

PHARMACOGENOMICS

What is Pharmacogenomics?

Pharmacogenomics is the relationship between a patient's unique genetic makeup and their response to certain medications. Genetic mutations can cause either higher or lower rates of metabolism for known drugs. According to the FDA, each year, approximately 4.5 million Americans visit their doctors or the emergency room due to adverse drug reactions.

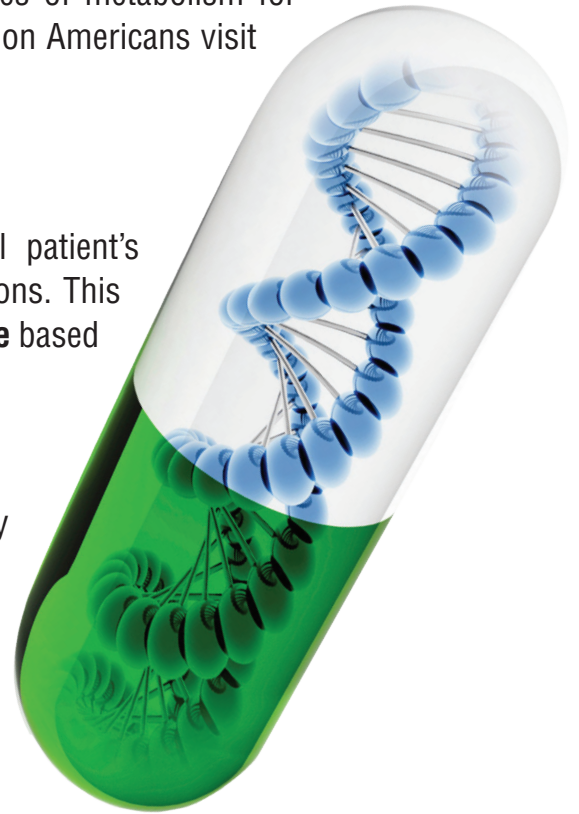
How will Pharmacogenomics benefit my patients?

Aeon will provide a comprehensive report based on an individual patient's genetic makeup that will indicate metabolic rates for defined medications. This information will help clinicians' prescribe the **right drug** at the **right dose** based on your patients DNA profile.

Why trust Aeon with your Pharmacogenomics testing?

Aeon uses the latest in high throughput DNA sequencing technology to analyze patient samples in an expedient and precise approach. All genetic scientists at Aeon are highly trained, handle testing with the utmost care, and are always available for in-depth consultations. Aeon pharmacogenomics reports are easy to read and provide you with clinically significant data based on the most recent medical innovations.

Prescribe with Confidence[®] using Aeon's pharmacogenomics testing services.



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PGx Testing Options

Comprehensive Profile

Aeon's Comprehensive PGX Profile also includes genetic-metabolic relationships for antifungal, antiemetic, acid disorder, immunosuppressant and urinary incontinence medications. Risk factors for Thrombophilia, HyperHomocysteinemia and Dyslipidemia are also tested. **All of the panels in the document are covered in the Comprehensive Profile. The panel below is drugs that are only tested in the Comprehensive profile.**

Impacted Medications and Genes Tested		
Drug Class	Potentially Impacted Drugs	Gene(s) Tested
Alpha Blockers	Alfuzosin (UroXatral) Doxazosin (Cardura)	CYP34A
Phosphodiesterase Inhibitors for ED	Avanafil (Stendra) Sildenafil (Viagra) Tadalafil (Cialis) Vardenafil (Levitra)	CYP3A4, CYP3A5
Sulfonylureas	Chlorpropamide (Diabenese)	CYP2C9
Antispasmodics for Overactive Bladder	Darifenacin (Enablex) Fesoterodine (Toviaz) Mirabegron (Myrbetriq) Oxybutynin (Ditropan) Solifenacin (Vesicare) Trospium (Sanctura)	CYP2D6, CYP34A
Proton Pump Inhibitors	Dexlansoprazole (Dexilant, Kapidex) Esomeprazole (Nexium) Lansoprazole (Prevacid) Pantoprazole (Protonix) Rabeprazole (Aciphex) Omeprazole (Prilosec) Pantoprazole (Protonix)	CYP2C19
Antiemetics	Dolasetron (Anzemet) Metoclopramide (Reglan) Ondansetron (Zofran) Palonosetron (Aloxi)	CYP2D6
5-Alpha Reductase Inhibitors for Benign Hyperplasia	Dutasteride (Avodart) Silodosin (Rapafalo) Tamsulosin (Flomax) Terazosin (Hytrin)	CYP34A
Meglitinides	Nateglinide (Starlix) Repaglinide (Prandin)	SLC01B1, CYP2C9
Antifungals	Voriconazole (Vfend)	
Antimalarials	Proguanil (Marlarone)	CYP2C9
Immunosuppressant	Tacrolimus (Prograf)	CYP3A5

