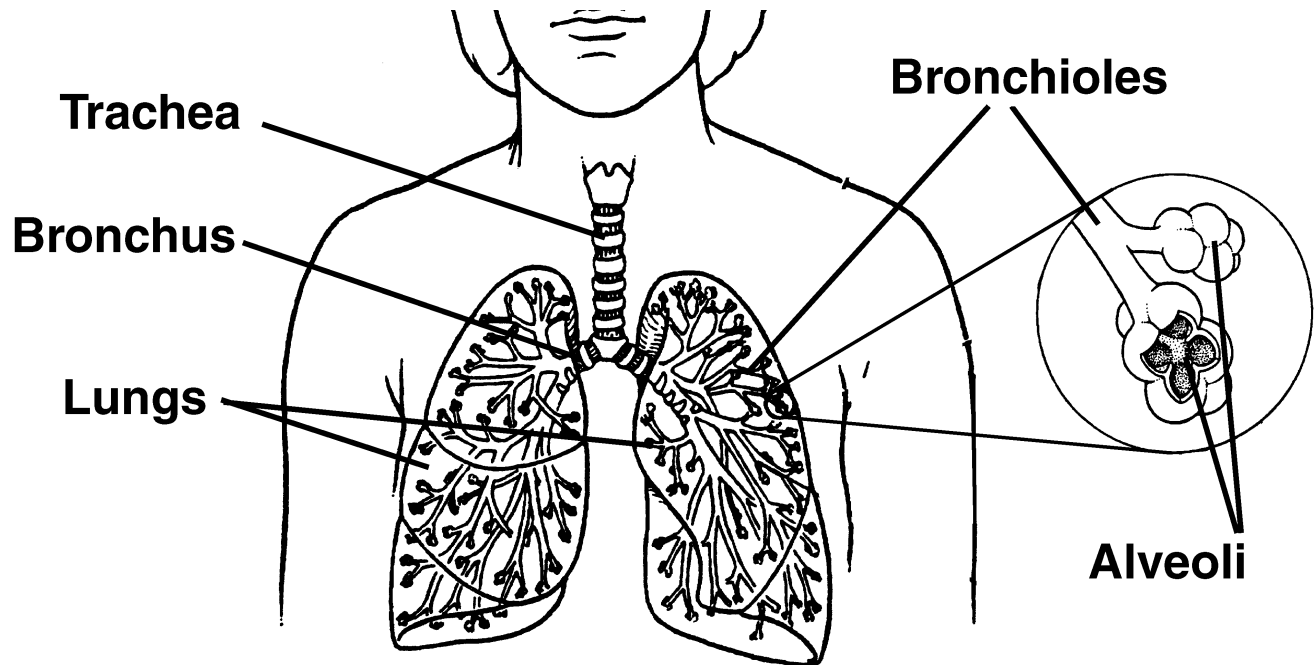
### What Is a Lung Carcinoid Tumor?

#### The Lungs

The lungs are 2 sponge-like organs in your chest cavity. Your right lung has 3 sections, called lobes. The left lung has 2 lobes. It is smaller because the heart takes up more room on that side of the body. The lungs bring air in and out, taking in oxygen and getting rid of carbon dioxide gas, a waste product of the body.

The lining, which surrounds the lungs and helps to protect them and ease the sliding motion during breathing, is called the **pleura**.

The chest cavity is called the **pleural cavity**. The **trachea** (windpipe) brings air down into the lungs. It divides into tubes called the **bronchi**, which divide into smaller branches called the **bronchioles**. At the end of the bronchioles are tiny air sacs known as **alveoli**.



### The Diffuse Neuroendocrine System

The diffuse (spread out or widely scattered) neuroendocrine system is made up of cells that are in certain ways like nerve cells and in other ways like cells of endocrine (hormone-producing) glands. These cells do not form an actual organ like the pancreas, adrenal, or thyroid. Instead, they are scattered throughout your body in organs like the lungs, stomach, and intestines.

Neuroendocrine cells produce hormones like adrenaline and adrenaline-like substances. This may help control air flow and blood flow in the lungs and may help control growth of other types of lung cells. These neuroendocrine cells may detect decreased oxygen or increased carbon dioxide in the air we breathe and then release chemical messages to help the lungs adjust to changes in air composition. People who live at higher altitudes have more lung neuroendocrine cells, apparently because there is less oxygen in the air they breathe.

### Neuroendocrine Cancers

Like most cells in your body, lung neuroendocrine cells sometimes undergo certain changes that cause them to grow too much and form tumors. The tumors that develop from neuroendocrine cells are known as *neuroendocrine tumors* or *neuroendocrine cancers*. These tumors can develop anywhere in the body.

There are 4 types of neuroendocrine lung tumors. The most serious type, **small cell lung cancer** (SCLC), is one of the most rapidly growing and spreading of all cancers. It is discussed in a separate American Cancer Society lung cancer document. **Large cell neuroendocrine carcinoma** is a rare cancer that, except for the size of the cells forming the cancer, is very similar to SCLC in its prognosis (outlook for survival) and in how patients are treated. **Carcinoid tumors**, also known as **carcinoids**, comprise the other 2 types of lung neuroendocrine cancer: **typical carcinoid** and **atypical carcinoid**. This document will only cover these 2 types of tumors. Another ACS document discusses carcinoid tumors that begin in the gastrointestinal tract, another common site for these tumors.

### Carcinoid Tumors

Typical and atypical carcinoid tumors are distinguished from each other by their appearance under the microscope.

- **Typical carcinoids** grow slowly and only rarely spread beyond the lungs. They are 9 times as common as atypical carcinoids.
- **Atypical carcinoids** grow a little faster and are somewhat more likely to spread to other organs. They have more

cells in the process of dividing and look more like a fast-growing tumor. They are much less common than typical carcinoids.

In addition to being classified as typical or atypical based on how they look under a microscope, carcinoids are sometimes also classified according to where they form within the lung.

- **Central carcinoids** form in the walls of large airways near the center of the lungs.
- **Peripheral carcinoids** develop in the narrower airways toward the edges of the lungs.

This distinction is important because the tumor's location determines which symptoms a patient will have. (See the section "How Are Lung Carcinoid Tumors Diagnosed?") Nearly all central carcinoid tumors are also typical carcinoids. Most peripheral carcinoids are also typical carcinoids.

## What Are the Key Statistics About Lung Carcinoid Tumor?

About 0.5% of all cancers are carcinoids and about one-fourth of these are lung carcinoid tumors. This means there are about 1,700 newly diagnosed lung carcinoid cancers in the United States each year. They are twice as common in whites as in blacks, Asians, and Hispanics. They are also twice as common in women as in men. The average age at diagnosis is around 60 years.

