

Adenocarcinomas

Adenocarcinoma

This is a cancer originating in glandular tissue. This tissue is also part of a larger tissue category known as epithelial. Epithelial tissue includes, but is not limited to, skin, glands and a variety of other tissue that lines the cavities and organs of the body. Epithelium is derived embryologically from ectoderm, endoderm and mesoderm.

To be classified as adenocarcinoma, the cells do not necessarily need to be part of a gland, as long as they have secretory properties. This form of carcinoma can occur in some higher mammals, including humans. Well differentiated adenocarcinomas tend to resemble the glandular tissue that they are derived from, while poorly differentiated may not. By staining the cells from a biopsy, a pathologist will determine whether the tumor is an adenocarcinoma or some other type of cancer.

Adenocarcinomas can arise in many tissues of the body due to the ubiquitous nature of glands within the body. While each gland may not be secreting the same substance, as long as there is an exocrine function to the cell, it is considered glandular and its malignant form is therefore named adenocarcinoma.

Endocrine gland tumors, such as a vipoma, an insulinoma, a pheochromocytoma, etc, are typically not referred to as adenocarcinomas, but rather, are often called neuroendocrine tumors. If the glandular tissue is abnormal, but benign, it is said to be an adenoma. Benign adenomas typically do not invade other tissue and rarely metastasize. Malignant adenocarcinomas invade other tissues and often metastasize given enough time to do so.

- A *Helicobacter pylori* infection seems to be the cause of most stomach cancer.
- Vague abdominal discomfort, weight loss, and weakness are some typical symptoms.
- The best diagnostic procedure is an endoscopy.

- The survival rate is low because the cancer tends to spread early to other sites.
- Surgery is performed to eliminate the cancer or relieve symptoms.

About 95% of stomach cancers are adenocarcinomas. Adenocarcinomas of the stomach originate from the glandular cells of the stomach lining.

In the United States, adenocarcinoma of the stomach occurs in about 21,000 people each year and is the seventh most common cause of cancer death. It is more common among certain populations: people aged 50 and older, poor people, blacks, Hispanics, American Indians, and people who live in northern climates. For unknown reasons, adenocarcinoma of the stomach is becoming less common in the United States. It is far more common in Japan, China, Chile, and Iceland. In these nations, screening programs are an important means of early detection.

Causes and Risk Factors

Adenocarcinoma of the stomach often begins at a site where the stomach lining is inflamed. Many experts now believe that an infection with the bacterium *Helicobacter pylori* is the cause of most stomach cancer.

Stomach polyps may become cancerous (malignant) and are thus removed. Adenocarcinoma of the stomach is particularly likely to develop if the polyps consist of glandular cells, if the polyps are larger than $\frac{3}{4}$ inch (2 centimeters), or if several polyps exist.

Certain dietary factors were once thought to play a role in the development of adenocarcinoma of the stomach. These factors included a high intake of salt, a high intake of carbohydrates, a high intake of preservatives called nitrates (often present in smoked foods), and a low intake of fruit and green leafy vegetables. However, none of these factors has proven to be a cause.

Rare Types of Stomach Cancer

Lymphoma is cancer of the lymphatic system. Lymphoma can develop within the stomach. The bacterium *Helicobacter pylori* are believed to

play a role in the development of some lymphomas of the stomach. Surgery is often the initial treatment. Chemotherapy and radiation therapy are more successful in treating lymphoma than adenocarcinoma. Longer survival and even cure are possible. Leiomyosarcoma (also called stromal cell tumor or spindle cell tumor) is cancer of the smooth muscle of the stomach. It is best treated with surgery. If cancer has already spread (metastasized) to other parts of the body at the time a leiomyosarcoma is found, then chemotherapy may lead to slightly longer survival. A newer drug, Imatinib, Trade Names GLEEVEC, has been found to be effective in treating leiomyosarcoma that cannot be treated with surgery.

