





Lab Director : David S. Mehr, MD, PC
Customer Name : Sample Report,Urinary
Date of Birth : 01/01/2006
Test Date : 7/23/2024

CLIA Number : 46D2181769
Test ID : P242050004
Health Care Professional :Hashaam
Report Date : 7/23/2024



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Quick Start

The report contains three major sections:

- Drug Guide Page
- Summary of Genes Tested
- Detailed Explanation of Findings

All three sections are color-coded to easily show whether there is a genetic predisposition that may affect the patient's response to drugs or indicate the potential for adverse effects.

- Green Color indicates **+ NORMAL**
- Yellow Color indicates **- INCREASED RISK**
- Red Color indicates **x EXTREME RISK**

1 Drug Guide - Illustrates the impact of the tested genes on the most commonly prescribed medications. Simply identify therapeutic category of interest and review the impact of genetics on these drugs listed by medication name (both brand and generic). The impact of genetics as shown in the drug guide is derived by considering ALL tested genes that are relevant for each listed drug (also called combinatorial pharmacogenetics).

2 Summary of Genes Tested - Shows the patient's genotype and phenotype for each of the genes tested.

3 Detailed Explanation of Findings - Looks at each gene separately and explains how the genotype and phenotype may impact drug response. For each tested gene, the report shows how the phenotype impacts drugs, along with a list of the most commonly prescribed drugs affected by each gene.



Patient Medications:



How to interpret the patient medications table:

- The first column "Drug Name" lists all medications, prescribed and contemplated, that are indicated on the order.
- Each medication will show in the color corresponding to its drug to gene interactions.
- Any drug to drug interaction(s) will show in the corresponding column, Major or Moderate, relating to each of the patient's medications.

Drug Name	Major Drug Interaction	Moderate Drug Interaction
- Solifenacin (Vesicare) (4)		- Darifenacin (Enablex)
		- Oxybutynin (Ditropan)
- Tadalafil (Cialis) (2,4)	- sildenafil (Viagra)	
- Darifenacin (Enablex) (4)		- Doxazosin (Cardura)
- Mirabegron (Myrbetriq) (2,4)		- Darifenacin (Enablex)
+ Tamsulosin (Flomax) (2,4)	- Silodosin (Rapaflo)	- Darifenacin (Enablex)
- Oxybutynin (Ditropan) (4)		- Darifenacin (Enablex)
- Vardenafil (Levitra) (2,4)	- Silodosin (Rapaflo)	- Doxazosin (Cardura)
- Doxazosin (Cardura) (2,4)	+ Tamsulosin (Flomax)	- Darifenacin (Enablex)
	- Vardenafil (Levitra)	- Doxazosin (Cardura)
	- Doxazosin (Cardura)	- Mirabegron (Myrbetriq)
	- Tadalafil (Cialis)	- Mirabegron (Myrbetriq)
		- Mirabegron (Myrbetriq)
		- Doxazosin (Cardura)
		- Doxazosin (Cardura)
		- Mirabegron (Myrbetriq)
		- Oxybutynin (Ditropan)
		- Oxybutynin (Ditropan)
		- Oxybutynin (Ditropan)
		- Mirabegron (Myrbetriq)
		- Oxybutynin (Ditropan)
		- Oxybutynin (Ditropan)
		- sildenafil (Viagra)
		- sildenafil (Viagra)
	- sildenafil (Viagra)	+ Tamsulosin (Flomax)
		- sildenafil (Viagra)
		- sildenafil (Viagra)
		- sildenafil (Viagra)
		- Vardenafil (Levitra)



Patient Medications:



How to interpret the patient medications table:

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- Any drug to drug interaction(s) will show in the corresponding column, Major or Moderate, relating to each of the patient's medications.

Drug Name	Major Drug Interaction	Moderate Drug Interaction
	- Silodosin (Rapaflo)	+ Tamsulosin (Flomax)
		- Solifenacin (Vesicare)
		- Solifenacin (Vesicare)
		- Vardenafil (Levitra)
		- Tadalafil (Cialis)
		+ Tamsulosin (Flomax)
		+ Tamsulosin (Flomax)
		- Vardenafil (Levitra)
		- Vardenafil (Levitra)
- Finasteride (Proscar) (5)		
- sildenafil (Viagra) (2,4)	- Silodosin (Rapaflo)	- Darifenacin (Enablex)
	- Tadalafil (Cialis)	- Doxazosin (Cardura)
		- Mirabegron (Myrbetriq)
		- Oxybutynin (Ditropan)
	- Vardenafil (Levitra)	+ Tamsulosin (Flomax)
- Silodosin (Rapaflo) (2)	- Mirabegron (Myrbetriq)	
	- sildenafil (Viagra)	
	+ Tamsulosin (Flomax)	
	- Vardenafil (Levitra)	