Most lung carcinoids are small. They vary from 0.5 cm (slightly smaller than ¼ inch) to 2 cm (a little over ¾ inch) at the time of diagnosis. Patients with carcinoids larger than 3 cm (almost 1 ¼ inch), atypical carcinoids, or carcinoids that have spread to lymph nodes have a worse outlook for survival (prognosis).

The 5-year survival rate for patients with typical lung carcinoids is around 95% and for patients with atypical lung carcinoids is around 70%. The ranges reflect different survival rates quoted by several medical journal articles. For both types of carcinoids, the 10-year survival rates are about 10% lower than the 5-year rates. The 5-year survival rate for patients whose carcinoid tumors have not spread (metastasized) to their lymph nodes is 80%. For those patients with lymph node metastasis, the 5-year survival rate is 77%. If the carcinoid has spread to distant sites, the 5-year survival is 26%. These numbers will be higher for patients with typical carcinoids and lower for those with atypical carcinoids.

The 5-year survival rate refers to the percentage of patients who live at least 5 years after their cancer is diagnosed. Many of these patients live much longer than 5 years after diagnosis, and 5-year rates are used to produce a standard way of discussing prognosis. Five-year **relative** survival rates do not include patients dying of other diseases and are considered to be a more accurate way to describe the prognosis for patients with a particular type and stage of cancer. Of course, 5-year survival rates are based on patients diagnosed and initially treated more than 5 years ago. They may no longer be accurate. Improvements in treatment result in a more favorable outlook for recently diagnosed patients.

## What Are the Risk Factors for Lung Carcinoid Tumor?

A **risk factor** is anything that increases your chance of getting a disease such as of cancer. Different cancers have different risk factors. For example, unprotected exposure to strong sunlight is a risk factor for skin cancer and smoking is a risk factor for cancers of the lung, larynx, mouth, throat, esophagus, kidneys, bladder, and several other organs. In contrast, very little is known about why lung carcinoid tumors develop in some people but not in others.

**Chemical exposure:** Typical lung carcinoid tumors are not associated with smoking or with any known chemicals in the environment or workplace. But some report that atypical lung carcinoids may be associated with smoking.

**Gender:** Carcinoids occur more frequently in women.

**Age:** These tumors are usually found in people around 60 years old. Children are rarely affected.

**Family history:** A tendency to develop lung carcinoid tumors can be inherited. There have been descriptions of rare families in which several members have been diagnosed with this cancer. Also, generally children whose parents have this disease have a higher chance of developing carcinoid. Most people with carcinoid tumors, however, do not have a parent with this form of cancer.

And, because this cancer is so uncommon, that risk is still low.

## Do We Know What Causes Lung Carcinoid Tumor?

Very little is known about the causes of lung carcinoid tumors. Researchers have learned a lot about how certain risk factors like cancer-causing chemicals or radiation cause lung cells to become carcinomas, the usual type of lung cancer. But similar studies of lung carcinoid tumors have not found any risk factors.

Sometimes, tiny clusters of neuroendocrine cells that are similar to those seen in lung carcinoid tumors are seen under the microscope as an unexpected finding in lung biopsies done to treat or diagnose other conditions. These lesions, called **carcinoid tumorlets**, develop in small airways. Under the microscope, tumorlets have a striking resemblance to peripheral carcinoid tumors, except that they are usually much smaller (¼ inch).

Central carcinoid tumors are believed to develop from the glands under the surface of the large air passages. Researchers still do not understand how carcinoid tumorlets develop from lung neuroendocrine cells or why some tumorlets may eventually grow to become carcinoid tumors.

## Can Lung Carcinoid Tumors Be Prevented?

Researchers have not found any avoidable risk factors yet, so there is no way to prevent carcinoid tumors.

## Can Lung Carcinoid Tumors Be Found Early?

Because carcinoid tumors usually grow and spread slowly, most are found at an early or localized stage. Most patients with peripheral carcinoid tumors or with small central carcinoid tumors have no symptoms. Carcinoids that do not cause symptoms often are found when you have a chest x-ray during a routine examination or to look into unrelated medical problems, such as some heart diseases.

## How Are Lung Carcinoid Tumors Diagnosed?

### Signs and Symptoms

**Central carcinoid** tumors start in the large bronchial tubes leading into the lung. If you have 1 of these, you may have a cough, may cough up bloody sputum, or may have wheezing symptoms like asthma. When a large carcinoid causes partial or complete blockage of a large air passage, you may develop a lung infection called **post-obstructive pneumonia**. Sometimes your doctor may suspect a tumor only after treatment with antibiotics fails to cure the pneumonia.

**Peripheral carcinoids** rarely cause symptoms unless there are so many of them they interfere with breathing. Usually they are found as a spot on a chest x-ray taken for an unrelated problem.

Some carcinoid tumors can produce hormone-like substances that are released into the bloodstream. Lung carcinoids do this far less often (10% to 20% of the time) than gastrointestinal carcinoid tumors. The **carcinoid syndrome** results from the effect of these substances. Symptoms include facial **flushing** (redness and warm feeling that may last hours to days), sweating, diarrhea, and a fast heartbeat. Some carcinoid tumors may produce adrenocorticotrophic hormone (ACTH), a hormone that stimulates your adrenal gland to produce excessive amounts of cortisol and related hormones. Symptoms of excessive amounts of these hormones include weight gain, weakness, secondary diabetes, and increased body and facial hair.

If you have 1 or more symptoms that suggest this you may have this a lung carcinoid tumor, your doctor will ask about other symptoms such as:

- cough
- chest pain
- wheezing
- asthma

- blood-tinged sputum
- pneumonia that is not cured by antibiotics
- recent weight gain
- facial flushing (redness)
- diarrhea

A thorough physical exam will provide information about signs of carcinoid tumor, such as the carcinoid syndrome, and other health problems.

### Imaging Tests

Imaging tests produce pictures or images of the inside of the body and are useful in finding carcinoid tumors and determining how far they have spread.

**Chest x-rays:** This will be done to look for a lung tumor. However, some carcinoids that are small or are in places where they are covered by other organs in the chest may not show up on a chest x-ray. If your doctor is still suspicious or if a vague abnormality appears on the chest x-ray, a CT scan may be ordered.

**Computed tomography (CT):** The CT scan is an X-ray procedure that produces detailed cross-sectional images of your body. Instead of taking one picture, like a conventional x-ray, a CT scanner takes many pictures as it rotates around you. A computer then combines these pictures into an image of a slice of your body. The machine will take pictures of multiple slices of the part of your body that is being studied.

