

Common Cancers and Associated Tumor Markers

What Should You Ask Your Doctor About Tumor Markers?

It is important to talk openly with your cancer care team. Don't be afraid to ask any question that's on your mind, no matter how small or silly it might seem to you. Here are some questions you might ask. Be sure and add your own.

- Do I have any elevated tumor markers?
- Which tumor markers are elevated?
- What does this mean for me?
- Does the elevation in my tumor marker(s) change my treatment?
- Will you use these markers to evaluate my treatment?
- How often will I be tested?

Bladder Cancer

No urinary tumor markers are recommended for bladder cancer screening. But the *bladder tumor antigen (BTA)* and the *NMP22* tests can be used along with cystoscopy (using a thin, lighted tube to look in the bladder for cancer) in diagnosing it.

These tests are also being used to follow some patients after treatment, though cystoscopy and urine cytology (using a microscope to look for cancer cells in the urine) are still recommended as the standard tests for diagnosis and follow-up. It is too early to tell if these tests will take the place of urine cytology and cystoscopy or if they will best be used along with these tests. Other tumor markers are also being studied in this setting.

For advanced cancer, some of the markers used for other cancers such as *CEA*, *CA 125*, *CA 19-9*, and *TPA* may be elevated and can be used to follow patients during and after treatment.

(For more information refer to the ACS document [Bladder Cancer](#).)

Breast Cancer

No tumor marker has been found to be useful for screening or for the diagnosis of early stage breast cancer.

At the time of diagnosis, breast cancer tissue is often tested for *estrogen* and *progesterone receptors*, as well as the *HER2/neu* antigen. These markers provide some information on how aggressive the cancer may be and how likely it is to respond to certain treatments.

The markers most commonly used to follow patients with advanced cancer or to detect recurrence are *CA 15-3* and *CEA*. The *CA 27.29* test is also used by some doctors. The *CA 15-3* and *CA 27.29* are probably equally sensitive, while the *CEA* is less sensitive.

These markers are most useful in measuring the results of treatment for patients with advanced disease. Generally speaking, blood levels go down if the cancer responds to treatment and rise if the cancer progresses.

Some doctors use these tests to look for signs of recurrence in women who have no symptoms of cancer after their first treatment. But most professional groups do not recommend using these markers to follow women already treated for early stage disease.

(For more information refer to the ACS document [Breast Cancer](#).)

Colorectal Cancer

The markers most often elevated in advanced colorectal cancer are *CEA* and *CA 19-9*, but neither of these is useful as a screening test for colorectal cancer.

An elevated CEA before surgery may indicate a poorer prognosis. If it is high before surgery, the CEA should return to normal levels in about 4 to 6 weeks if all of the cancer has been removed.

Many doctors follow patients after surgery with CEA tests every 3 to 6 months or so to look for the return of the cancer. Patients are sometimes helped by finding a recurrence early so it can be removed by surgery, but for most patients the recurrence may be too widespread to be removed.

CEA is also used to follow patients who are being treated for advanced or recurrent disease. The CEA level will go down if the treatment is working and will rise if the cancer progresses.

If the CEA is not elevated in patients with advanced or recurrent cancer, sometimes the CA 19-9 can be used to follow the disease.

(For more information refer to the ACS document [Colorectal Cancer](#).)

Gestational Trophoblastic Disease

Trophoblastic tumors include molar pregnancies (a pregnancy that results in a tumor of the placenta) and the more aggressive choriocarcinoma. *Human chorionic gonadotropin (HCG)* is elevated in these tumors. HCG testing can be used to detect these cancers in women who are no longer pregnant and whose wombs do not shrink to normal size.

Measurements of HCG during treatment for trophoblastic disease are very useful in determining response to treatment.

(For more information refer to the ACS document [Gestational Trophoblastic Disease](#).)

Liver Cancer

Cancer that starts in the liver (known as *hepatocellular carcinoma*) is linked with chronic infections caused by hepatitis B and C viruses and with cirrhosis from various causes. This is a common type of cancer in Southeast Asia.