Symptoms

In the early stages, symptoms are vague and easily ignored. Early symptoms may mimic peptic ulcer disease, with burning abdominal pain. Therefore, peptic ulcer symptoms that do not resolve with treatment may indicate stomach cancer. The person may notice a feeling of fullness after a small meal (early satiety). Weight loss or weakness usually results from difficulty in eating or from an inability to absorb some vitamins and minerals. Anemia, characterized by fatigue, weakness, and light-headedness, may result from very gradual bleeding that causes no other symptoms, from malabsorption of vitamin B₁₂ (a vitamin needed for red blood cell formation), or from malabsorption of iron (a mineral needed for red blood cell formation) due to a lack of stomach acid. Uncommonly, a person may vomit large amounts of blood (hematemesis) or pass black tarry stools (melena). When adenocarcinoma is advanced, a doctor may be able to feel a mass when pressing on the abdomen.

Even in the early stages, a small adenocarcinoma may spread (metastasize) to distant sites. The spread of the tumor may cause liver enlargement, a yellowish discoloration of the skin and the whites of the eyes (jaundice), fluid accumulation and swelling in the abdominal cavity (ascites), and cancerous skin nodules. The spreading cancer also may weaken bones, leading to bone fractures.

Diagnosis

Endoscopy (an examination in which a flexible tube is used to visualize the inside of the digestive tract) is the best diagnostic procedure. It allows a doctor to view the stomach directly, to check for *Helicobacter pylori*, and to remove tissue samples for examination under a microscope (biopsy). Barium x-rays are used less often because they rarely reveal small early-stage cancers and do not allow for biopsy.

If cancer is found, people usually have a computed tomography (CT) scan of the chest and abdomen to determine the extent to which the tumor has spread to other organs. If the CT scan does not show the tumor has spread, doctors usually perform an endoscopic ultrasound (which shows the lining of the digestive tract more clearly because the probe is placed on the tip of the endoscope) to determine the depth of the tumor and the involvement of nearby lymph nodes.

Prognosis and Treatment

Fewer than 15% of people with adenocarcinoma of the stomach survive longer than 5 years. The cancer tends to spread early to other sites. If the cancer is confined to the stomach, surgery is usually performed to try to cure it. Removal of the entire tumor before it has spread offers the only hope of cure. Most or all of the stomach and nearby lymph nodes are removed. The prognosis is good if the cancer has not penetrated the stomach wall too deeply.

In the United States, the results of surgery are often poor, because most people have extensive cancer by the time a diagnosis is made. In Japan, where stomach cancer is very common, mass public health screening programs help to detect it early so that a cure is more likely. Chemotherapy and radiation therapy may help in certain circumstances.

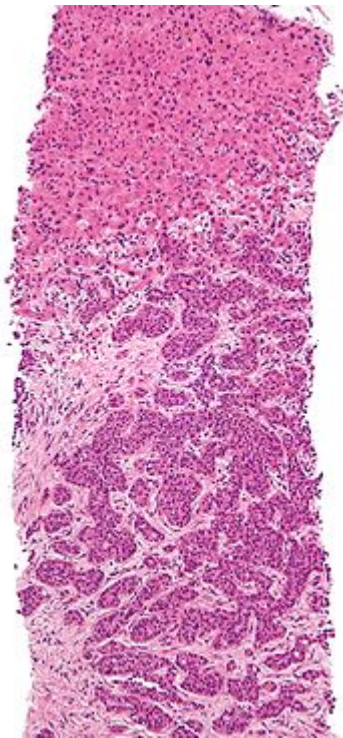
If the cancer has spread beyond the stomach, surgery cannot cure the condition, but it is sometimes used to relieve symptoms. For example, if the passage of food is obstructed at the far end of the stomach, a bypass

operation, in which an alternate connection is made between the stomach and the small intestine, allows food to pass. This connection relieves the symptoms of obstruction—pain and vomiting—at least for a while. Chemotherapy and radiation therapy may relieve symptoms as well, but their effectiveness is limited.

Diagnostic significance

Adenocarcinoma, NOS

Classification and external resources



Micrograph of an adenocarcinoma (lower two-thirds of image). Liver biopsy.

A diagnosis of *adenocarcinoma* which is not further described, known as *adenocarcinoma not otherwise specified* or *adenocarcinoma NOS*, is significant because it indicates a cancerous process is present. However, it is not very useful for treatment decisions and prognosis, as these are determined by the tissue from which the tumor cells arose, i.e. the tissue of origin; an

adenocarcinoma of the colon has a different prognosis and treatment than an adenocarcinoma of the ovary.