Legends:

 = Contemplated Medication

- 1.Consider changing drug due to one or more Major drug to drug interaction(s)
- 2.Consider changing drug due to one or more Major drug to drug interaction(s) and potential genetic interaction(s)
- 3.Consider changing drug due to one or more Moderate drug to drug interaction(s)
- 4.Consider changing drug due to one or more Moderate drug to drug interaction(s) and potential genetic interaction(s)
- 5.Consider changing drug due to one or more potential genetic interaction(s)



Drug Guide

These lists of drugs are color-coded to reflect whether a genetic predisposition indicates that there may be issues with regard to drug response or adverse effects.

+ Normal

A drug in green font indicates that no genetic issues of clinical relevance were found for this drug among the genes tested.

⊖ Increased Risk

A drug in yellow font indicates that genetic issues of clinical relevance were found for this drug. Extra caution should be observed when considering this drug for this patient.

⊗ Extreme Risk

A drug in red font Indicates that serious genetic issues of clinical relevance were found for this drug and extreme caution or avoidance of this drug should be observed when considering this drug for this patient.

Drug Category/Class	Drugs
Antidiabetic	- glyburide (Diabeta, Micronase), - Repaglinide (Prandin, Prandimet), + tolbutamide (Orinase), + glimepiride (Amaryl), + Chlorpropamide (Diabinese), + glipizide (Glucotrol), + Nateglinide (Starlix)
Anti-Infectives	- ritonavir (Norvir), - nelfinavir (Viracept), - erythromycin (E-Mycin), - indinavir (Crixivan), - efavirenz (Sustiva), - clarithromycin (Biaxin), - saquinavir (Invirase), - telithromycin (Ketek)
Cardiovascular - Antianginal	- ranolazine (Ranexa)
Cardiovascular - Antiarrhythmics	- Disopyramide (Norpace), - Amiodarone (Nexterone, Pacerone), - quinidine (Quinidine), - dofetilide (Tikosyn), - propafenone (Rythmol), + flecainide (Tambocor), + Mexiletine (Mexitil), + Sotalol (Betapace, Sorine, Sotylize)
Cardiovascular - Anticoagulants	- rivaroxaban (Xarelto), - Apixaban (Eliquis), - ticargelol (Brilinta), - Vorapaxar (Zontivity), - warfarin (Coumadin, Jantoven), + clopidogrel ++ (Plavix), + Betrixaban (Bevyxxa), + Prasugrel (Effient)
Cardiovascular - Antihypertensive	- felodipine (Plendil), - Labetalol (Normodyne, Trandate), - losartan (Cozaar, Hyzaar), - nisoldipine (Sular), - lercanidipine (Zanidip), - nitrendipine (Baypress), - nifedipine (Adalat, Procardia), - amlodipine (Norvasc), - diltiazem (Cardizem), - Bisoprolol (Zebeta), + Irbesartan (Avapro), + timolol (Blocadren), + Propranolol (Inderal), + Candesartan cilexetil (Atacand), + Azilsartan medoxomil (Edarbi, Edarbyclor), + metoprolol (Lopressor, Toprol), + nebivolol (Bystolic), + carvedilol (Coreg), + Olmesartan (Benicar), + Atenolol (Tenormin), + Valsartan (Diovan, Entresto), + Telmisartan (Micardis)
Cardiovascular - Cholesterol Lowering	- simvastatin (FloLip, Zocor), - atorvastatin (Lipitor, Caduet), - lovastatin (Mevacor, Altoprev, Advior), + fluvastatin (Lescol), + pravastatin (Pravachol), + rosuvastatin (Crestor)
Cholinesterase Inhibitors	x Donepezil (Aricept), + Rivastigmine (Exelon), + Galantamine (Razadyne, Reminyl), + Memantine (Namenda)
Gastrointestinal	- rabeprazole (Aciphex), + Dexlansoprazole (Dexilant, Kapidex), + pantoprazole (Protonix), + omeprazole (Prilosec), + esomeprazole (Nexium), + lansoprazole (Prevacid)
Gastrointestinal - Antiemetics	- Aprepitant (Emend-oral), - Ondansetron (Zofran, Zuplenz), - Rolapitant (Varubi), - Granisetron (Sancuso, Sustol), + Dronabinol (Marinol), + Metoclopramide (Reglan), + Dolasetron (Anzemet)
Immunological	- tacrolimus (Prograf, Protopic), - hydrocortisone, - cyclosporine (Gengraf), - zafirlukast (Accolate)
Immunological - Cholinergic Agonists	- Cevimeline (Evoxac)