Liver cancers can cause elevated levels of *alpha fetoprotein (AFP)*. Higher AFP levels occur in about 2 of 3 patients with liver cancer. An elevated AFP in someone with chronic hepatitis may suggest the diagnosis of this cancer, although further testing must be done along with a biopsy to prove that there is cancer.

Because liver cancer is not very common in the United States, AFP testing is not used to test the general population for this type of cancer. Screening with AFP has been successful in parts of Asia where liver cancer is common. Sometimes the cancer is found early enough so that the patient can be cured with surgery. Because of this success, some doctors in the United States may screen their patients with cirrhosis of the liver due to hepatitis B or C. A rising AFP level might indicate cancer.

AFP can be used to help determine the most appropriate treatment for liver cancer and to follow patients after curative surgery or other treatment.

(For more information refer to the ACS document [Liver Cancer](#).)

Lung Cancer

No tumor markers have proven useful as screening tests for lung cancer.

Some of the tumor markers that may be elevated in lung cancer are the *carcinoembryonic antigen (CEA)* in non-small cell lung cancer and the *neuron-specific enolase (NSE)* in small cell lung cancer. Sometimes doctors will follow these markers to evaluate treatment results. There are many other markers that can also be followed. However, because lung cancer is fairly easily seen on chest x-rays or other imaging tests, tumor markers play a less important role.

(For more information refer to the ACS document [Lung Cancer \(Non-Small Cell\)](#) or [Lung Cancer \(Small Cell\)](#).)

Melanoma Skin Cancer

No tumor marker is of value in finding this disease early.

The markers *TA-90*, *S-100*, and some other markers can be used to test tissue samples to help diagnose melanoma in areas of concern.

Blood levels of TA-90 have been used to help find out if the melanoma has metastasized (spread). If the blood TA-90 level is high, there is a good chance the melanoma is metastatic. But TA-90 can sometimes be elevated in the absence of metastatic melanoma. Because of this, it has not yet been used to plan treatment or predict prognosis.

S-100 is also elevated in the blood when the disease is widespread. This marker can also be used to look for progression of the melanoma.

(For more information refer to the ACS document [Melanoma Skin Cancer](#).)

Multiple Myeloma

There are no tumor markers commonly used to screen for this disease, although tests for immunoglobulins can be used to help detect it or make a diagnosis. Protein electrophoresis and immunofixation can find these immune system proteins in the blood or urine of most patients with myeloma.

Pieces of immunoglobulins in the urine, called *Bence Jones* proteins, are found in some patients with multiple myeloma. Most people with myeloma also have detectable levels of immunoglobulins, called *monoclonal proteins* or *M-proteins*, in their blood. (These proteins lead to a monoclonal spike, or M spike, on the test readout.) These markers can help diagnose the disease, but a bone marrow biopsy may be needed to confirm the diagnosis. They are also helpful in tracking the course of the disease and its response to treatment.

Many patients with multiple myeloma also have higher blood levels of *beta-2-microglobulin*, which can also provide information on prognosis and the response to treatment.

(For more information refer to the ACS document [Multiple Myeloma](#).)

Ovarian Cancer

Epithelial ovarian cancer (the most common form of ovarian cancer) is linked with elevated levels of *CA 125*. Other markers that are sometimes measured are *CA 72-4* and *LASA-P*. *CA 125*, which is elevated in most women with advanced disease, is the standard marker that most doctors use. Ovarian cancer, even when advanced, is often confined to the abdomen and pelvis and hard to find through x-ray testing. Because of this, the *CA 125* is often the easiest and most effective way to measure the response to treatment or to find a cancer that has come back.

CA 125 is also being used by some doctors to screen for ovarian cancer in women with a strong family history of ovarian cancers. Such women usually get regular ultrasounds for early detection along with *CA 125* measurements.

CA 125 is being studied as a screening tool in women who have no family history of ovarian cancer. At the present time, most medical groups do not recommend *CA 125* testing for ovarian cancer screening because it is not clear whether it will detect the cancer early enough to increase the cure rate. Another problem with this test is that ovarian cancer is not common, and the *CA 125* level can be elevated in other cancers and other conditions. Therefore, an elevated *CA 125* is more likely to be due to some other cause, even though a lot testing might be needed to rule out ovarian cancer.

