Tumor Markers for Colorectal Cancer

Tumor markers, also called biomarkers, are substances that are produced by the cancer, or by other cells of the body, in response to cancer. Tumor markers for colorectal cancer can be found in the blood, which are measured using a blood test, or are found in the tumor tissue itself. Having a high level of a tumor marker suggests that cancer may be present in the body, but by itself, a high tumor marker level is not enough to make a diagnosis.

Tumor markers may be used in conjunction with other tests (scans, biopsies, etc.) to help diagnose a patient who has symptoms suspicious for cancer, to predict prognosis after diagnosis, and assist in making treatment decisions. In colorectal cancer, tumor markers are most often used to evaluate the patient's response to cancer treatment or to monitor for a recurrence (return of the cancer after treatment). A decrease in a tumor marker may indicate that the cancer is responding to treatment. If there is no change, or the tumor marker increases, this may indicate that the treatment is not working or that the cancer has returned. These results must be evaluated in combination with radiology tests, physical exam and the increase or decrease in any symptoms the patient may be experiencing.

There are some limits to the use of tumor markers. There are non-cancerous conditions that can cause tumor markers to be elevated, so these must also be considered when interpreting the test results. In addition, not everyone with colorectal cancer will have an elevated tumor marker. Your doctor will recommend testing for tumor markers only if you need them.

**Markers found in the blood:**

- Carcinoembryonic antigen (CEA) level is the tumor marker most often used in colorectal cancer. This level can be checked prior to surgery to predict prognosis, can be used during therapy to assess response to treatment or after completion of therapy to monitor for recurrence.
- CA 19-9 is a blood marker that may be elevated in colorectal cancer.
- Chromosome 18q loss of heterozygosity (18qLOH): often applied in patients with stage II or III colorectal cancer; can influences prognosis.

**Markers found in tumor tissue:**

- MSI (microsatellite instability): MSI is a way to measure a deficiency of mismatch repair (MMR) in tumor DNA. A deficiency of MMR results in an increase in mutations within the colon cells, which partly contributes to the development of colon cancer.
  - MSI can be used to identify early stage colon cancer that may require more aggressive treatment or to identify patients who should have further genetic testing due to the risk for a familial syndrome related to several cancer types.
  - MSI identifies tumors as MSI-high (MSI-H) or MSI-Stable and MSI-low.
- K-RAS mutations: specific mutations in the K-RAS gene can predict whether or not a patient is likely to benefit from treatment with several biologic therapies.
- BRAF mutations: usually associated with a V600E mutation; can be predictive of prognosis after colorectal cancer diagnosis.