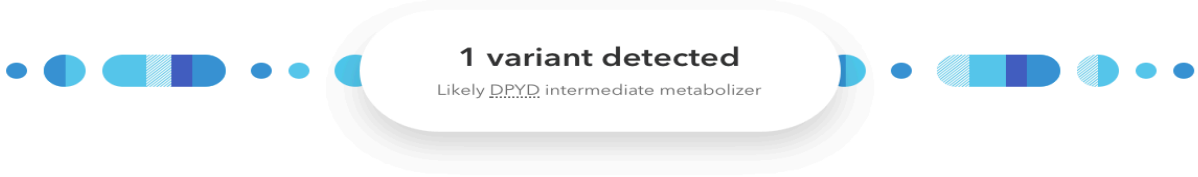
DPYD Drug Metabolism

The DPYD gene provides instructions for making the DPD enzyme, which helps process (or "metabolize") certain medications. Specific variants in the DPYD gene can affect how well this enzyme works. Do not use this report to start, stop, or change any course of treatment. Medications should always be taken as directed.

intermediatedpyd, you have a variant associated with altered function of the DPD enzyme.

People with your genetic result are predicted to be **DPYD intermediate metabolizers** and may process some medications slower than normal. However, since many factors impact how medications are processed, the variant detected may have no noticeable effects on how you process medications. The variant we detected may also be associated with a condition called dihydropyrimidine dehydrogenase (DPD) deficiency. Learn more below.



VARIANT(S) DETECTED	OVERALL FUNCTIONAL EFFECT
DPYD*2A (one copy)	Decreased enzyme function

Likely DPYD intermediate metabolizer

People who are predicted to be DPYD intermediate metabolizers may process some medications slower than normal, but most medications won't be affected.

Depending on the medication, being a DPYD intermediate metabolizer may lead to higher than normal medication levels in the body, or have no noticeable effects.

The variant we detected is also associated with a condition called dihydropyrimidine dehydrogenase (DPD) deficiency. People with only one variant are not expected to have DPD deficiency, but could pass the variant on to their children. Talk to a healthcare professional if you are concerned about your results, and learn more about DPD deficiency on our **Frequently Asked Questions** page.

DPYD Metabolism

Test Limitations

Does **not** provide information on associations between specific DNA variants and any specific medications.

Does **not** account for lifestyle or other health factors that may affect an individual's ability to process medications.

Does **not** include all possible DNA variants in the DPYD gene or in other genes that may affect how your body processes medications.

Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Share a summary of your Pharmacogenetics reports with a healthcare professional.

Please talk to a healthcare professional if you are interested in learning more about how DNA variants may impact processing of some medications, or if you have concerns about your results. Your healthcare provider could consider both genetic and non-genetic factors when choosing an appropriate course of treatment.

Do not use this report to start, stop, or change any course of treatment. Medications should always be taken as directed.

See examples of medications processed in part by the DPD enzyme below.

Print summary

How To Use This Test

This test does not diagnose any health conditions, determine drug response, provide medical advice, or determine whether a medication is indicated for you.

Do not use this result to start, stop, or change any course of treatment. Medications should always be taken as directed. Making changes can lead to harmful side effects or reduce intended benefits of the medication.

Review the Pharmacogenetics tutorial

See Scientific Details for complete Indications for Use statement and full list of Warnings and Limitations

See Frequently Asked Questions

Intended Uses

- Tests for two DNA variants in the DPYD gene: *2A (c.1905+1G>A) and D949V (c.2846A>T). These variants are associated with altered DPD enzyme function.
- Provides information about how these specific DNA variants may affect the function of the DPD enzyme.
- Informs individuals with certain variant combinations how these variants may be associated with a condition called dihydropyrimidine dehydrogenase (DPD) deficiency.

Limitations

- Does **not** test for all possible DNA variants in the DPYD gene that may affect DPD enzyme function. Having a variant not included in this test may change a person's predicted DPYD metabolizer profile.
- Does **not** test for DNA variants in other genes that may affect other proteins involved in the processing of medications.
- Does **not** provide information on associations between specific DNA variants and any specific medications.
- Does **not** account for lifestyle or other health factors that may affect an individual's ability to process medications.
- Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Important Ethnicities

- The DNA variants included in this test are found in many ethnicities. See Scientific Details for more information.

