Know Your Biomarker

RAF | CEA | ctDNA | DPYD | FAP | HER2 | KRAS | Lyn

DPYD

MSI | MSS | NRAS | NTRK

K3CA | TMB | Tumor Location/Sidedness | UGT1A1 | P

Who should have DPYD biomarker testing?

All colorectal cancer patients who experience severe toxic effects of 5-FU related chemotherapy (5-FU, FOLFOX, FOLFIRI, capecitabine) should be tested for DPYD. Testing for DPYD mutation before starting treatment with 5-FU related chemotherapy identifies about 50% of the patients who will develop severe 5-FU toxicity. Recommendations for pre-treatment DPYD testing are different around the world. Talk to your medical team about whether pre-treatment testing would benefit you.

What is DPYD?

DPYD is the gene that encodes an enzyme called dihydropyrimidine dehydrogenase (DPD). That means that the DPYD gene gives your cells the recipe or instructions to make the DPD enzyme. The DPD enzyme is needed to break down and clear 5-FU related chemotherapy drugs from your body. If you have a DPYD mutation leading to decreased (partial deficiency) or absent (complete deficiency) DPD enzyme, these chemotherapy drugs are not broken down properly, leading to increased levels of 5-FU in your body. Increased 5-FU levels can lead to severe and even life threatening toxic effects. DPYD mutations are not the cause or result of your colorectal cancer, but they are relevant to your cancer treatment and treatment side effects. Mutations in the DPYD gene are hereditary.

How is DPYD tested? How are the results reported?

When testing for DPYD, your medical team is looking specifically at your genes and/or enzyme levels, not your tumor's genes and/or enzymes. DPYD is tested in a blood sample or in cells collected from your mouth or saliva.

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Biomarker testing can give you and your medical team valuable knowledge about your cancer and help guide your treatment choices. For more information about colorectal cancer biomarkers, please visit knowyourbiomarker.org and talk to your medical team.

DPYD is usually tested by genotyping (examining the DNA sequence of the gene to look for a mutation).

Sometimes, DPYD is first tested by phenotyping (measuring the DPD enzyme or its effects, to look for a deficiency). If phenotyping results are normal, no genotype testing is needed, you are not at higher risk of severe 5-FU toxicity. If phenotyping results show decreased DPD enzyme, you are at higher risk of severe 5-FU toxicity, and genotyping will be done to determine your DPYD mutation and more specific level of risk. Both phenotyping and genotyping are good ways to determine whether your DPYD status puts you at high risk for severe 5-FU related toxicity.

What do my DPYD results mean for me? How do they impact my treatment?

If your DPYD result is wild-type (WT) or your DPD enzyme level is normal

→ You are not at higher risk of severe 5-FU related toxic effects.

→ Your treatment can include 5-FU related drugs (5-FU, capecitabine) at the usual doses.

If your DPYD has a mutation that causes decreased or absent DPD enzyme

→ 2-8% of people have a DPYD mutation causing decreased DPD (partial deficiency)

→ If you have DPYD mutations that cause partial deficiency of DPD enzyme (heterozygous mutation) then your medical team may reduce the dose of your chemotherapy, so that the levels of 5-FU in your body are therapeutic but not severely toxic.

→ Mutations leading to no DPD enzyme at all (complete deficiency) are very rare

→ If you have DPYD mutations that cause complete deficiency of DPD enzyme (homozygous mutation), your medical team may change your chemotherapy regimen to avoid 5-FU related drugs.

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