UNIVERSITY OF MICHIGAN HEALTH
MICHIGAN MEDICINE

DPYD Genotype Testing

What is genotype testing?

Genotype testing is a type of DNA test that looks for specific spelling variations (called **variants**) in the genetic code of the body. Variants in certain genes can help predict how your body will respond to certain medications. Your provider may recommend this testing to help identify what medication or medication dose might work best for you. This test may also help predict your risk of developing complications with certain medications.

What is DPYD?

DPYD is a gene that provides instructions for your body to produce a substance called **dihydropyrimidine dehydrogenase** (DPD). DPD helps break down the chemotherapy medications **5-fluorouracil** and **capecitabine**. The ability of DPD to break down these medications can vary between people based on variants in their DPYD gene.

Most people have normal DPD activity, but some (3-7%) have **slow DPD activity**, meaning their body takes longer to break down 5-fluorouracil and capecitabine. In rare cases, people may have **very slow DPD activity**, meaning their body will take a very long time to break down these medications. If the medications remain active in the body for too long, an individual may develop a toxic response, which can have severe health complications.

How is the testing done?

If your provider orders the test, you will be asked to provide a DNA sample either through a blood draw or cheek swab. After the sample is collected, it is

sent to a clinical laboratory for evaluation. The laboratory will evaluate specific locations in your DNA to predict your DPD activity.

How will my provider use the test result?

Your **oncologist** (cancer doctor) will use the DPYD genotype test result and information about your other medications and conditions to decide the best dose of 5-fluorouracil or capecitabine (Xeloda®) for you. Individuals with slow or very slow DPD activity are more likely to have side effects from 5-fluorouracil or capecitabine. The DPYD genotype test can help your oncologist pick a medication dose that has a lower chance of causing side effects.

What is DPD deficiency and how could this impact my family?

The goal of DPYD genotype testing is to help your providers make informed decisions about your medications and treatment plan. However, if your test identifies that you have slow or very slow DPD activity, we encourage you to share this information with your blood relatives since DPYD gene variants are inherited (passed down from family member to family member). There is a chance that your blood relatives could also be at risk to experience side effects from 5-fluorouracil or capecitabine (Xeloda®).

It is possible that DPYD genotyping could provide information on risk for a genetic condition called dihydropyrimidine dehydrogenase deficiency (DPD deficiency). This occurs when an individual inherits two copies of the DPYD gene (one from each biological parent) that function abnormally or do not function at all. The health complications caused by DPD deficiency can vary widely from person to person. Some individuals may not have any signs or symptoms of the condition except for side effects to 5-fluorouracil and capecitabine (Xeloda®). However, some individuals with the condition may have problems with growth in infancy/childhood and may develop severe neurological symptoms such as seizures, changes in muscle tone, delays in

development, learning issues, and/or intellectual disabilities. Individuals who experience these severe symptoms typically develop these health problems in infancy or very early childhood.

Who can I contact for more information about genetics counseling as related to DPD deficiency and pregnancy?

If you or your relatives are planning a future pregnancy, this information may also help assess the risk to have a child with DPD deficiency.

If you or your relatives are interested in speaking with a genetic counselor or geneticist about your reproductive risks and testing options, genetic counseling services are available at Michigan Medicine. Please call (734) 647-8902 to schedule an appointment with our genetics clinic.

Relatives who are outside the state of Michigan can also identify a genetics clinic in their local area by visiting the "Find a Genetic Counselor" webpage through the National Society of Genetic Counselors: https://findageneticcounselor.nsgc.org.

What should I do with the test result?

Your providers at Michigan Medicine will be able to view this test result to help determine the best medications and dosing for you. If you see providers at other institutions, let them know that you have had DPYD genotype testing and share your result with them so that they can also use this information to personalize your medications.

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