

Tumor Markers: What They Mean in Cancer Care

A tumor marker is anything in or made by cancer cells—or by other cells reacting to cancer or to certain noncancerous conditions—that gives information about a cancer. Markers can help with diagnosis, treatment choices, and follow-up. But an elevated level does not mean someone has cancer, and results are usually combined with other tests like biopsies or imaging.

The simple version

A tumor marker is anything present in or produced by cancer cells that tells you something about a cancer. Other cells in the body can also make markers, in response to cancer or to certain benign (noncancerous) conditions. A marker can give clues about how aggressive a cancer is. It can suggest what kind of treatment the cancer may respond to. And it can show whether the cancer is responding to treatment.

A tumor marker is one piece of information, not a diagnosis by itself.

What tumor markers are

Tumor markers have usually been proteins, or other substances, that cancer cells make in larger amounts than normal cells do. They can be found in the blood, urine, stool, tumors, or other tissues or body fluids of some people with cancer.

Genomic markers are used more and more too. These include tumor gene mutations, patterns of tumor gene expression, and nongenetic changes in tumor DNA. Genomic markers are found in tumors themselves. They are also found in tumor fragments shed into body fluids.

Many different tumor markers have been described, and many are in clinical use. Some are linked to only one type of cancer. Others are linked to several cancer types.

Why a single result is not the whole picture

Tumor markers can help diagnose cancer. But a raised level of a tumor marker does not mean that someone has cancer. There are two important reasons for this.

- **Noncancerous conditions can raise a marker.** A benign condition can sometimes push a marker level up.
- **Not everyone with a cancer has a raised marker.** Some people with a given cancer never show a higher level of the marker linked to it.

So tumor marker measurements are usually combined with other tests, such as biopsies or imaging, to diagnose cancer.

How tumor markers are used in cancer care

Tumor markers can give a wide range of information that matters for cancer care.

- **Helping to diagnose cancer**, alongside other tests.
- **The type of cancer.**
- **The stage of the cancer**—how far it has spread.
- **An estimate of prognosis**, meaning the likely course of the disease.
- **What treatment may work.** Some markers show whether a person is a candidate for a particular targeted therapy. These are sometimes called biomarkers for cancer treatment. They are usually measured in samples of tumor tissue. But tumors can shed cells or bits of material into the blood. So some markers can also be measured with blood tests called liquid biopsies.
- **How well treatment is working.** Measuring a marker again and again ("serial" measurements) during treatment can show whether the tumor is responding.
- **Whether cancer has returned.** Measuring tumor markers from time to time after treatment ends may be used to check for recurrence.

Where the tests are done

A number of tumor marker tests are used across a wide range of cancer types. Commercial and academic laboratories carry out many of them. Sometimes a cancer center uses a test developed inside a single clinical laboratory, known as a lab-developed test, to meet a specific medical need. All tumor markers are tested in laboratories that meet standards set by the Clinical Laboratory Improvement Amendments program.

Tumor markers and screening

Tumors produce markers that can be measured in blood and other body fluids. So researchers hoped these markers might help screen people for cancer—finding it early, before symptoms appear.

Studies have generally found that circulating tumor markers do not work well for screening. Often they miss people who do have the disease, which means they are not sensitive enough. Or they suggest cancer in people who do not have it, which means they are not specific enough.

Researchers are now studying multi-cancer detection tests. These look at several biomarkers at once, in the blood of people without symptoms, to try to find early cancers. Many such tests are in development, and several are being marketed. But much remains to be learned about how best to use them, and about their harms and benefits.

Talk with your health care team about what any specific tumor marker result means for you.

Source: National Cancer Institute (cancer.gov/about-cancer/diagnosis-staging/diagnosis/tumor-markers-fact-sheet)

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