CT scans are often used to find small lung tumors. The CT scan can help to determine if surgery is a good treatment option.

This test can help tell if your cancer has spread into your liver or other organs. Often after the first set of pictures is taken you will receive an intravenous injection of a "dye" or **radiocontrast agent** that helps better outline structures in your body. Then a second set of pictures is taken.

CT scans can also be used to guide a biopsy needle into a suspected tumor or metastasis. For this procedure, called a **CT-guided needle biopsy**, you remain on the CT scanning table while a radiologist (a doctor who specializes in reading x-rays) advances a biopsy needle toward the location of the mass. CT scans are repeated until the doctors are confident that the needle is within the mass. A fine needle biopsy sample (tiny fragment of tissue) or a core needle biopsy sample (a thin cylinder of tissue about ½ inch long and less than 1/8 inch in diameter) is removed and examined under a microscope.

CT scans are more tiring than regular x-rays because they take longer and you need to lie still on a table while they are being done. But just like other computerized devices, they are getting faster and your stay might be pleasantly short. Also, you might feel a bit confined by the ring you lie within when the pictures are being taken.

You will have an IV (intravenous) line through which the contrast "dye" is injected. The injection can also cause some flushing. Some people are allergic and get hives or rarely more serious reactions like trouble breathing and low blood pressure. Be sure to tell the doctor if you have ever had a reaction to any contrast material used for x-rays.

**Somatostatin Receptor Scintigraphy:** This is a scan technique that uses radioactive octreotide (octreotide is a hormone that when injected into the body, attaches to carcinoid tumors). A small amount of this radioactive hormone-like substance is injected into a vein. A special radioactivity-detecting camera is used to show where the radioactivity accumulates. This test is useful in detecting spread of lung carcinoid tumors to other areas of the body.

A similar test uses radioactive **meta-iodobenzylguanidine (MIBG)**. MIBG is another chemical that is taken up by carcinoid tumors. The MIBG is attached to radioactive iodine and injected into the bloodstream. If there is a carcinoid tumor, the radioactivity will go there and the scanner will detect it.

About one-third of carcinoids are diagnosed by accident, in people without any symptoms that suggest a carcinoid. In these cases, a chest x-ray done to evaluate an unrelated medical problem finds a lung mass.

Even if imaging tests such as a chest x-ray and/or CT scan find a mass, these imaging tests cannot show if the mass is a carcinoid tumor, a lung carcinoma, or a localized infection. The only way to know for sure is to remove cells from the tumor and examine

them under a microscope. This procedure is called a **biopsy**.

### **Bronchoscopy and Biopsy**

There are several ways to take a sample from a lung tumor. Tumors of large airways, such as central carcinoids, can be found and sampled by **bronchoscopic biopsy**. The doctor passes a long, thin, flexible, lighted tube called a **bronchoscope** down the throat to look at the lining of the lung's main airways. You will be sedated for this. When a tumor is found, the doctor can take a small sample of the tumor through the tube.

The advantages of this approach are that no surgical incision is needed, no hospital stay is needed, and you are ready to return home within hours. One disadvantage is that a bronchial biopsy may not always be able to remove enough tissue to be certain the tumor is a carcinoid. But, thanks to recent advances in laboratory testing of lung tumors, doctors can usually make a more accurate diagnosis even with very small samples.

Bleeding from a carcinoid tumor after a biopsy is rare but it can be a serious problem. If bleeding becomes a problem, doctors can inject drugs through the bronchoscope into the tumor to narrow its blood vessels, or they can seal off the bleeding vessels with a laser beam aimed through the bronchoscope.

Doctors can also take a **brushing** sample through the bronchoscope. They wipe a tiny brush over the surface of the tumor. The cells removed by the brush are smeared onto a microscope slide and examined in the lab. Brushing samples are sometimes a helpful addition to the bronchial biopsy but are not as helpful in diagnosing carcinoids as they are with lung carcinomas.

Tumors that are not near the large airways are often sampled by needle biopsy. A long needle is passed between the ribs into the lung. CT scan images are used to guide the needle into the tumor so that a small tissue sample can be removed for examination under the microscope. This procedure is also done without a surgical incision or overnight hospital stay. You may experience a collapse of one lung, called **pneumothorax**, after this procedure. But this complication can be treated by temporarily placing a suction tube into the chest. This will reexpand the lung.

In some cases, neither a bronchoscopic biopsy nor a needle biopsy can provide enough tissue to identify the type of tumor, and your doctor may need to surgically open your chest cavity. This procedure is called a **thoracotomy**. In other cases, when the doctors strongly suspect a carcinoid or some other type of lung cancer, they may do a thoracotomy and remove the entire mass without first doing a bronchoscopic biopsy or needle biopsy.

Recently, a less invasive procedure for removing small lung tumors has been developed. This is called **video-assisted thoracic surgery**. A small hollow tube with a video camera attached to the end can be placed through a small hole in the chest to help the surgeon see the tumor. Only small incisions are needed, so there is a little less pain after the surgery.

### **Other Tests**

Because the carcinoid tumor sometimes secretes chemicals into the blood like the ones that cause the carcinoid syndrome, the tumor can often be detected by simple laboratory tests. These abnormal substances are excreted in the urine and can be found by urine tests. Sometimes, blood tests may be done to detect some of the hormone-like substances produced by carcinoids, particularly if you have symptoms of the **carcinoid syndrome**, caused by excessive levels of these substances in the blood.

Although these substances are often made by carcinoid tumors that start elsewhere in the body, they are uncommon in people with lung carcinoids.

### **How Are Lung Carcinoid Tumors Staged?**

Staging is a process of finding out how localized or widespread the lung carcinoid tumor is. The treatment and **prognosis** (the outlook for chances of cure) for a lung carcinoid tumor depend, to a large extent, on its stage. Because carcinoid tumors are uncommon, there is no official staging system for these tumors. Generally, the staging system that most doctors use for lung carcinoid tumors is the same one used to stage non-small cell lung cancer.

The system most often used to describe the growth and spread of carcinoids and of non-small cell lung cancers is the **TNM** staging system, also known as the American Joint Committee on Cancer (AJCC) system.

**T** stands for tumor (its size and how far it has spread within the lung and to nearby organs).

**N** stands for spread to lymph nodes.

**M** is for spread to distant organs (**metastasis**).

In TNM staging, information about the tumor, lymph nodes, and metastasis is combined, and a stage is assigned to specific TNM groupings. The grouped stage is described using the number 0 and Roman numerals from I to IV.