Drug Category/Class	Drugs
Immunological - Selective Immunosuppressants	+ Siponimod (Mayzent)
Infections - Antifungals	- Itraconazole (Sporanox), + Voriconazole (Vfend), + Fluconazole (Diflucan)
Miscellaneous Metabolic Agents	+ Eliglustat (Cerdelga)
Neuropsychiatric - ADHD Drug	- amphetamine (Adderall, Evekeo), - Guanfacine (Intuniv), - Dextroamphetamine (Dexadrine), - atomoxetine (Strattera), - Lisdexamfetamine (Vyvanse), - Methylphenidate (Ritalin, Aptensio XR, Concerta, Metadate, Quillivant ER), - Clonidine (Kapvay)
Neuropsychiatric - Antiaddictives	+ Lofexidine (Lucremyra)
Neuropsychiatric - Anticonvulsants	- tiagabine (Gabitril), - Felbamate (Felbatol), - zonisamide (Zonegran), - carbamazepine (Tegretol, Carbatrol, Epitol), + phenytoin (Dilantin), + Primidone (Mysoline), + Pregabalin (Lyrica), + Oxcarbazepine (Trileptal, Oxtellar XR), + Levetiracetam (Keppra), + Valproic acid, + Lamotrigine (Lamictal), + Topiramate (Topamax)
Neuropsychiatric - Antidepressant	- nefazodone (Serzone), - desvenlafaxine (Pristiq), - trazodone (Oleptro), - mirtazapine (Remeron), - vilazodone (Viibryd), + amitriptyline (Elavil), + paroxetine (Paxil, Brisdelle), + Protriptyline (Vivactil), + Trimipramine (Surmontil), + venlafaxine (Effexor), + doxepin (Sinequan, Silenor, Prudoxin, Zonalon), + fluoxetine (Prozac, Sarafem), + Fluvoxamine (Luvox), + Maprotiline (Ludiomil), + sertraline (Zoloft), + Vortioxetine (Trintellix), + desipramine (Norpramin), + escitalopram (Lexapro), + nortriptyline (Aventyl, Pamelor), + bupropion (Wellbutrin, Zyban), + clomipramine (Anafranil), + citalopram (Celexa), + imipramine (Tofranil)
Neuropsychiatric - Antiemetics	+ Meclizine (Antivert)
Neuropsychiatric - Antipsychotic	- Brexpiprazole (Rexulti), - promazine (Sparine), - olanzapine (Zyprexa), - aripiprazole (Abilify, Aristada), - lurasidone (Latuda), - ziprasidone (Geodon), - Cariprazine (Vraylar), - chlorpromazine (Thorazine), - haloperidol (Haldol), - perphenazine (Trilafon), - clozapine (Clozaril), - asenapine (Saphris), - quetiapine (Seroquel), + thioridazine (Mellaril), + Pimozide (Orap), + lloperidine (Fanapt), + Fluphenazine (Prolixin), + risperidone (Risperdal)
Neuropsychiatric - Anxiolytic	x Clonazepam (Klonopin), - midazolam (Versed), - alprazolam (Xanax), - triazolam (Halcion), - diazepam (Valium), - buspirone (BuSpar), - zolpidem (Ambien), + Clobazam (Onfi), + phenobarbital
Neuropsychiatric - Other	- Valbenazine (Ingrezza), + Tetrabenazine (Xenazine), + Dextromethorphan (Nuedexta)
Neuropsychiatric - Pain Management	- duloxetine (Cymbalta)
Neuropsychiatric - Precognitive Drug	- tacrine (Cognex)
Oncology	- docetaxel (Taxotere), - ifosfamide (Ifex), - vincristine (Vincasar, Oncovin)
Other	- caffeine, - theophylline (Theo-24, Elixophylline, Theochron)
Pain Management	+ Acetylsalicylic acid (Aspirin)
Pain Management - Muscle Relaxant	- tizanidine (Zanaflex), - cyclobenzaprine (Flexaril, Amrix), - Milnacipran (Savella), + Methocarbamol (Robaxin)
Pain Management - NSAID	- ropivacaine (Naropin), - naproxen (Aleve), - Ketorolac (Toradol), + Piroxicam (Feldene), + Flurbiprofen (Ansaid, Ocufer), + Meloxicam (Mobic), + Diclofenac (Voltaren), + celecoxib (Celebrex), + ibuprofen (Advil, Motrin), + Indomethacin (Indocin, Tivorbex), + Nabumetone (Relafen), + Acetaminophen (Tylenol)