Psychiatry Profile

Antipsychotics, antidepressants, ADHD drugs, anti-anxiety medications and mood stabilizers are some of the more commonly used psychotropic drugs in this country. Side effects of psychotropic drugs include weight gain, mania, psychosis, anxiety, hallucinations, depersonalization, birth defects, convulsions, seizures or tremors, suicidal ideation, heart attack, stroke, and sudden death. However, our Psychiatry Profile can mitigate these risks and provide a precise and personalized therapeutic regimen for your patient.

Impacted Medications and Genes Tested		
Drug Class	Potentially Impacted Drugs	Gene(s) Tested
Alzheimer's Disease	Donepezil, Galantamine	CYP2D6
Antidepressants	Amoxapine (Amoxapine) Desipramine (Norpramin) Desvenlafaxine (Pristiq) Duloxetine (Cymbalta) Fluoxetine (Prozac, Sarafem) Fluvoxamine (Luvox) Levomilnacipran (Fetzima) Maprotiline (Ludiomil) Mirtazapine (Remeron) Nefazodone (Serzone) Nortriptyline (Pamelor) Paroxetine (Paxil, Brisdelle) Protriptyline (Vivactil) Venlafaxine (Effexor) Vilazodone (Viibryd) Vortioxetine (Trintellix) Citalopram (Celexa) Doxipine (Selenor) Setraline (Zoloft) Levomilnacipram (Fetzima)	CYP2D6, CYP2C19
Antiepileptic	Phenytoin (Dilantin)	CYP2C9
Antipsychotics	Aripiprazole (Abilify) Asenapine (Saphris) Brexpiprazole (Rexulti) Chlorpromazine (Thorazine) Clozapine (Clozaril) Fluphenazine (Prolixin) Haloperidol (Haldol) Iloperidone (Fanapt) Loxapine (Loxitane, Adasuve) Lurasidone (Latuda) Olanzapine (Zyprexa) Paliperidone (Invega) Perphenazine (Trilafon) Pimavanserin (Nuplazid) Pimozide (Orap) Quetiapine (Seroquel) Risperidone (Risperdal) Thioridazine (Mellaril) Thiothixene (Navane) Trazodone (Oleptro) Trifluoperazine (Stelazine) Ziprasidone (Geodon) Tetrabenazine (Xenazine) Asenpine (Saphris) Topirmate (Topomax) Tolterodine (Detrol) Trifluoperazine (Stelazine)	CYP2D6, CYP1A2, CYP3A4, CYP2D6, CYP1A2, VKORC1, SLC1B1

Psychiatry Profile Continued

Impacted Medications and Genes Tested		
Drug Class	Potentially Impacted Drugs	Gene(s) Tested
Anticonvulsants	Brivaracetam (Briviact) Carbamazepine (Tegretol, Carbatrol, Epitol) Eslicarbazepine (Aptiom) Ethosuximide (Zarontin) Ezogabine (Potiga) Felbamate (Felbatol) Fosphenytoin (Cerebyx) Gabapentin (Neurontin) Lacosamide (Vimpat) Lamotrigine (Lamictal) Levetiracetam (Keppra) Oxcarbazepine (Trileptal, Oxtellar XR) Perampanel (Fycompa) Phenobarbital (Luminal) Phenytoin (Dilantin) Pregabalin (Lyrica) Primidone (Mysoline) Rufinamide (Banzel) Tiagabine (Gabitril) Topiramate (Topamax) Valproic Acid (Depakote, Depakene) Vigabatrin (Sabril) Zonisamide (Zonegran)	CYP3A4, CYP3A5, CYP2C19, CYP2C9
Anxiety/Insomnia	Diazepam, Clobazam	CYP2C19
ADHD	Amphetamine (Adderall) Atomoxetine (Strattera) Clonidine (Kapvay) Dextroamphetamine (Dexedrine) Guanfacine (Intuniv) Lisdexamfetamine (Vyvanse) Dexmethylphenidate (Focalin) Methylphenidate (Ritalin)	CYP2D6, COMT
Huntington's Disease	Tetrabenazine	CYP2D6
Antiaddictives	Bupropion (Wellbutrin, Zyban, Aplenzin, Contrave), Naltrexone (Vivitrol, Contrave)	COMT, OPRM1, ANKK1/DRD2
Antidementia Agents	Donepezil (Aricept) Galantamine (Razadyne) Memantine (Namenda)	CYP2D6
Benzodiazepines	Alprazolam (Xanax) Clobazam (Onfi) Clonazepam (Klonopin)	CYP2C19, CYP3A4
Other Neurological Agents	Dextromethorphan/Quinidine (Nuedexta) Flibanserin (Addyi)	CYP2D6