### T Stages

**T1:** The cancer is no larger than 3 cm (slightly less than 1¼ inches), has not spread to the membranes that surround the lungs (visceral pleura), and does not affect the main branches of the bronchi.

**T2:** The cancer has 1 or more of the following features:

- It is larger than 3 cm.
- It involves a main bronchus but is not closer than 2 cm (about ¾ inch) to the point where the windpipe (trachea) branches into the left and right main bronchi.
- It has spread to the visceral pleura.
- The cancer may partially clog the airways, but this has not caused the entire lung to collapse or develop pneumonia.

**T3:** The cancer has 1 or more of the following features:

- It has spread to the chest wall, the breathing muscle that separates the chest from the abdomen (diaphragm), the membranes surrounding the space between the 2 lungs (mediastinal pleura), or membranes of the sac surrounding the heart (parietal pericardium).
- It involves a main bronchus and is closer than 2 cm (about ¾ inch) to the point where the windpipe (trachea) branches into the left and right main bronchi, but does not involve this area.
- It has grown into the airways enough to cause 1 lung to entirely collapse or to cause pneumonia of the entire lung.

**T4:** The cancer has 1 or more of the following features:

- It has spread to the space behind the chest bone and in front of the heart (mediastinum), the heart, the windpipe, the tube connecting the throat to the stomach (esophagus), the backbone, or the point where the windpipe branches into the left and right main bronchi (carina).
- Two or more separate tumor nodules are present in the same lobe.
- There is a fluid containing cancer cells in the space surrounding the lung.

### N Stages

**N0:** The cancer has not spread to lymph nodes.

**N1:** The cancer has spread to lymph nodes within the lung, hilar lymph nodes (located around the area where the bronchus enters the lung). The cancer has metastasized only to lymph nodes on the same side as the cancerous lung.

**N2:** The cancer has spread to lymph nodes around the point where the windpipe branches into the left and right bronchi or to lymph nodes in the **mediastinum** (space behind the chest bone and in front of the heart). The lymph nodes on the same side of the cancerous lung are affected.

**N3:** The cancer has spread to lymph nodes near the collarbone on either side, to hilar or mediastinal lymph nodes on the side opposite the cancerous lung.

## M Stages

**M0:** The cancer has not spread to distant sites.

**M1:** The cancer has spread to distant sites such as other lobes of the lungs, lymph nodes farther than those mentioned in N stages, and other organs or tissues such as the liver, bones, or brain.

## Stage Grouping

Once the T, N, and M categories have been assigned, this information is combined (stage grouping) to assign an overall stage of I, II, III, or IV. Patients with lower stage numbers have a more favorable outlook for survival.

**Stage 0 (Tis, N0, M0):** The cancer is found only in the layer of cells lining the air passages. It has not invaded other lung tissues nor spread to lymph nodes or distant sites.

**Stage IA (T1, N0, M0):** The cancer is no larger than 3 cm, has not spread to the membranes that surround the lungs, does not affect the main branches of the bronchi and has not spread to lymph nodes or distant sites.

**Stage IB (T2, N0, M0):** The cancer is larger than 3 cm, or involves a main bronchus, but is not near the carina (the point where the trachea divides into the left and right main bronchus); or it has spread to the pleura; or the cancer is partially clogging the airways. It has not spread to lymph nodes or distant sites.

**Stage IIA (T1, N1, M0):** The cancer is no larger than 3 cm, has not spread to the membranes that surround the lungs, and does not affect the main branches of the bronchi. It has spread to nearby or hilar lymph nodes, but not to distant sites.

**Stage IIB (T2, N1, M0 or T3, N0, M0):** The cancer is larger than 3 cm, or involves a main bronchus, but is not near the carina; or it has spread to the pleura or the cancer is partially clogging the airways. It has spread to nearby or hilar lymph nodes, but not to distant sites. **OR**, the cancer has spread to the chest wall or the diaphragm, the mediastinal pleura, or membranes surrounding the heart, or it invades a main bronchus and is close to the carina or it has grown into the airways enough to cause an entire lung to collapse or to cause pneumonia in the entire lung. It has not spread to lymph nodes or distant sites.

**Stage IIIA (T1 or 2, N2, M0 or T3, N1 or 2, M0):** The cancer can be any size, or involve a main bronchus, but is not near the carina or it has spread to the pleura or the cancer is partially clogging the airways. It has spread to nodes in the middle of the chest (mediastinum), but not to distant sites. **OR** the cancer has spread to the chest wall or the diaphragm, the mediastinal pleura, or membranes surrounding the heart, or it invades a main bronchus and is close to the carina or it has grown into the airways enough to cause an entire lung to collapse or to cause pneumonia in the entire lung. It has spread to lymph nodes anywhere in the chest on the same side as the cancer, but not to distant sites.

**Stage IIIB (T1, 2 or 3, N3, M0 or T4, N1,2 or 3, M0):** The cancer can be any size. It has spread to lymph nodes around the collarbone on either side, or to hilar or mediastinal lymph nodes on the side opposite the cancerous lung. **OR** the cancer has spread to the mediastinum, the heart, the windpipe (trachea), the esophagus (tube connecting the throat to the stomach), the backbone, or the carina or 2 or more separate tumor nodules are present in the same lobe, or there is a fluid containing cancer cells in the space surrounding the lung. The cancer may or may not have spread to lymph nodes. It has not spread to distant sites.

**Stage IV (Any T, Any N, M1):** The cancer has spread to distant sites.

## How Are Lung Carcinoid Tumors Treated?

*This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience.*

*The treatment information in this document is not official policy of the Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor.*

*Your doctor may have reasons for suggesting a treatment plan different from these general treatment options.*

*Don't hesitate to ask him or her questions about your treatment options.*

After the tumor is found and staged, your cancer care team will suggest treatment plans. Selecting a plan is an important decision, and you should take the time to think about all of your choices.

The main factors in selecting a treatment for lung carcinoid tumors are the size and location of the tumor, whether it has spread to lymph nodes or other organs, and if you have any other serious medical conditions. Seeking a second opinion is often a good idea. A second opinion may provide more information and help you feel more certain about the treatment plan you choose.

## **Surgery**

Surgery is the main treatment for lung carcinoid tumors. Most lung carcinoid tumors are cured by surgery alone. You should be referred to a thoracic or cardiothoracic surgeon who will tell you about the surgical options. The type of surgery will depend on a number of factors, including the size and location of the tumor and whether you have any other lung problems or serious diseases.

Several types of surgery are used to treat people with lung carcinoid tumors. Surgeons usually have to remove some normal lung tissue along with the tumor, but they try not to remove any more normal tissue than they need to.