Drug Category/Class	Drugs
Pain Management - Opioids	- alfentanil (Alfenta), - meperidine (Demerol), - Buprenorphine (Butrans, Buprenex), - methadone (Dolophine), - fentanyl (Actiq, Duragesic, Sublimaze), + tapentadol (Nucynta), + codeine++ (Codeine, Fioricet with codeine), + carisoprodol++ (Soma), + tramadol++ (Ultram), + hydrocodone++ (Vicodin), + Benzhydrocodone (Apadaz), + oxycodone++ (Oxycontin, Percocet), + Oxymorphone (Opana, Numorphan), + Hydromorphone (Dilaudid, Exalgo), + Morphine (MS Contin)
Pain Management - Other	- lidocaine (xylocaine, Lidoderm), - zolmitriptan (Zomig)
Rheumatology - Anti Hyperuricemic/Anti-Gout	x Colchicine (Mitigare), + Febuxostat (Uloric)
Rheumatology - Immunomodulators	- Tofacitinib (Xeljanz), - Apremilast (Otezla), + Leflunomide (Arava)
Steroids	- testosterone, - progesterone, - estradiol
Urologicals - 5-Alpha Reductase Inhibitors	- Finasteride (Proscar)
Urologicals - Alpha-Blockers	- Doxazosin (Cardura), - Silodosin (Rapaflo), + Tamsulosin (Flomax), + Terazosin (Hytrin)
Urologicals - Antispasmodics for OAB	- Oxybutynin (Ditropan), - Mirabegron (Myrbetriq), - Darifenacin (Enablex), - Solifenacin (Vesicare), + Tolterodine (Tolterodine)
Urologicals - Erectile Dysfunction	- Vardenafil (Levitra), - Avanafil (Stendra), - sildenafil (Viagra), - Tadalafil (Cialis)

++ Pro-drug; may not be effective in Poor Metabolizers due to inability to metabolize and produce active metabolite

* The enzyme encoded by this gene is a minor metabolic pathway for this drug (of minor clinical importance)



Summary of Genes Tested

The following is a summary of findings

Genes affecting drug metabolism

Gene (Genotype)	Phenotype (Gene expression)	What it means
CYP1A2 *1C/*1F	Intermediate Metabolizer	This genotype predicts less than normal metabolic enzyme activity for the enzyme controlled by this gene. Increased potential for drug accumulation and adverse drug reactions.
CYP2B6 *1/*1	Normal Metabolizer	The patient is an extensive (normal) metabolizer, and changes in metabolism are not generally expected.
CYP2C19 *1/*1	Normal Metabolizer	This genotype predicts normal metabolic activity for the enzyme controlled by this gene.
CYP2C9 *1/*1	Normal Metabolizer	This genotype predicts normal metabolic activity for the enzyme controlled by this gene.
CYP2D6 *1/*1	Normal Metabolizer	This genotype predicts normal metabolic activity for the enzyme controlled by this gene.
CYP3A5 *1/*3	Intermediate Metabolizer	The expected metabolic activities for the enzymes controlled by these genes are shown at left. CYP3A4 and CYP3A5 are so similar that they generally affect the same drugs. If you are normal for one of these genes, then you can expect to metabolize these drugs normally. If you are impaired for both of these genes, then there is increased potential for drug accumulation and adverse drug reactions.
CYP4F2 C/C	Normal Warfarin	This genotype is not associated with the need for higher warfarin doses to achieve therapeutic level of anticoagulation.



Summary of Genes Tested

The following is a summary of your drug sensitivity report. More detail on each gene can be found on the pages referenced.