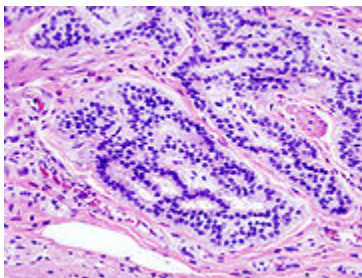
Adenocarcinoma not otherwise specified is often a preliminary diagnosis and can frequently be clarified by a pathologist with the use of immunohistochemistry. Cancer for which a primary site cannot be found is called cancer of unknown primary.

Colon

- [colon](#)



Gross appearance of a colectomy specimen containing two adenomatous polyps (the brownish oval tumors above the labels, attached to the normal beige lining by a stalk) and one invasive colorectal carcinoma (the crater-like, reddish, irregularly-shaped tumor located above the label).



Histopathological image of colonic carcinoid stained by hematoxylin and eosin.

The vast majority of colorectal cancer is an adenocarcinoma. This is because the colon has numerous glands within the tissue. Normal colonic glands tend to be simple and tubular in appearance with a mixture of mucus secreting goblet cells and water absorbing cells. These glands are called glands because they secrete a substance into the lumen of the colon, this substance being mucus. The purpose of these glands is twofold.

- The first is to absorb water from the feces back into the blood.
- The second purpose is to secrete mucus into the colon lumen to lubricate the now dehydrated feces.

This is crucial as a failure to lubricate the feces can result in colonic damage by the feces as it passes towards the rectum.

When these glands undergo a number of changes at the genetic level, they proceed in a predictable manner as they move from benign to an invasive, malignant colon cancer.

In their research paper “Lessons from Hereditary Colorectal Cancer”, Vogelstein, et al., suggested that colon cells lose the APC tumor suppressor gene and become a small polyp. Next, they suggested that k-Ras becomes activated and the polyp becomes a small, benign, adenoma. The adenoma, lacking the ‘carcinoma’ attached to the end of it, suggests that it is a benign version of the malignant adenocarcinoma.

The gastroenterologist uses a colonoscopy to find and remove these adenomas and polyps to prevent them from continuing to acquire genetic changes that will lead to an invasive adenocarcinoma. Vogelstein et al. went on to suggest that loss of the DCC gene and of p53 result in a malignant adenocarcinoma.

Grossly, one will see a mass that looks of a different color than the surrounding tissue. Bleeding from the tumor is often apparent as the tumor tends to grow blood vessels into it in a haphazard manner via secretion of a number of angiogenesis promoting factors such as VEGF.

Histologically, a glandular structure, similar to the healthy normal surrounding glands may be seen. If they look very similar, this is a low grade, well differentiated tumor. Often these glands will be disorganized and they will be seen growing back to back. However, if the tumor does not look like a gland anymore, it is a high grade tumor with poor differentiation.

Regardless of the grade, malignant tumors tend to have a large nucleus with prominent nucleoli. There will also be a noticeable increase in the incidence of mitoses, or cell divisions.

Lung

- ***lung non-small cell***

Currently, the most common type of lung cancer in lifelong non-smokers is the adenocarcinoma. Adenocarcinomas account for approximately 10% of lung cancers. This cancer usually is seen peripherally in the lungs, as opposed to small cell lung cancer and squamous cell lung cancer, which both tend to be more centrally located.

The adenocarcinoma has an increased incidence in smokers, but is also the most common type of lung cancer seen in non-smokers. Adenocarcinoma of the lung tends to stain mucin positive as it is derived from the mucus producing glands of the lungs. Similar to other adenocarcinoma, if this tumor is well differentiated (low grade) it will resemble the normal glandular structure. Poorly differentiated adenocarcinoma will not resemble the normal glands (high grade) and will be detected by seeing that they stain positive for mucin (which the glands produce).