Both genetic and non-genetic factors influence how your body processes medications.

Healthcare professionals could consider these factors and more when choosing an appropriate course of treatment.

- Drug-drug interactions
- Other DNA variants
- Other health conditions
- Following medication instructions
- Body weight
- Age

Examples of medications metabolized in part by the DPD enzyme

Oncology

- capecitabine
- fluorouracil (5-FU)

Precautions

- The medications listed here are processed in part by the DPD enzyme. However, the DNA variants included in this report may not have any effect on these medications, and most medications are not affected by the DNA variants detected in this report. This is because the processing of medications is influenced by many genetic and non-genetic factors, including the activity of other enzymes.
- **Do not use this result to start, stop, or change any course of treatment.** These medications should always be taken as directed. Making changes on your own can lead to side effects or reduce intended benefits of the medication.
- Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Consider sharing this result with a healthcare professional.

Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Please talk to a healthcare professional to learn more about how DNA variants may impact medication processing, or how the variants in this report may be associated with DPD deficiency.

Print summary

See our Frequently Asked Questions for more information.

FAQs

If you have questions about your results or how they might affect you or your family, a genetic counselor may be able to help.

Learn more

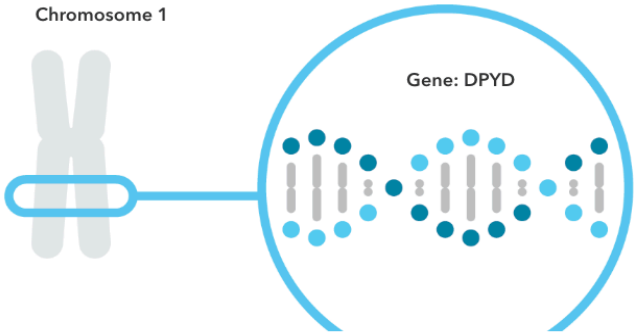
DPYD Drug Metabolism

The DPYD gene provides instructions for making the DPD enzyme, which helps process (or "metabolize") certain medications. Specific variants in the DPYD gene can affect how well this enzyme works. Do not use this report to start, stop, or change any course of treatment. Medications should always be taken as directed.

Specific variants in the DPYD gene can alter the body's ability to metabolize certain medications.

DPYD

The DPYD gene contains instructions for making an enzyme called dihydropyrimidine dehydrogenase (DPD). This enzyme plays an important role in breaking down molecules called uracil and thymine. Specific variants can lead to decreased or no DPD enzyme activity, which can reduce the body's ability to metabolize certain medications that have structures similar to uracil or thymine. Keep in mind that other factors besides your genetics can also affect how your body processes medications.



You have one of the genetic variants we tested.

People with this result are predicted to be **DPYD intermediate metabolizers**.

Variants Detected | View All Tested Markers

Marker Tested	Genotype*			Additional Information
*2A Gene: DPYD Marker: rs3918290	C Typical copy from one of your parents		T Variant copy from your other parent	Biological explanation Typical vs. variant DNA sequence(s) Percent of 23andMe customers with variant References [2]

* The percent of 23andMe customers with a variant may not be representative of the general population.

This test cannot distinguish which copy you received from which parent. This test also cannot determine whether multiple variants, if detected, were inherited from only one parent or from both parents. This may impact how these variants are passed down.

23andMe always reports genotypes based on the 'positive' strand of the human genome reference sequence (build 37). Other sources sometimes report genotypes using the opposite strand.

Test Interpretation

DNA variants in the DPYD gene can affect the function of the DPD enzyme. This altered enzyme function can influence the body's ability to metabolize certain medications. However, the metabolism of most medications isn't affected by variants in the DPYD gene. Since many other genetic as well as non-genetic factors influence how the body processes medications, having a variant detected may have no noticeable effects on how medications are processed. Keep in mind that our reports do not provide information about individual response or reaction to any particular medications.