Genes affecting response or function

Factor II G/G	Normal Risk	The patient is wildtype for Factor II Prothrombin. Patients with this genotype (G/G) are associated with a normal risk of developing an abnormal blood clot.
Factor V Leiden C/C	Normal Risk	The patient is wildtype for Factor V Leiden. Patients with this genotype (C/C) are associated with a normal risk of developing an abnormal blood clot.
MTHFR CC-677/AA-1298	Normal Function	This genotype predicts normal function of the enzyme methylenetetrahydrofolate reductase (MTHFR). This enzyme plays a crucial role in converting dietary folate into methylfolate, the active form of this critical B vitamin. Normal ability to convert dietary folate into active methylfolate. This genotype is associated with normal plasma homocysteine levels and no homocysteine-related increased risk of premature cardiovascular disease.
SLCO1B1 *1/*1	Normal Function	No increased risk of statin-induced myopathy expected at low to moderate doses.
VKORC1 C/C	Low Sensitivity	Higher warfarin doses may be required to produce the desired anticoagulant effect. Excessive anticoagulant activity is associated with an increased risk of serious bleeding.
APOE E2/E2	Significant Risk	This diplotype is associated with decreased risk of Alzheimer's Disease and an increased risk of hyperlipidemia and cardiovascular disease.
BCHE (rs1799807) G/G	Severly Reduced Function	Patients with the CC genotype have an increased risk of post anesthesia apnea when treated with succinylcholine as compared to patients with the TT genotype. Other genetic and clinical factors may also influence risk of post anesthesia apnea.
COMT A/G	Decreased Activity	This genotype is associated with a decrease in COMT activity. Patient may have increased sensitivity to stimulant medications and other drugs that affect norepinephrine and dopamine release. Lower doses of these medications should be tried upon initiation of therapy.



Detailed Explanation of Findings

Gene	Phenotype (Gene expression)	What it means
CYP2D6	Normal Metabolizer	This genotype predicts normal metabolic activity for the enzyme controlled by this gene.

COMMON MEDICINES METABOLIZED BY CYP2D6

Neuropsychiatric

amitriptyline (Elavil)	haloperidol (Haldol)
amphetamine (Adderall)	iloperidone (Fanapt)
aripiprazole (Abilify)	imipramine (Tofranil)
asenapine (Saphris)	mirtazapine (Remeron) *
atomoxetine (Strattera)	nortriptyline (Aventyl, Pamelor)
bupropion (Wellbutrin)	olanzapine (Zyprexa) *
chlorpromazine (Thorazine)	paroxetine (Paxil)
citalopram (Celexa) *	perphenazine (Trilafon)
clomipramine (Anafranil)	quetiapine (Seroquel) *
desipramine (Norpramin)	risperidone (Risperdal)
desvenlafaxine (Pristiq)*	sertraline (Zoloft) *
doxepin (Sinequan,	tacrine (Cognex)
Silenor, Prudoxin, Zonalon)	thioridazine (Mellaril)
duloxetine (Cymbalta)	trazadone (Oleptro) *
escitalopram (Lexapro)	venlafaxine (Effexor)
fluoxetine (Prozac)	

Cardiovascular

carvedilol (Coreg)	propafenone (Rythmol)
flecainide (Tambocor)	propranolol (Inderal)
lercandipine (Zandip)	quinidine (various brands)
metoprolol (Lopressor, Toprol)	timolol (Blocadren)
nebivolol (Bystolic)	

Pain

celecoxib (Celebrex) *
codeine++
cyclobenzaprine (Flexeril) *
hydrocodone++ ibuprofen *
methadone *
oxycodone++ (Oxycontin)
tiagabine (Gabitril) *
tramadol++ (Ultram)

Anti-Infectives

indinavir (Crixivan) *
ritonavir (Norvir) *

Oncologic

tamoxifen ++

++ Pro-drug; may not be effective in Poor Metabolizers due to inability to metabolize and produce active metabolite

* The enzyme encoded by this gene is a minor metabolic pathway for this drug (of minor clinical importance)



Detailed Explanation of Findings

Gene	Phenotype (Gene expression)	What it means
CYP2C19	Normal Metabolizer	This genotype predicts normal metabolic activity for the enzyme controlled by this gene.

