

Biomarkers

A Guide on Tumor Testing and How It Impacts Treatment

WHAT THIS GUIDE DOES

- Explains what biomarkers are and how testing works
- Shows who needs testing and when
- Points you to the Conversation Guide for visit-ready questions

What Are Biomarkers?

Biomarkers are changes in genes or proteins found in tumor tissue or blood. Testing finds those changes so your team can personalize treatment, decide what to start now, and plan what could come next (targeted therapy, immunotherapy, or chemo).

BIOMARKER (TUMOR) TESTING VS. GENETIC (GERMLINE):

Biomarker (tumor) testing—also called genomic profiling/somatic testing/next-generation sequencing (NGS)—looks at changes in the tumor. Ordered by your oncology team. Results guide treatment choices now and later.

Genetic (germline) testing looks at your inherited DNA. Ordered by your oncologist or a genetic counselor. Results inform family risk of cancer and sometimes treatment options.

There is a role for both biomarker testing and genetic testing in your cancer treatment, but the two are not interchangeable. Discuss your need for both with your provider.

"My biomarkers are RAS wild-type (no mutation), MSI stable (MSS/pMMR), BRAF D594G (a non-V600E change), and APC/TP53 mutations. Knowing my results helped my team find the best options for me. Ask if your biomarkers have been tested—if not, request testing now."

Amy J.
STAGE IV SURVIVOR

Ready to tell your story and offer your advice? fightcrc.org/story

NEED MORE HELP?

Use our Biomarker Conversation Guide to help prepare questions that you can bring to your next visit. Learn more about colorectal cancer biomarkers by scanning the QR codes in this guide.

Working with doctors who perform biomarker testing is critical. Find a provider who offers biomarker testing
fightcrc.org/provider

FightCRC Biomarker Education
fightcrc.org/biomarkers



ADDITIONAL RESOURCES

ChatCRC Get patient-friendly answers about biomarker testing. You can also text ChatCRC to (318) 242-8272. You can also upload a picture of your biomarker report to get personalized insights into your treatment options. chatbot.fightcolorectalcancer.org

Tip Ask your team to upload the PDF of your lab report to your portal or ask for a printed copy.

A Resource for Patients by Patients

3 Questions to Ask Your Insurer

1 Do you cover biomarker testing for colorectal cancer, and is prior authorization required?

This confirms coverage, avoids surprise bills, and ensures tests are sent to approved labs.

2 What documentation do you need from my clinic, and where should they be sent?

This prevents delays by submitting exactly what the insurer requires the first time.

3 If testing coverage is denied, what is the appeals process and deadline?

Sets a path to overturn denials and reduces out-of-pocket costs.

How to Get Biomarker Testing

Your oncologist or surgeon usually orders these tests. If you don't see results in your portal or paperwork, ask directly:

- **"Which tests were ordered, can you provide me a copy of the results?"**
- **"If not done yet, can we order them today?"**

TIP

Don't hesitate to consider a second opinion (or third) and ask about financial assistance.

How Testing is Done

TISSUE BIOPSY: Tests a sample from surgery or a biopsy.

LIQUID BIOPSY: A blood test that looks for tumor DNA (ctDNA) or circulating tumor cells (CTCs).

TIP

Ask your doctor, "Was my tumor left-sided or right-sided?" In RAS wild-type metastatic CRC, left-sided tumors are more likely to benefit from adding anti-EGFR to chemotherapy than right-sided tumors. Knowing the location will help you make treatment choices.

Who Needs Biomarker Testing?

Everyone with CRC needs some testing, ideally before treatment begins.