The predicted metabolizer profiles listed in the table are based on the standardized terms proposed by Caudle et al. (2017). In some cases when a tested variant could not be determined, metabolizer profile may not be assigned.

Do not use this information to start, stop, or change any course of treatment. Medications should always be taken as directed. Making changes on your own can lead to side effects or possible serious events such as a heart attack, or can reduce intended benefits of the medication.

Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

References [1]

DPYD*2A is a no-function variant and DPYD D949V is a decreased-function variant. The *1 (normal function) genotype is assigned based on the absence of the two variants included in this test. Predicted normal metabolizers may still have a variant that is not included in this test, which could affect their DPD enzyme function or the function of other proteins important for drug processing.

Predicted DPYD metabolizer profile	Genotype information
DPYD normal metabolizer	No variants detected. This is designated as the *1/*1 genotype.
DPYD intermediate metabolizer	One decreased-function variant (*1/D949V) or one no-function variant (*1/*2A), or two copies of a decreased-function variant (D949V/D949V)
DPYD poor metabolizer	Two no-function variants (*2A/*2A), or one no-function variant plus one decreased-function variant (*2A/D949V)

Test Details

Indications for Use

The 23andMe Personal Genome Service (PGS) is a qualitative genotyping assessment system applied to genomic DNA isolated from human saliva to simultaneously detect, report, and interpret genetic variants in a broad multigene test. The assessment system is intended to enable users to access information about their genetics that could aid discussions with a healthcare professional.

The 23andMe Personal Genome Service Pharmacogenetics Report for DPYD is indicated for reporting of the *2A and D949V variants in the DPYD gene. This report is for over-the-counter use by adults over the age of 18, and provides genetic information to inform discussions with a healthcare professional about processing of therapeutics. This report describes if a person has DPYD variants associated with processing of some therapeutics, but does not describe if a person will or will not respond to a particular therapeutic, and does not describe the association between detected variants and any specific therapeutic. This test is not a substitute for visits to a healthcare professional. The information provided by this report should not be used to start, stop, or change any course of treatment.

Special Considerations

- There are currently no published guidelines recommending DPYD genetic testing prior to prescribing a medication. However, several clinical organizations support continued efforts to incorporate pharmacogenetic information into clinical decision making.
- Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Test Performance Summary

Clinical Performance [2]

The *2A and D949V variants included in this report represent two of the best studied variants that can lead to reduced or no DPD enzyme activity. However, there are other DPYD variants with established functional impact and clinical relevance that are not included in this test, including *13 (c.1679T>G) and c.1129-5923C>G. In addition, there are other rare or less well-studied variants that are not included in this test.

Analytical Performance

Accuracy was determined by comparing results from this test with results from sequencing. Greater than 99% of test results were correct. While unlikely, this test may provide false positive or false negative results. For more details on the analytical performance of this test, refer to the package insert.

Warnings and Limitations

- This test does not describe any specific associations between detected variants and any specific therapeutics.
- This test does not cover all variants in the DPYD gene that could influence drug processing.*
- This test does not include variants in other genes that could influence drug processing.
- This report does not diagnose any health conditions, determine drug response, provide medical advice, or determine whether a medication is indicated for you.
- Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

See the **Package Insert** for more details on use and performance of this test.

* Variants not included in this test may be rare, may not be available on our genotyping platform, or may not pass our testing standards.

References

1. Caudle KE et al. (2017). "Standardizing terms for clinical pharmacogenetic test results: consensus terms from the Clinical Pharmacogenetics Implementation Consortium (CPIC)." Genet Med. 19(2):215-223.
2. Whirl-Carrillo M et al. (2012). "Pharmacogenomics knowledge for personalized medicine." Clin Pharmacol Ther. 92(4):414-7.

DPYD Drug Metabolism

What does this test do?

This test looks for two DNA variants in the DPYD gene: *2A (c.1905+1G>A) and D949V (c.2846A>T). These variants are associated with reduced DPD enzyme function.

This test provides information about how these specific DNA variants may affect the function of the DPD enzyme.

This test does not include all possible DNA variants that may affect the function of the DPD enzyme or other proteins involved in the processing of medications.