The second most common group of ovarian cancers is the germ cell tumors. Patients with these cancers often have elevated levels of *HCG* and/or *AFP*, which are useful in diagnosis and follow-up.

(For more information refer to the ACS document [Ovarian Cancer](#).)

Pancreatic Cancer

No markers have been found to be helpful in screening for pancreatic cancer.

The *CA 19-9* marker is the most useful marker for pancreatic cancer. Most people with pancreatic cancer have elevated levels of this marker in their blood. The higher the level, the more likely the disease has spread.

It is also useful in patient follow-up. Patients whose *CA 19-9* levels drop to normal after surgery have a much better outlook than those people whose *CA 19-9* remains elevated after surgery. This marker can also be used to follow the effects of treatment on more advanced disease.

Some doctors also follow the level of CEA in the blood, but it may not be as helpful as the CA 19-9 level.

(For more information refer to the ACS document [Pancreatic Cancer](#).)

Prostate Cancer

The most commonly used marker to detect prostate cancer is the *prostate-specific antigen (PSA)*. Prostate cancer can often be detected in its early stages by measuring blood levels of PSA. Levels above 4 ng/mL suggest cancer may be present, while levels above 10 ng/mL strongly suggest cancer. Doctors usually advise that men with elevated PSA levels have their prostate gland biopsied to find out if there is cancer.

Prostate cancer is often a slow growing cancer that is found in older men. For this reason, it is not clear if screening with PSA actually saves lives. Some doctors believe that screening may cause more harm than good. It may lead some men to get treated for cancers that would never have caused them problems, and the treatment itself can have major side effects.

PSA is very useful in monitoring recurrent disease. After surgery, the PSA level should be undetectable or near undetectable (0 or very close to 0). Those treated with radiation therapy should also have a significant drop in PSA after treatment. A rise in PSA after treatment could mean the disease is coming back and that more treatment should be considered. The PSA can also be used to follow the response to treatment for more advanced disease.

Another marker being studied for following prostate cancer is the *prostate-specific membrane antigen (PSMA)*. It's not yet clear how useful it will be.

In rare cases, prostate cancers that do not cause abnormal blood PSA levels and do not respond well to hormone therapy turn out to have neuroendocrine features. Men with these cancers may have higher than normal levels of *chromogranin A*. These cancers are more likely to respond to certain chemotherapy drugs.

Prostatic acid phosphatase (PAP) is an older, less sensitive marker which is no longer used very much.

(For more information refer to the ACS document [Prostate Cancer](#).)

Stomach (Gastric) Cancer

No marker has been developed specifically for this cancer. Some other digestive cancer markers may be elevated, such as *CEA*, *CA 72-4*, and/or *CA 19-9*. If the levels of these markers are elevated at the time of diagnosis, the levels can be followed while the cancer is being treated.

(For more information refer to the ACS document [Stomach Cancer](#).)

Testicular Cancer

Tumor markers are very important in this cancer and are used by doctors to follow its course. The markers usually elevated in the blood of men with testicular cancer are *human chorionic*

gonadotropin (HCG) and *alpha fetoprotein (AFP)*. There are different kinds of testicular cancers, and they differ in the level and kind of marker that is elevated.

Seminoma: About 10% of men with seminoma, a type of testicular cancer, will have elevated HCG. None will have elevated AFP.

Non-seminoma: More than half of men with early stage disease will have elevated HCG or AFP or both. The amount of the marker found in the blood does not necessarily help in predicting outcome. The markers will be elevated in most men with more advanced disease.

HCG is almost always elevated and AFP is never elevated in choriocarcinoma, a subtype of non-seminoma. As with the other non-seminomas, the amount of the marker found in the blood does not necessarily help in predicting outcome. In contrast AFP, but not HCG, is elevated in another subtype known as yolk sac tumor or endodermal sinus tumor.

(For more information refer to the ACS document [*Testicular Cancer*](#).)