

Pharmacogenetic Testing



Pharmacogenetic (PGx) testing by Fulgent allows clinicians to better understand how their patients will respond to certain medications.

With PGx testing, it's possible to tailor medication plans to a patient's specific genetic makeup. This can lead to reduced medical costs for patients and providers, safer medication plans, and more efficient drug efficacy.

BENEFITS OF PHARMACOGENETIC TESTING

Identify which drug may be most effective before treatment starts

PGx testing can help clinicians choose the most effective drug for each patient, minimize the risk of adverse reactions, and reduce hospitalizations.

Reduce the risk of adverse events related to certain drugs

PGx testing can assess a patient's risk for adverse drug reactions before they take the medication which can improve patient safety and minimize costs for healthcare facilities.

Adjust and optimize the dose of current medications

PGx testing can help clinicians predict the appropriate dose of medication for their patient. This allows them to create more personalized medication plans to maximize efficacy and reduce pharmacy costs.

Improved Patient Care

PGx test results become part of a patient's medical record, allowing physicians to make more informed decisions when prescribing medications for future medical issues.

ADVERSE DRUG REACTION (ADR) STATS*

- ADRs are a leading cause of morbidity and mortality in healthcare, causing approximately 100,000 deaths annually.
- More than 2 million serious ADRs occur every year.
- Nursing homes experience approximately 350,000 ADRs per year.

* <https://www.fda.gov/drugs/drug-interactions-labeling/preventable-adverse-drug-reactions-focus-drug-interactions>

WHAT TESTING CAN TELL US

PGx testing can reveal if a person is a fast, normal, or slow metabolizer. A person's metabolism changes the way their body responds to medication, including:

- **Toxicity**
Excessive amounts of the drug accumulate in the bloodstream, resulting in ADRs.
- **Lack of Efficacy**
The bloodstream cannot absorb enough of the drug to achieve a therapeutic effect.
- **Hypersensitivity**
Normal amounts of the drug enter the bloodstream, but even this is enough to trigger severe reactions in people with hypersensitivity to the medication.

OUR PANEL OFFERINGS

Fulgent offers two panels available with a physician's order:

- **PGx Focus Panel:** Includes genes associated with drug metabolism with high-level evidence and clinically actionable guidelines.
- **PGx Comprehensive Panel:** Includes genes associated with drug metabolism with high-level evidence and clinically actionable guidelines, in addition to genes with PharmGKB evidence of 2 or higher.

DRUGS INFLUENCED BY GENETIC VARIATION

- **Cardiovascular**
ACE Inhibitors, Antiarrhythmics, Anticoagulants, Antiplatelets, Beta Blockers, Statins
- **Gastroenterology**
Proton-Pump Inhibitors
- **Immunology**
Calcineurin Inhibitors, Immunosuppressants
- **Infectious Disease**
Antivirals, Antibiotics, Antimalarials, Antifungals
- **Neurology**
Anticonvulsants
- **Oncology**
5-HT3 Antagonists, Antineoplastic Agents, Estrogen Modulators, Platinum Compounds, Purine Analogs, Pyrimidine Analogs
- **Pain Management**
Nonsteroidal Antiinflammatory Drugs (NSAIDs), Opioids
- **Psychiatry**
Antipsychotics, Benzodiazepines, Selective Serotonin Reuptake Inhibitors (SSRIs), Tricyclic Antidepressants

TEST SPECIFICATIONS

Acceptable Sample Requirements

- Blood, two 4-mL EDTA tubes, lavender top
- Extracted DNA, 3 µg in TE buffer
- Buccal swab