To treat central carcinoids of a large airway, the surgeon may do a **sleeve resection**. If you think of the large airway with a tumor as similar to the sleeve of a shirt with a stain an inch or 2 above the wrist, the sleeve resection would be like cutting across the sleeve above and below the stain and sewing the cuff back onto the shortened sleeve.

If it is not possible to do a sleeve resection because of the size of the tumor and its exact location in a large airway, the surgeon will usually do a **lobectomy** (remove an entire lung lobe). Less often, it may be necessary to remove 2 lobes or, rarely, remove the entire left or right lung (this operation is called a **pneumonectomy**).

Carcinoids found at the edges of the lungs away from the large airways, called **peripheral carcinoids**, are usually treated by lobectomy. If the tumor is very small, the surgeon may remove a wedge-shaped piece of the lung in an operation called a **wedge resection**.

In most cases, the surgeon will also remove some lymph nodes near the lungs. This is important because about 10% of typical carcinoids and 30% to 50% of atypical carcinoids will have spread to lymph nodes by the time they are diagnosed. Not removing these nodes might increase the risk of the carcinoid tumor spreading even farther, to other organs. If this happens, you can no longer be cured by surgery. Removing the lymph nodes also provides some indication of your risk of having the cancer come back.

If you also have lung diseases, such as severe emphysema or chronic bronchitis, you may not be able to have your carcinoid treated surgically, because removing some normal lung tissue along with the cancer would cause you severe shortness of breath. If you have other medical problems, such as severe heart disease, you also may not be able to have curative surgery.

If this is the case, removing most of the tumor through a bronchoscope or vaporizing most of it with a laser, can be helpful. These treatments, called palliative procedures, can relieve symptoms caused by blockage of airways, but they cannot cure the cancer and are recommended only if you cannot have surgery to completely remove the tumor. If you are treated with these procedures you may also have external radiation or radiation given through the bronchus (see our document on radiation therapy).

As discussed above a less invasive procedure for treating early stage lung cancer, called video-assisted thoracic surgery, has been developed. Most experts recommend that only tumors smaller than 4 to 5 cm (about 2 inches) be treated with this method. This would apply to most carcinoids. The cure rate after this surgery seems to be the same as with older techniques. It is important, though, that the surgeon performing this procedure be experienced since it requires more technical skill than the standard surgery.

## **Chemotherapy**

Chemotherapy is the use of anticancer drugs that are injected into a vein or a muscle or taken by mouth. These drugs enter the bloodstream and reach all areas of the body, making this treatment useful for some types of lung cancer that have spread or metastasized to organs beyond the lungs. Unfortunately, carcinoid tumors are not usually sensitive to chemotherapy.

Chemotherapy is generally used only for carcinoid tumors that have spread to other organs, are causing severe symptoms, and have not responded to other medications. Some of the chemotherapy drugs used in this situation include streptozotocin, etoposide, cisplatin, cyclophosphamide, 5-fluorouracil, doxorubicin, and dacarbazine. Several chemotherapeutic drugs are sometimes used

together to treat metastatic carcinoid tumor, often in combination with other types of medications.

Chemotherapy drugs kill some cancer cells but can also affect some of the normal, healthy cells in your body, causing side effects. Rapidly growing cells, such as the blood-producing cells of bone marrow, cells of hair follicles, and cells lining the mouth, are particularly sensitive to chemotherapy. Possible side effects include:

- nausea, vomiting, and decrease in appetite
- temporary loss of hair
- mouth sores
- increased risk of infections (because of low white blood cell counts) or bleeding (because of low blood platelet counts)
- fatigue

If you have side effects, your cancer care team can suggest steps to ease them. For example, there are drugs to help prevent or control nausea and vomiting. Sometimes changing the dosage or the time of day you take your medicines can reduce side effects. Fortunately, most side effects will go away when your course of treatment ends.

Chemotherapy is only occasionally effective in shrinking carcinoid tumors. You should discuss with your doctors whether the side effects you might have are worth the small chance that you will get better.

### **Other Drugs for Treating Carcinoid Tumors**

Several medicines are available to control symptoms of carcinoid syndrome (problems caused by tumor-released substances. These substances can be found by blood and urine tests) if you have metastatic carcinoid tumors.

**Octreotide** is a drug chemically related to somatostatin, a natural hormone.. It is very helpful in treating the flushing (skin redness and feeling hot), diarrhea, and wheezing in carcinoid syndrome. It is given by **subcutaneous** (under the skin) injection. Sometimes octreotide can temporarily shrink carcinoid tumors, but it does not cure them. The medicine's side effects include pain at the injection site. It can also cause stomach cramps, nausea, vomiting, headaches, dizziness, and fatigue. Octreotide must be given at least twice daily. There is also a long-acting version of octreotide called Sandostatin LAR that can be given monthly.

**Lanreotide** is a drug similar to octreotide but has the advantage of being longer acting.. Lanreotide can be given every 10 days.

**Interferons** are substances that activate the body's immune system and suppress growth of some tumors. Alpha-interferon is helpful in shrinking some metastatic carcinoid tumors and improving symptoms of carcinoid syndrome. The drug has many side effects though. The major one is causing people to feel weak and tired - as if the person had the "flu." Interferon can also cause depression.

Other medicines are also available to control specific symptoms. Ask your doctor about them, or describe your symptoms to your doctor and ask about medicine for them.

### **Radiation Therapy**

Radiation therapy is the use of high-energy radiation to kill cancer cells. Although most cases of carcinoid tumor are cured by surgery alone, if for some reason you are unable to have surgery, radiotherapy may be an option. Radiation therapy is not usually very effective against most lung carcinoid tumors, however, and is seldom used.

**External beam radiation therapy** is the type of radiation used most often for lung cancer. It is like having a regular x-ray except it lasts a little longer. Patients typically have treatments for 5 days a week for several weeks. The main side effects of lung radiation therapy are fatigue (tiredness) and mild temporary, sunburn-like skin changes. If high doses are given, radiation damage to normal lung tissue can cause scar tissue formation, trouble breathing, and increased susceptibility to infection.

A radioactive drug has been useful in treating widespread carcinoid tumors. The drug meta-iodobenzylguanidine, or MIBG, attaches to carcinoid cells. When a radioactive iodine molecule is attached to MIBG, this compound can kill carcinoid cells. Doctors have used this drug effectively in patients who have advanced carcinoid tumors, and about half the patients showed improvement. Radioactive octreotide is being used in the same way.