Urogenital

- cervix
- prostate
- urachus
- vagina

Other

- breast
- esophagus
- Pancreas (*95% of pancreatic cancers are ductal adenocarcinomas.*)

- stomach

Nutrition Therapy Program

Nourishing your body with a healthy, well-balanced diet is one way you can help yourself in the fight against cancer. Adequate nutrition and prevention of malnutrition is very important during this time. Every patient should receive a nutrition assessment and a personalized nutrition plan designed to keep you nourished, reduce treatment-related side effects, and enhance your overall well-being and quality of life. We believe that nutrition should be a key component of the patient's personalized cancer treatment plan.

Nutrition in Cancer Care

There is a lot you can do to give yourself the best chance to win the fight against cancer. Staying nutritionally fortified is one positive way to take control of your life and your well-being. Optimal nutrition allows your body to function at its best. Maintaining optimal nutrition can provide several benefits for people living with cancer, including:

- *Support immune function*
- *Preserve lean body cell mass*
- *Rebuild body tissue*
- *Decrease your risk of infection*
- *Improve strength and increase energy*
- *Improve your tolerance to treatment*
- *Help you recuperate faster after treatment*
- *Improve quality of life*

Good nutrition is essential to keep you strong—to increase the chance that your cancer treatment goes uninterrupted. Your body needs more ‘fuel’ than normal during this time, because it needs to repair from the effects of cancer treatments, such as surgery, radiation therapy and/or chemotherapy. If you are unable to consume the fuel you need, your body will soon draw upon what it has stored—fat and protein. When your body uses stored protein, malnutrition and impaired functioning of your immune system may result.

According to the National Cancer Institute, about one-third of all cancer deaths are related to *malnutrition*. Therefore, it is important to give your body a constant supply of nutrients to use as fuel during the healing process. This supply of nutrients includes calories from all macronutrients, including carbohydrates, protein and fat.

The goal for you is to prevent malnutrition, reduce side effects, promote positive healthy eating habits, and enhance your overall well-being and quality of life—with an emphasis on proactive nutrition intervention.

The assessment may include:

- *Laboratory analysis of the blood* – this determines the status of your immune system (immuno-competence) and protein stores
- *Medical and nutrition history* – this provides the insight into your appetite, food preferences, the status of your digestive system, and any existing or potential complications
- *Nutrition anthropometrics* – take body measurements to determine your percent of body fat and loss of lean tissue

The following additional areas are:

- *Calorimetry* – to assess your calorie requirements.
- *Creating a diet profile* – a ten day nutrient intake analysis is prepared for you to follow.
- *Nitrogen balance* – a measurement of protein loss to determine if your body is using protein properly.

Use your personalized nutrition plan, focusing on managing side effects of cancer treatment, recommend supplements to improve your use of calories, and help find foods your body can tolerate. Adequate protein, calories and high-nutrient foods are essential during this time. As part of your care plan, include immune-boosting foods designed to complement your cancer treatments with the fortifying effects of nutritional support.

Selections include fish, poultry, legumes, yogurt, fruits and vegetables, whole grains and cereals, and other healthy food choices. Ensure a variety

in the diet. Include supplements to make sure you are getting the necessary nutrients if you are not able to keep whole foods down. Make certain that you receive a well-balanced diet rich in phytochemicals, vitamins and minerals.

Vitamin and Mineral Supplementation

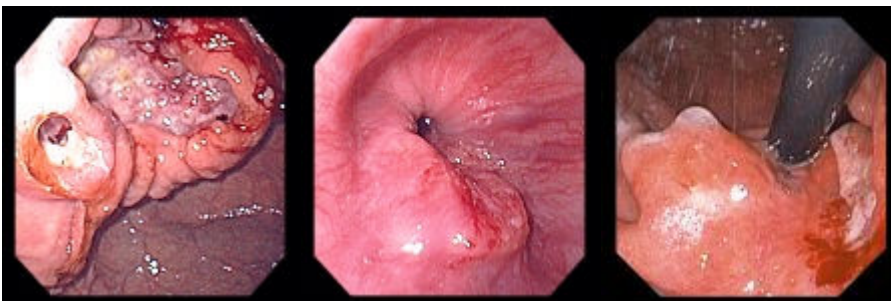
Vitamin and mineral supplements provide nutrients that your diet may not, and offer a boost where illness may have depleted your body's stores. The supplementation plan includes nutrients that may help support your immune system and reduce toxic side effects. A daily dosages of various nutrients, is recommend, including:

- *Beta carotene*
- *Selenium*
- *Vitamin C*
- *Eicosapentaenoic acid (EPA)*
- *Vitamin E*
- *Others as appropriate*

It is advisable to reduce as far as possible the amount of simple carbohydrates consumed (high glyesmic index foods). This will help keep the sugar levels down and starve the cancer cells of their primary nutrition. Weak cancerous cells can be more easily overwhelmed and destroyed by the treatment.