Turnaround Time 2 weeks

Coverage >99% at 50x

Screens Up to 45 genes

Pharmacogenetic Testing Reported Variant List

Gene	Reported Variants	Focus Panel	Comprehensive Panel
<i>BCHE</i>	rs1803274, rs1799807	●	●
<i>CYP2B6</i>	*1, *4, *5, *6, *7, *8, *9, *13, *16, *18, *22	●	●
<i>CYP2C19</i>	*1, *2, *3, *4, *5, *6, *7, *8, *9, *10, *17, *35	●	●
<i>CYP2C9</i>	*1, *2, *3, *5, *6, *8, *11	●	●
<i>CYP2D6</i>	*1, *1x2, *2, *2x2, *3, *4, *4x2, *5, *6, *7, *8, *9, *10, *10x2, *11, *12, *14, *15, *17, *19, *20, *21, *29, *31, *35, *36, *36x2, *40, *41, *45, *46	●	●
<i>CYP3A5</i>	*1, *3, *6, *7	●	●
<i>CYP4F2</i>	rs2108622	●	●
<i>DPYD</i>	*1, *2A, *13, rs67376798	●	●
<i>G6PD</i>	rs5030868, rs1050829, rs1050828	●	●
<i>HLA-B</i>	HLA-B*15:02 (rs144012689 as proxy), HLA-B*57:01 (rs2395029 as proxy)	●	●
<i>IFNL4</i>	rs12979860	●	●
<i>NAT2</i>	*4, *5, *6, *7, *14	●	●
<i>RYRI</i>	rs118192177, rs118192176, rs193922762, rs118192175, rs193922770, rs118192124, rs193922832, rs193922809, rs193922802, rs193922816, rs112563513, rs193922748, rs118192161, rs121918595, rs121918596, rs28933397, rs193922753, rs118192178, rs28933396, rs121918593, rs193922843, rs1801086, rs144336148, rs118192162, rs193922768, rs193922807, rs118192116, rs193922747, rs118192122, rs121918592, rs118192168, rs121918594, rs118192172, rs118192170, rs11888148, rs193922878, rs193922876, rs193922764, rs193922772, rs118192167, rs193922818, rs193922803, rs63749869, rs118192163	●	●
<i>NUDT15</i>	*1, *2, *3, *6, *9	●	●
<i>SLCO1B1</i>	rs4149056 (found in *5, *15, and *17 alleles)	●	●
<i>TPMT</i>	*1, *2, *3A, *3B, *3C, *4	●	●
<i>UGT1A1</i>	*6, *80 (proxy for *28 and *37 alleles)	●	●

PHARMACOGENETIC TESTING GENE LIST CONTINUED

Gene	Reported Variants	Focus Panel	Comprehensive Panel
<i>VKORC1</i>	rs9923231	●	●
<i>ABCB1</i>	rs2032582, rs1045642	-	●
<i>ACE</i>	rs1799752 (called using rs4343)	-	●
<i>ANKK1</i>	rs1800497	-	●
<i>APOE</i>	rs7412	-	●
<i>ATM</i>	rs11212617	-	●
<i>CES1</i>	rs71647871	-	●
<i>COMT</i>	rs4680, rs13306278	-	●
<i>CYP2C8</i>	rs10509681	-	●
<i>CYP3A4</i>	rs2740574, rs2242480	-	●
<i>DRD2</i>	rs1799978	-	●
<i>ERCC1</i>	rs3212986, rs11615	-	●
<i>F2</i>	rs1799963	-	●
<i>F5</i>	rs6025	-	●
<i>GGCX</i>	rs11676382	-	●
<i>GRIK4</i>	rs1954787	-	●
<i>GSTP1</i>	rs1695	-	●
<i>HTR1A</i>	rs6295	-	●
<i>HTR2A</i>	rs7997012	-	●
<i>HTR2C</i>	rs1414334, rs3813929	-	●
<i>ITPA</i>	rs1127354, rs7270101	-	●
<i>KIF6</i>	rs20455	-	●
<i>MTHFR</i>	rs1801133	-	●
<i>NQO1</i>	rs1800566	-	●
<i>OPRM1</i>	rs1799971	-	●
<i>UGT1A4</i>	rs2011425	-	●
<i>XRCC1</i>	rs25487	-	●