Is this answer helpful? Yes No

What does this test **not** do?

This test does not diagnose any health conditions, determine drug response, provide medical advice, or determine whether a medication is indicated for you.

This test does not provide information on associations between variants detected and any specific medications.

This test does not include all possible DNA variants that may affect the function of the DPD enzyme or other proteins involved in the processing of medications.

This test does not account for lifestyle or other health factors that may affect your body's ability to process medications.

Do not use this result to start, stop, or change any course of treatment. Medications should always be taken as directed. Making changes on your own can increase the chance of experiencing harmful side effects or reduce intended benefits of the medication.

Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Is this answer helpful? Yes No

What should I do if I'm taking any medication?

You should not use this result to start, stop, or change any course of treatment. Medications should always be taken as directed. Making changes on your own can increase the chance of experiencing harmful side effects or reduce intended benefits of the medication.

If you have questions or concerns about your result, talk to a healthcare professional, such as a doctor or a pharmacist, about the medication(s) you are taking.

Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Is this answer helpful? Yes No

What is pharmacogenetics?

Pharmacogenetics is the study of how genes and genetic variants may affect the processing of medications in the body. The term "pharmacogenetics" is sometimes used interchangeably with the term "pharmacogenomics."

Is this answer helpful? Yes No

What are the advantages of sharing my results with a healthcare professional?

A healthcare professional can help you learn more about how DNA variants may impact the processing of some medications, or if you have concerns about your results. Your healthcare provider could consider both genetic and non-genetic factors when choosing an appropriate course of treatment.

Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Do not use this result to start, stop, or change any course of treatment. Medications should always be taken as directed. Making changes on your own can increase the chance of experiencing harmful side effects or reduce intended benefits of the medication.

You can print **a summary of all your Pharmacogenetics reports** to share with a healthcare professional.

If you have questions about your results or how they might affect you or your family, a genetic counselor may be able to help. **Learn more about genetic counseling.**

Is this answer helpful? Yes No

What are some non-genetic factors that can affect how the body processes medications?

Both genetic and non-genetic factors affect how the body processes medications.

Non-genetic factors that may influence how the body processes medications include age, body weight, having certain health conditions, treatment adherence, and interactions among different medications or dietary supplements that you may be taking. **Learn more about other factors.**

Is this answer helpful? Yes No

My genetic profile says that I am predicted to be a DPYD intermediate metabolizer. What does this mean?

The DNA variants in this report impact the function of the DPD enzyme. Having a **DPYD intermediate metabolizer** profile means that your DPD enzyme may metabolize certain medications **slower** than normal. This may lead to higher than normal medication levels in the body, or have no noticeable effects. In fact, most medications will not be affected by the DNA variants included in this report.

Keep in mind that this genetic result alone does not determine your body's ability to process medications. You could have another variant not included in this test that could affect your ability to process medications. Moreover, non-genetic factors such as age, weight, liver function, and drug-drug interactions can also impact how medications are processed. **Learn more about other factors.**

Do not use this result to start, stop, or change any course of treatment. Medications should always be taken as directed. Making changes on your own can increase the chance of experiencing harmful side effects or reduce intended benefits of the medication.

Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent genetic testing before taking any medical action.

Is this answer helpful? Yes No

What does it mean that the variant detected is associated with a condition called dihydropyrimidine dehydrogenase (DPD) deficiency?

The result does not mean that you have dihydropyrimidine dehydrogenase (DPD) deficiency, but your result may be relevant for your family.

DPD deficiency is a condition characterized by the body's inability to break down molecules known as thymine and uracil. Symptoms can vary widely, from no symptoms to neurological symptoms starting in infancy.

People with one copy of the DPYD variant we detected are carriers for DPD deficiency. They do not have the condition themselves, but they can pass a variant on to their children. A child must inherit a DPYD variant from each parent in order to have this condition. If your partner has a DPYD variant, each of your children may inherit a combination of variants that could put them at risk for DPD deficiency.

Is this answer helpful? Yes No

Have more questions? **Check out our Customer Care Help Center.**