Psychiatry Risk Factors

Impacted Medications and Genes Tested		
Drug Class	Condition	Gene(s) Tested
Antipsychotic	Induced Tardive Dyskinesia	DRD2
Antipsychotic	Induced Hyperprolactinemia	DRD2
Antipsychotic	Induced Weight Gain	DRD2

Cardiology Profile

Many prescription drugs have been linked to problems related to the heart, including heart attacks, congestive heart failure, lifelong heart damage and Cardiomyopathy. Aeon will provide a complete guide for cardiology medication along with risk factors for Thrombophilia, Hyperhomocysteinemia, and Dyslipidemia.

Impacted Medications and Genes Tested		
Drug Class	Potentially Impacted Drugs	Gene(s) Tested
Anitarrhythmics	Mexiletine (Mexitil) Propafenone (Rythmol)	CYP2D6
Angiotensin II Receptor Antagonists	Azilsartan (Edarbi, Edarbyclor) Candesartan (Atacand) Eprosartan (Teveten) Irbesartan (Avapro) Losartan (Cozaar, Hyzaar) Olmesartan (Benicar) Telmisartan (Micardis) Valsartan (Diovan, Entresto)	CYP2C9
Anticoagulants	Apixaban (Eiiquis) Dabigatran Eteziat (Pradaxa) Edoxaban (Savaysa) Fondaparinux (Arixtra) Rivaroxaban (Xarelto) Solifenacin (Vesicare) Dabigatran Eteziat (Pradaxa)	CYP3A4, CYP3A5, CYP1A2, CYP2C9, VKORC1
Antianginal Agents	Ranolazine (Ranexa) Flecainide (Tambocor)	CYP2D6
Antidiabetics	Glimepiride, Glipizide, Glyburide, Tolbutamide	CYP2C9
Beta Blockers	Carvedilol (Coreg) Labetalol (Normodyne, Trandate) Metoprolol (Lopressor) Propranolol (Inderal) Timolol (Timoptic)	CYP2C19, CYP2D6
Antihyperlipidemic Agents	Metoprolol (Lopressor) Nebivolol (Systolic) Propranolol (Inderal) Timolol (Timoptic)	SLC01B1, CYP3A4, CYP2C9
Diuretics	Torseamide (Demandex)	CYP2C9
Antihypertensives	Irbesartan (Avapro) Labetalol (Normodyne, Trandate) Nebivolol (Systolic)	CYP2D6, CYP2C9
Antiplatelets-Anticoagulants	Clopidogrel (Plavix) Prasugrel (Effient) Ticagrelor (Brilinta) Warfarin (Coumadin)	CYP2C19, CYP2C9, VKORC1, CYP3A5
Statins	Fluvastatin (Lescol) Atorvastatin (Lipitor) Lovastatin (Mevacor), Altoprev, Advicor) Pitavastatin (Livalo) Pravastatin (Pravachol) Rosuvastatin (Crestor) Simvastatin (Zocor)	CYP3A4, SLC01B1
Phosphodiesterase Inhibitors for erectile Dysfunction	Avanafil (Stendra)	CYP3A4
Sulfonylureas	Chlorpropamide (Diabenese)	CYP2C9

Cardiology Profile Continued

Cardiology Risk Factors

Condition	Gene(s) Tested
Thrombosis	Factor II, Factor V Leiden
Hyperhomocysteinemia	MTHFR
Dyslipidemia	APOE

Pain Management Profile

Pain affects more Americans than diabetes, heart disease and cancer combined and is a leading cause of disability as well as a major contributor to health care costs. Due to variety of pain conditions, different research and approaches are required to provide proper diagnosis.