SITUATION / WHEN	WHAT TO TEST / DO	WHY THIS MATTERS	WHAT TO ASK
Stage I–III (after diagnosis/surgery)	Test MMR/MSI. Ask if ctDNA (MRD) blood testing is used at your center after surgery.	MMR/MSI can identify immunotherapy candidates and genetics referral. Circulating tumor DNA (ctDNA) can inform follow-up and trial talks (not used by itself to make treatment decisions).	"What is my MMR/MSI result? Do we use ctDNA (MRD) after surgery here?"
Stage IV / Metastatic (early)	Test MMR/MSI and note tumor sidedness (left-sided/right-sided). Do NGS for RAS (KRAS/NRAS), BRAF, HER2 amplification, and NTRK fusions before first-line therapy; ask about ctDNA use at your center.	Ensures key targets are known before first treatment, so you can choose the best first-line therapy and plan your treatment sequence.	"Do we have NGS results (RAS, BRAF, KRAS G12C, HER2, NTRK) so we can pick the best first-line treatment?"
If cancer returns or spreads	Order metastatic biomarker testing (NGS) before choosing the next treatment—check RAS, BRAF, KRAS G12C, HER2, NTRK. Consider liquid biopsy if tissue is hard to get.	Finds targets for next-line therapy and clinical trials; speeds decision making.	"Do we have NGS results yet? If not, can we send liquid biopsy while arranging tissue?"



Common Biomarkers in Colorectal Cancer (CRC)

BIOMARKER	WHAT IT TELLS YOU	HOW IT CAN AFFECT TREATMENT	WHAT TO ASK
DNA repair status (MMR/MSI)	Whether the tumor's DNA-repair system works. MSI-H/dMMR may respond to immunotherapy.	May open immunotherapy options; helps stratify plans.	<i>"What is my MMR/MSI result? If MSI-H/dMMR, how does that change my plan?"</i>
Tumor mutational burden (TMB)	Total number of DNA changes in the tumor.	Sometimes supports immunotherapy talks with other results.	<i>"Is TMB on my report? How should we use it?"</i>
Growth-signal genes (RAS: KRAS/NRAS)	Mutations drive overactive cell growth. If wild-type, may be targetable with therapy.	RAS-mutated: anti-EGFR usually won't help. RAS wild-type + left-sided tumor: consider anti-EGFR + chemo.	<i>"Am I RAS wild-type (no mutation)? Is my tumor left-sided/right-sided?"</i>
BRAF V600E	A specific BRAF change with distinct behavior.	May use BRAF-targeted combinations (with an EGFR antibody ± chemo).	<i>"Do I have BRAF V600E? When would BRAF-targeted therapy fit?"</i>
HER2 (ERBB2)	Extra copies/overexpression of HER2.	If HER2-positive and RAS wild-type, HER2-targeted therapy may be an option (often after standard chemo).	<i>"Is my tumor HER2-positive and RAS wild-type? When would that therapy be used?"</i>
NTRK fusions	A gene fusion that can drive tumor growth.	May open TRK inhibitor options (tumor-agnostic).	<i>"Does my report show an NTRK fusion? What options exist?"</i>
Other results: KRAS G12C, POLE/POLD1, RET, ALK, PIK3CA	These can guide trials or later-line choices.	May point to targeted medicines or clinical trials.	<i>"What do these mean for my plan and trial options?"</i>

Typical Timelines & Sample Types

(ask your clinic)

TEST	TYPICAL TIMING	SAMPLE TYPE	WHY IT'S USED
DPYD / UGT1A1	3–10 business days	Blood or cheek swab	Personalizes starting chemo doses (5-FU/capecitabine; irinotecan).
NGS (tissue)	2–3 weeks	Tumor tissue (existing block or new biopsy)	Broad tumor profiling before/at treatment decisions.
NGS (liquid biopsy)	5–10 business days	Blood	Faster profiling when tissue is limited or while awaiting biopsy.
ctDNA (MRD)	Setup 2–3 weeks; follow-ups 7–10 days	Blood	Helps guide follow-up and clinical-trial talks (not a stand-alone decision tool).

This brochure is educational and not medical advice. Talk with your care team about your specific situation.

All medically reviewed content was written by Fight Colorectal Cancer, and reviewed by Van Morris, MD. Visit our site for citations.
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