## Clinical Trials

**The purpose of clinical trials:** Studies of promising new or experimental treatments in patients are known as clinical trials. A clinical trial is only done when there is some reason to believe that the treatment being studied may be valuable to the patient. Treatments used in clinical trials are often found to have real benefits. Researchers conduct studies of new treatments to answer the following questions:

- Is the treatment helpful?
- How does this new type of treatment work?
- Does it work better than other treatments already available?
- What side effects does the treatment cause?
- Are the side effects greater or less than the standard treatment?
- Do the benefits outweigh the side effects?
- In which patients is the treatment most likely to be helpful?

**Types of clinical trials:** There are 3 phases of clinical trials in which a treatment is studied before it is eligible for approval by the FDA (Food and Drug Administration).

**Phase I clinical trials:** The purpose of a phase I study is to find the best way to give a new treatment and how much of it can be given safely. The cancer care team watches patients carefully for any harmful side effects. The treatment has been well tested in lab and animal studies, but the side effects in patients are not completely known. Doctors conducting the clinical trial start by giving very low doses of the drug to the first patients and increasing the dose for later groups of patients until side effects appear. Although doctors are hoping to help patients, the main purpose of a phase I study is to test the safety of the drug.

**Phase II clinical trials:** These studies are designed to see if the drug works. Patients are given the highest dose that doesn't cause severe side effects (determined from the phase I study) and closely observed for an effect on the cancer. The cancer care team also looks for side effects.

**Phase III clinical trials:** Phase III studies involve large numbers of patients—often several hundred. One group (the control group) receives the standard (most accepted) treatment. The other group receives the new treatment. All patients in phase III studies are closely watched. The study will be stopped if the side effects of the new treatment are too severe or if one group has had much better results than the others.

If you are in a clinical trial, you will have a team of experts taking care of you and monitoring your progress very carefully. The study is especially designed to pay close attention to you.

However, there are some risks. No one involved in the study knows in advance whether the treatment will work or exactly what side effects will occur. That is what the study is designed to find out. While most side effects disappear in time, some can be permanent or even life threatening. Keep in mind, though, that even standard treatments have side effects. Depending on many factors, you may decide to enroll in a clinical trial.

**Deciding to enter a clinical trial:** Enrollment in any clinical trial is completely up to you. Your doctors and nurses will explain the study to you in detail and will give you a form to read and sign indicating your desire to take part. This process is known as giving your informed consent. Even after signing the form and after the clinical trial begins, you are free to leave the study at any time, for any reason. Taking part in the study does not prevent you from getting other medical care you may need.

To find out more about clinical trials, ask your cancer care team. Among the questions you should ask are:

- Is there a clinical trial for which I would be eligible?
- What is the purpose of the study?
- What kinds of tests and treatments does the study involve?
- What does this treatment do? Has it been used before?
- Will I know which treatment I receive?
- What is likely to happen in my case with, or without, this new treatment?
- What are my other choices and their advantages and disadvantages?

- How could the study affect my daily life?
- What side effects can I expect from the study? Can the side effects be controlled?
- Will I have to be hospitalized? If so, how often and for how long?
- Will the study cost me anything? Will any of the treatment be free?
- If I am harmed as a result of the research, what treatment would I be entitled to?
- What type of long-term follow-up care is part of the study?
- Has the treatment been used to treat other types of cancers?

The American Cancer Society offers a clinical trials matching service for patients, their family, and friends. You can reach this service at 1-800-303-5691 or on our Web site at <http://clinicaltrials.cancer.org>. Based on the information you provide about your cancer type, stage, and previous treatments, this service can compile a list of clinical trials that match your medical needs. In finding a center most convenient for you, the service can also take into account where you live and whether you are willing to travel.

You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll free at 1-800-4-CANCER or by visiting the NCI clinical trials Web site at [www.cancer.gov/clinical\\_trials/](http://www.cancer.gov/clinical_trials/).

### Complementary and Alternative Therapies

Complementary and alternative therapies are a diverse group of health care practices, systems, and products that are not part of usual medical treatment. They may include products such as vitamins, herbs, or dietary supplements, or procedures such as acupuncture, massage, and a host of other types of treatment. There is a great deal of interest today in complementary and alternative treatments for cancer. Many are now being studied to find out if they are truly helpful to people with cancer.

You may hear about different treatments from family, friends, and others, which may be offered as a way to treat your cancer or to help you feel better. Some of these treatments are harmless in certain situations, while others have been shown to cause harm. Most of them are of unproven benefit.

The American Cancer Society defines **complementary** medicine or methods as those that are used along with your regular medical care. If these treatments are carefully managed, they may add to your comfort and well-being.

**Alternative** medicines are defined as those that are used instead of your regular medical care. Some of them have been proven not to be useful or even to be harmful, but are still promoted as "cures." If you choose to use these alternatives, they may reduce your chance of fighting your cancer by delaying, replacing, or interfering with regular cancer treatment.

Before changing your treatment or adding any of these methods, discuss this openly with your doctor or nurse. Some methods can be safely used along with standard medical treatment. Others, however, can interfere with standard treatment or cause serious side effects. That is why it's important to talk with your doctor. More information about specific complementary and alternative therapies used for cancer is available through our toll-free number or on our Web site.

### Treatment of Lung Carcinoid by Stage

**Localized carcinoid:** Surgery is the main treatment if you have localized carcinoid. The surgery should remove the cancer and any nearby lymph nodes, especially if you have an atypical carcinoid which often spreads to lymph nodes.. Most patients will not need to add radiation therapy or chemotherapy. But some experts recommend additional treatment for people with atypical carcinoid that has spread to lymph nodes. This can be chemotherapy, radiation therapy or both. But there are no reported clinical trials that show people will live longer with the added therapy.

**Metastatic carcinoid:** The treatment of this stage depends on where the cancer is and whether you have symptoms of the carcinoid syndrome. In general, it is a slow-growing cancer, and chemotherapy has not proven very successful. If you have only a small number of tumors that can be removed, surgery is your best option. Another option, if the carcinoid involves only your liver, would be liver transplantation. This is still an experimental procedure that is performed at only a few transplant centers.

If the carcinoid is in your liver and is causing symptoms, 2 kinds of treatment have been tried and have been successful. The first is placing small particles of materials like gelfoam, a kind of sponge-like material made from animal skin gelatin, into the arteries that run into the liver and the cancer. This keeps the cancer from getting nourishment and causes many of the cells to die. A second approach is to tie off the arteries leading to the liver and the cancer.

Both are temporarily effective, although these procedures can cause serious side effects as the cancer cells and liver cells die. You might experience liver pain, fever, and severe weakness. These usually pass but have sometimes been fatal. It is important that your doctor has experience with these procedures.