Impacted Medications and Genes Tested		
Drug Class	Potentially Impacted Drugs	Gene(s) Tested
Antidepressants	Amoxapine (Amoxapine) Desipramine (Norpramin) Desvenlafaxine (Pristiq) Duloxetine (Cymbalta) Fluoxetine (Prozac, Sarafem) Fluvoxamine (Luvox) Levomilnacipran (Fetzima) Maprotiline (Ludiomil) Mirtazapine (Remeron) Nefazodone (Serzone) Nortriptyline (Pamelor) Paroxetine (Paxil, Brisdelle) Protriptyline (Vivactil) Venlafaxine (Effexor) Vilazodone (Viibryd) Vortioxetine (Trintellix) Citalopram (Celexa) Escitalopram (Lexapro) Doxepin (Silenor) Setraline (Zoloft)	CYP2D6, CYP2C19
Anti-ADHD Agents	Amphetamine (Adderall) Atomoxetine (Strattera) Clonidine (Kapvay) Dextroamphetamine (Dexedrine) Guanfacine (Intuniv) Lisdexamfetamine (Vyvanse) Dexmethylphenidate (Focalin) Methylphenidate (Ritalin)	CYP2D6, COMT
Antiaddictives	Bupropion (Wellbutrin, Zyban, Aplenzin, Contrave), Naltrexone (Vivitrol, Contrave)	COMT, OPRM1, ANKK1/DRD2
Antidepressants, Tricyclic	Amitriptyline, Clomipramine, Desipramine, Doxepin, Imipramine, Nortriptyline, Trimipramine	CYP2D6, CYP2C19
Antiepileptic	Phenytoin	CYP2C9

Pain Management Profile Continued

Impacted Medications and Genes Tested		
Drug Class	Potentially Impacted Drugs	Gene(s) Tested
Narcotic Addiction/Pain	Methadone	CYP2B6
Muscle Relaxants	Cyclobenzaprine (Flexeril, Amrix) Metaxolone (Skelaxin) Methocarbamol (Robaxin) Tizanidine (Zanaflex) Carisoprodol (Soma)	CYP2C19, CYP1A2, CYP3A4, CYP2D6
Opioids	Alfentanil (Alfenta) Buprenorphine (Butrans, Buprenex) Codeine (Codeine; Fioricet with Codeine) Dihydrocodeine (Synalgos-DC) Fentanyl (Actiq) Hydrocodone (Vicodin) Hydromorphone (Dilaudid, Exalgo) Levorphanol (Levo Dromoran) Meperidine (Demerol) Methadone (Dolophine) Morphine (MS Contin) Oxycodone (Percocet, Oxycontin) Oxymorphone (Opana, Numorphan) Sufentanil (Sufenta) Tapentadol (Nucynt) Tramadol (Ultram) Milancipran (Savella)	CYP2D6, OPRM1, CYP3A5, CYP3A4, CYP2B6
Other	Bupropion, Naltrexone	COMT, OPRM1, ANKK1/DRD2
Antipsychotics	Aripiprazole (Abilify) Asenapine (Saphris) Brexpiprazole (Rexulti) Chlorpromazine (Thorazine) Clozapine (Clozaril) Fluphenazine (Prolixin) Haloperidol (Haldol) Iloperidone (Fanapt) Loxapine (Loxitane, Adasuve) Lurasidone (Latuda) Olanzapine (Zyprexa) Paliperidone (Invega) Perphenazine (Trilafon) Pimavanserin (Nuplazid) Pimozide (Orap) Quetiapine (Seroquel) Risperidone (Risperdal) Thioridazine (Mellaril) Thiothixene (Navane) Trazodone (Oleptro) Trifluoperazine (Stelazine) Ziprasidone (Geodon) Tetrabenazine (Xenazine)	CYP2D6, CYP1A2, CYP3A4, CYP2D6, CYP1A2, VKORC1, SLC1B1
Anxiety/Insomnia	Diazepam, Clobazam, Colanzepam	CYP2C19
Other Neurological Agents	Dextromethorphan/Quinidine (Nuedexta)	CYP2D6

Pain Management Profile Continued

Impacted Medications and Genes Tested		
Drug Class	Potentially Impacted Drugs	Gene(s) Tested
Other Analgesics	Celecoxib, Flurbiprofen, Piroxicam	CYP2C9
NSAIDs	Ibuprofen (Advil, Motrin) Ketoprofen (Orudis) Ketorolac (Toradol) Nabumetone (Relafen) Naproxen (Aleve) Sulindac (Clinoril) Celecoxib (Celebrex) Diclofenac (Voltaren) Flurbiprofen (Ansaid) Indomethacin (Indocin) Meloxicam (Mobic) Piroxicam (Feldene)	CYP2C9, CYP2D6