Have more proteins and natural fats and complex carbohydrates (low glyesmic index foods).

Some visuals



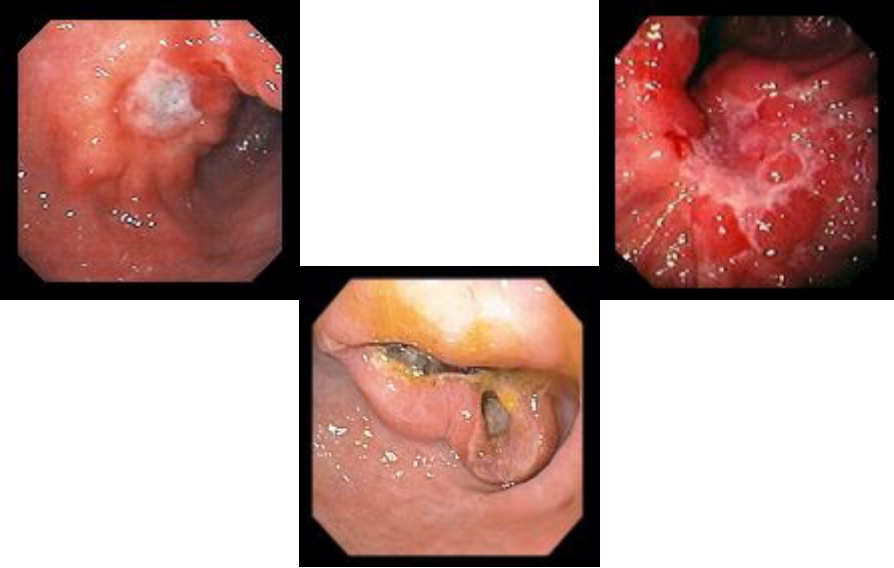
Left: 71 year-old man with dysphagia. Endoscopy revealed an ulcerated mass in the gastric cardia, seen here at retroflexion. **(center)** Esophageal symptoms were caused by upward extension of the tumor into distal esophagus. **Right:** Ulcerated neoplastic mass arising in the gastric cardia of a 34 year-old man. Biopsy revealed the lesion to be adenocarcinoma.



Left: 46 year-old man with no prior gastrointestinal symptoms, presented with five days of epigastric pain. Initial studies revealed iron-deficiency anemia and blood in the stool. Endoscopy demonstrated this lesion on the lesser curvature which appeared to be edematous folds with a central ulceration, but which on biopsy proved to be a poorly differentiated adenocarcinoma, signet ring cell type.

Center: 50 year-old man who had undergone seemingly successful resection of adenocarcinoma involving the gastric antrum, now undergoing endoscopy for routine postoperative screening several months later. Endoscopy revealed a poorly distensible, ulcerated distal gastric remnant. Biopsies confirmed the suspicion of recurrent carcinoma.

Right: 87 year-old woman was found to be anemic and to have occult blood in the stool; she had no gastrointestinal symptoms of any kind. Endoscopy revealed this ulcerated, sessile, polypoid mass which proved to be adenocarcinoma on biopsy.



Left: 82 year-old woman who presented with early satiety and postprandial vomiting, suggestive of gastric outlet obstruction, along with weight loss and anemia. Endoscopy demonstrated an ulcerated mass with prominent folds, which did not obstruct the gastric outlet. The lesion was an adenocarcinoma of the signet ring cell type.

Center: 54 year-old woman with abdominal pain. Biopsies of this ulcer, with raised margins, revealed poorly differentiated adenocarcinoma, signet-ring type.

Right: 70 year-old man with melena as his only presenting symptom; no nausea, vomiting, early satiety or pain. Endoscopy revealed a partially obstructing adenocarcinoma, seen here from the antrum. The tumor extended into the second portion