If your liver cannot be treated directly, or the carcinoid has spread to other parts of your body, then drugs can be useful. The most useful are octreotide or lanreotide, which can stop the secretion of the chemicals that cause the carcinoid syndrome and also can sometimes actually shrink the cancers. Another drug, alpha-interferon, can act the same way. Sometimes these 2 drugs are given together. Adding chemotherapy may also help reduce symptoms. It seldom shrinks the tumor very much more.

Other possible treatments are radiation therapy for localized tumors and radioactive MIBG for more widespread disease.

### **More Treatment Information**

For more details on treatment options -- including some that may not be addressed in this document -- the National Comprehensive Cancer Network (NCCN) and the National Cancer Institute (NCI) are good sources of information.

The NCCN, made up of experts from 20 of the nation's leading cancer centers, develops cancer treatment guidelines for doctors to use when treating patients. Those are available on the NCCN Web site ([www.nccn.org](http://www.nccn.org)).

### **What Should You Ask Your Doctor About Lung Carcinoid Tumors?**

It is important to have frank, open discussions with your cancer care team. They want to answer all of your questions, no matter how trivial you might think they are. For instance, consider these questions:

- What kind of carcinoid tumor do I have?
- Has my carcinoid tumor spread beyond the lungs?
- What is the stage of my carcinoid tumor and what does that mean in my case?
- What treatment choices do I have?
- What do you recommend and why?
- Based on what you've learned about my carcinoid tumor, how long do you think I'll survive?
- What risks or side effects are there to the treatments you suggest?
- What are the chances of recurrence of my carcinoid tumor with these treatment plans?
- What should I do to be ready for treatment?

In addition to these sample questions, be sure to write down some of your own. For instance, you might want more information about recovery times so that you can plan your work schedule. Or you may want to ask about second opinions or about clinical trials for which you may qualify.

### **What Happens After Treatment for Lung Carcinoid Tumor?**

Completing treatment can be both stressful and exciting. You will be relieved to finish treatment, yet it is hard not to worry about cancer coming back. (When cancer returns, it is called recurrence.) This is a very common concern among those who have had cancer.

It may take a while before your confidence in your own recovery begins to feel real and your fears are somewhat relieved. Even with no recurrences, people who have had cancer learn to live with uncertainty.

### **Follow-up Care**

After your treatment is over, it is very important to keep all follow-up appointments. During these visits, your doctors will ask about symptoms, do physical exams, and order blood tests or imaging studies such as CT scans or x-rays. Follow-up is needed to check for cancer recurrence or spread, as well as possible side effects of certain treatments. This is the time for you to ask your health care team any questions you need answered and to discuss any concerns you might have.

Almost any cancer treatment can have side effects. Some may last for a few weeks to several months, but others can be permanent. Don't hesitate to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them.

It is also important to keep medical insurance. Even though no one wants to think of their cancer coming back, it is always a possibility. If it happens, the last thing you want is to have to worry about paying for treatment. Many people have been bankrupted by cancer recurrence.

### **Seeing a New Doctor**

At some point after your cancer diagnosis and treatment, you may find yourself in the office of a new doctor. Your original doctor may have moved or retired, or you may have moved or changed doctors for some reason. It is important that you be able to give your new doctor the exact details of your diagnosis and treatment. Make sure you have the following information handy:

- a copy of your pathology report from any biopsy or surgery
- if you had surgery, a copy of your operative report
- if you were hospitalized, a copy of the discharge summary that every doctor must prepare when patients are sent home from the hospital
- finally, since some drugs can have long-term side effects, a list of your drugs, drug doses, and when you took them

### **Lifestyle Changes to Consider During and After Treatment**

Having cancer and dealing with treatment can be time-consuming and emotionally draining, but it can also be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term. Some people even begin this process during cancer treatment.

#### **Make Healthier Choices**

Think about your life before you learned you had cancer. Were there things you did that might have made you less healthy? Maybe you drank too much alcohol, or ate more than you needed, or smoked, or didn't exercise very often. Emotionally, maybe you kept your feelings bottled up, or maybe you let stressful situations go on too long.

Now is not the time to feel guilty or to blame yourself. However, you can start making changes *today* that can have positive effects for the rest of your life. Not only will you feel better but you will also be healthier. What better time than *now* to take advantage of the motivation you have as a result of going through a life-changing experience like having cancer?

You can start by working on those things that you feel most concerned about. Get help with those that are harder for you. For instance, if you are thinking about quitting smoking and need help, call the American Cancer Society's Quitline® tobacco cessation program at 1-800-ACS-2345.

#### **Diet and Nutrition**

Eating right can be a challenge for anyone, but it can get even tougher during and after cancer treatment. For instance, treatment often may change your sense of taste. Nausea can be a problem. You may lose your appetite for a while and lose weight when you don't want to. On the other hand, some people gain weight even without eating more. This can be frustrating, too.

If you are losing weight or have taste problems during treatment, do the best you can with eating and remember that these problems usually improve over time. You may want to ask your cancer team for a referral to a dietitian, an expert in nutrition who can give you ideas on how to fight some of the side effects of your treatment. You may also find it helps to eat small portions every 2 to 3 hours until you feel better and can go back to a more normal schedule.

One of the best things you can do after treatment is to put healthy eating habits into place. You will be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Try to eat 5 or more servings of vegetables and fruits each day. Choose whole grain foods instead of white flour and sugars. Try to limit meats that are high in fat. Cut back on processed meats like hot dogs, bologna, and bacon. Get rid of them altogether if you can. If you drink alcohol, limit yourself to 1 or 2 drinks a day at the most. And don't forget to get some type of regular exercise. The combination of a good diet and regular exercise will help you maintain a healthy weight and keep you feeling more energetic.

### **Rest, Fatigue, Work, and Exercise**

Fatigue is a very common symptom in people being treated for cancer. This is often not an ordinary type of tiredness but a "bone-weary" exhaustion that doesn't get better with rest. For some, this fatigue lasts a long time after treatment, and can discourage them from physical activity.

However, exercise can actually help you reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel physically and emotionally improved and can cope better.

If you are ill and need to be on bed rest during treatment, it is normal to expect your fitness, endurance, and muscle strength to decline some. Physical therapy can help you maintain strength and range of motion in your muscles, which can help fight fatigue and the sense of depression that sometimes comes with feeling so tired.

Any program of physical activity should fit your own situation. An older person who has never exercised will not be able to take on the same amount of exercise as a 20-year-old who plays tennis 3 times a week. If you haven't exercised in a few years but can still get around, you may want to think about taking short walks.

