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.

You do not have the variants we tested. This result is associated with normal function of the DPD enzyme.

People with your genetic result are predicted to be DPYD normal metabolizers. Keep in mind you may still have other DNA variants not tested that could alter the function of your DPD enzyme and affect how you process certain medications.

No variants detected
Likely DPYD normal metabolizer

<table>
<thead>
<tr>
<th>VARIANT(S) DETECTED</th>
<th>OVERALL FUNCTIONAL EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>No variants detected</td>
<td>Normal enzyme function</td>
</tr>
</tbody>
</table>

Likely DPYD normal metabolizer
People who are predicted to be DPYD normal metabolizers likely have normal function of their DPD enzyme. The DPD enzyme helps metabolize certain medications.

Keep in mind that DPYD normal metabolizers may still have DNA variants in the DPYD gene or in other genes that could influence how the body processes certain medications.

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.
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.

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.
- Inform 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 DPD 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 Ethnecities

- 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

Certain prescription and non-prescription medications, as well as dietary supplements, can interact with each other. These drug-drug interactions can increase the chance of side effects or reduce medication effectiveness.

Always tell your doctor about any medications and dietary supplements you are taking before starting a new treatment.

Other DNA variants

Other health conditions

Following medication instructions

Body weight

Age
Examples of medications metabolized in part by the DPD enzyme

<table>
<thead>
<tr>
<th>Oncology</th>
<th>capcitabine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fluorouracil (5-FU)</td>
</tr>
</tbody>
</table>

**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 if you are interested in learning more about how DNA variants may impact medication processing, or if you have concerns about your results.
**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.

### Overview

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

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 do not have the genetic variants we tested.

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

<table>
<thead>
<tr>
<th>Variants Detected</th>
<th>View All Tested Markers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2A</strong></td>
<td></td>
</tr>
<tr>
<td>Gene: DPYD</td>
<td></td>
</tr>
<tr>
<td>Marker: n3918290</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Typical copy from one of your parents</td>
<td>Biological explanation</td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Typical copy from your other parent</td>
<td>Typical vs. variant DNA sequence(s)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>D949V</strong></td>
<td></td>
</tr>
<tr>
<td>Gene: DPYD</td>
<td></td>
</tr>
<tr>
<td>Marker: n567376798</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Typical copy from one of your parents</td>
<td>Biological explanation</td>
</tr>
<tr>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Typical copy from your other parent</td>
<td>Typical vs. variant DNA sequence(s)</td>
</tr>
</tbody>
</table>

* 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 DYPD 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 DYPD 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 where 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.

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 DYPD is intended for reporting of the *2A and D949V variants in the DYPD gene. This report is for over-the-counter use by adults over the age of 16, and provides genetic information to inform discussions with a healthcare professional about processing of therapeutics. This report describes if a person has DYPD 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 DYPD 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

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 DYPD 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 DYPD 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.
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 normal metabolizer. What does this mean?

The DNA variants in this report impact the function of the DPD enzyme. Having a DPYD normal metabolizer profile means that your DPD enzyme is likely to metabolize medications at a normal rate. 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 still 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

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