Talk with your health care team before starting, and get their opinion about your exercise plans. Then, try to get an exercise buddy so that you're not doing it alone. Having family or friends involved when starting a new exercise program can give you that extra boost of support to keep you going when the push just isn't there.

If you are very tired, though, you will need to balance activity with rest. It is okay to rest when you need to. It is really hard for some people to allow themselves to do that when they are used to working all day or taking care of a household. (For more information about fatigue, please see the publication, "Cancer Related Fatigue and Anemia Treatment Guidelines for Patients.")

Exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- It strengthens your muscles.
- It reduces fatigue.
- It lowers anxiety and depression.
- It makes you feel generally happier.
- It helps you feel better about yourself.

And long term, we know that exercise plays a role in preventing some cancers. The American Cancer Society, in its guidelines on physical activity for cancer prevention, recommends that adults take part in at least 1 physical activity for 30 minutes or more on 5 days or more of the week. Children and teens are encouraged to try for at least 60 minutes a day of energetic physical activity on at least 5 days a week.

### **How About Your Emotional Health?**

Once your treatment ends, you may find yourself overwhelmed by emotions. This happens to a lot of people. You may have been going through so much during treatment that you could only focus on getting through your treatment.

Now you may find that you think about the potential of your own death, or the effect of your cancer on your family, friends, and career. You may also begin to re-evaluate your relationship with your spouse or partner. Unexpected issues

may also cause concern -- for instance, as you become healthier and have fewer doctor visits, you will see your health care team less often. That can be a source of anxiety for some.

This is an ideal time to seek out emotional and social support. You need people you can turn to for strength and comfort. Support can come in many forms: family, friends, cancer support groups, church or spiritual groups, online support communities, or individual counselors.

Almost everyone who has been through cancer can benefit from getting some type of support. What's best for you depends on your situation and personality. Some people feel safe in peer-support groups or education groups. Others would rather talk in an informal setting, such as church. Others may feel more at ease talking one-on-one with a trusted friend or counselor. Whatever your source of strength or comfort, make sure you have a place to go with your concerns.

The cancer journey can feel very lonely. It is not necessary or realistic to go it all by yourself. And your friends and family may feel shut out if you decide not to include them. Let them in -- and let in anyone else who you feel may help. If you aren't sure who can help, call your American Cancer Society at 1-800-ACS-2345 and we can put you in touch with an appropriate group or resource.

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life -- making healthy choices and feeling as well as possible, physically and emotionally.

## What's New in Lung Carcinoid Tumor Research and Treatment?

Research is ongoing in the field of lung cancer. Scientists are looking for causes and ways to prevent carcinoid tumors. Present and current carcinoid tumor research is focused on identifying causes and improving diagnosis and treatment of metastatic tumors.

**Genetics:** Researchers have made great progress in understanding how certain changes in DNA can cause normal cells to become cancerous. DNA is the molecule that carries the instructions for nearly everything our cells do. We usually resemble our parents because they are the source of our DNA.

However, DNA affects more than our outward appearance. Some *genes* (parts of our DNA) contain instructions for controlling when our cells grow and divide. Certain genes that promote cell division are called *oncogenes*. Others that slow down cell division or cause cells to die at the appropriate time are called *tumor-suppressor genes*. It is known that cancers can be caused by DNA *mutations* (defects) that turn on oncogenes or turn off tumor-suppressor genes. Researchers have characterized many of the DNA changes in lung carcinoids in the past few years.

We expect that continued research in understanding these changes will lead to new tests for earlier diagnosis and new drugs for more effective treatment.

**Diagnosis:** Because the outlook and treatment of lung carcinoids and lung carcinomas are very different, accurate diagnosis is important. Researchers have made great progress in developing tests that can detect specific substances found in the cells of carcinoid tumors but not lung cancers. Other substances may be found in both carcinoids and carcinomas, but higher levels are found in one type. Most of these tests involve treating tissue samples with special antibodies produced in the laboratory. The antibodies are designed to recognize specific substances in certain types of tumors.

**Imaging tests:** Researchers are testing indium-111-DTPA-octreotide scintigraphy scan (octreoscan) and other nuclear medicine methods to detect carcinoid tumors earlier.

**Treatment:** New chemotherapy agents are being tested to find treatments that are active against carcinoids. One such agent is a chemical called 7-hydroxytryptophan. This chemical, which is similar to naturally occurring ones, can be toxic to carcinoid tumor cells in test tube experiments. This agent hasn't been studied in clinical trials yet.

## Additional Resources

### More Information From Your American Cancer Society

We have selected some related information that may also be helpful to you. These materials can be ordered from our toll-free

number 1-800-ACS-2345.

After Diagnosis: A Guide for Patients and Families (also available in Spanish)

Caring for the Patient With Cancer at Home (also available in Spanish)

Guide to Quitting Smoking (also available in Spanish)

Questions About Smoking, Tobacco, and Health (also available in Spanish)

Pain Control: A Guide for People With Cancer and Their Families (also available in Spanish)

Surgery (also available in Spanish)

Understanding Radiation Therapy: A Guide for Patients and Families (also available in Spanish)

The following books are available from the American Cancer Society. Call us at 1-800-ACS=2345 to ask about costs or to place your order.

*Cancer in the Family: Helping Children Cope With a Parent's Illness*

*Caregiving: A Step-By-Step Resource for Caring for the Person with Cancer at Home*

### **National Organizations and Web Sites\***

In addition to the American Cancer Society, other sources of patient information and support include:

Lung Cancer Alliance

Telephone: 1-800-298-2436 or (202) 463-2080

Internet address: [www.lungcanceralliance.org](http://www.lungcanceralliance.org)

American Lung Association

Telephone: 1-800-586-4872 or (212) 315-8700

Internet address: [www.lungusa.org](http://www.lungusa.org)

The Carcinoid Cancer Foundation, Inc.

Telephone: 1-212-722-3132

Internet address: [www.carcinoid.org](http://www.carcinoid.org)

National Cancer Institute

Telephone 1-800-4-CANCER (1-800-422-6237) 1-800-332-8615 (TTY)

Internet address: [www.nci.nih.gov](http://www.nci.nih.gov) and [cancernet.nci.nih.gov](http://cancernet.nci.nih.gov)

*\*Inclusion on this list does not imply endorsement by the American Cancer Society.*

The American Cancer Society is happy to address almost any cancer-related topic. If you have any more questions, please call us at 1-800-ACS-2345 at any time, 24 hours a day.

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For additional assistance please contact your American Cancer Society  
1 · 800 · ACS-2345 or [www.cancer.org](http://www.cancer.org)