COMMON MEDICINES METABOLIZED BY CYP2C19

Neuropsychiatric

citalopram (Celexa)	paroxetine (Paxil) *
clomipramine (Anafranil) *	perphenazine (Trilafon) *
diazepam (Valium)	phenobarbital
doxepin (Sinequan, Silenor, Prudoxin, Zonalon)	phenytoin (Dilantin)
escitalopram (Lexapro)	sertraline (Zoloft)
imipramine (Tofranil)	venlafaxine (Effexor) *
	vilazodone (Viibryd) *

Antivirals, Hormones, and Anti-Diabetics

efavirenz (Sustiva) *	progesterone *
nelfinavir (Viracept)	tolbutamide (Orinase) *

Pain

carisoprodol ++ (Soma)
 ibuprofen *
 meperidine (Demerol)
 methadone
 tapentadol (Nucynta)

GERD

esomeprazole (Nexium)
 lansoprazole (Prevacid)
 omeprazole (Prilosec)
 pantoprazole (Protonix)
 rabeprazole (Aciphex)

Oncologic

tamoxifen ++

++ Pro-drug; may not be effective in Poor Metabolizers due to inability to metabolize and produce active metabolite

* The enzyme encoded by this gene is a minor metabolic pathway for this drug (of minor clinical importance)



Detailed Explanation of Findings

Gene	Phenotype (Gene expression)	What it means
CYP3A5	Intermediate Metabolizer	The expected metabolic activities for the enzymes controlled by these genes are shown at left. CYP3A4 and CYP3A5 are so similar that they generally affect the same drugs. If you are normal for one of these genes, then you can expect to metabolize these drugs normally. If you are impaired for both of these genes, then there is increased potential for drug accumulation and adverse drug reactions.

COMMON MEDICINES METABOLIZED BY CYP3A4 and CYP3A5

Pain

alfentanil (Alfenta)	lidocaine (xylocaine, various) *
codeine *	meperidine (Demerol)
cyclobenzaprine (Flexeril)	methadone
fentanyl (Actiq, Duragesic, Sublimaze)	oxycodone (Oxycontin)
hydrocodone *	ropivacaine (Naropin) *
ibuprofen *	tizanidine (Zanaflex) *
	tramadol (Ultram) *

Cardiovascular

amiodarone (Cordarone)
amlodipine (Norvasc)
atorvastatin (Lipitor, Caduet)
carvedilol (Coreg) *
clopidogrel (Plavix) *
diltiazem (Cardizem)
dofetilide (Tikosyn)
felodipine (Plendil)
fluvastatin (Lescol) *
lercanidipine (Zanidip)
losartan (Cozaar)
lovastatin (Mevacor)
nifedipine (Adalat, Procardia)
nisoldipine (Sular)
nitrendipine
propafenone (Rythmol)
quinidine (Various brands)
ranolazine (Ranexa)
rivaroxaban (Xarelto)
simvastatin (Zocor)
ticagrelor (Brilinta)

Neuropsychiatric

alprazolam (Xanax)	midazolam (Versed)
amphetamine (Adderall) *	mirtazapine (Remeron)
aripiprazole (Abilify)	nefazodone (Serzone)
atomoxetine (Strattera) *	paroxetine (Paxil) *
bupirone (Buspar)	perphenazine (Trilafon)
carbamazepine (Tegretol, Various brands)	phenytoin (Dilantin) *
chlorpromazine (Thorazine) *	promazine (Sparine)
citalopram (Celexa) *	quetiapine (Seroquel)
clomipramine (Anafranil) *	sertraline (Zoloft) *
clozapine (Clozaril) *	thioridazine (Mellaril)
desvenlafaxine (Pristiq)	tiagabine (Gabitril)
diazepam (Valium)	trazodone (Oleptro)
escitalopram (Lexapro) *	triazolam (Halcion)
fluoxetine (Prozac) *	venlafaxine (Effexor) *
haloperidol (Haldol)	vilazodone (Viibryd)
iloperidone (Fanapt)	ziprasidone (Geodon)
lurasidone (Latuda)	zolpidem (Ambien)
	zonisamide (Zonegran)

Oncological

docetaxel (Taxotere)
tamoxifen (Nolvades) *
vincristine (Vincasar, Oncovin)

Anti-Infective

clarithromycin (Biaxin)	nelnavir (Viracept)
efavirenz (Sustiva)	ritonavir (Norvir)
erythromycin (E-Mycin)	saquinavir (Invirase)
indinavir (Crixivan)	telithromycin (Ketek)

Hormonal / Endocrine

estradiol
hydrocortisone
progesterone
testosterone

Gastrointestinal

esomeprazole (Nexium)	pantoprazole (Protonix) *
lansoprazole (Prevacid)	rabeprazole (Aciphex)
omeprazole (Prilosec) *	

Antidiabetic

glipizide (Glucotrol) *
glyburide (Diabeta)

Immunosuppressant

cyclosporine (Gengraf)	tacrolimus (Prograf)
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Impotence

sildenafil (Viagra)

Immunomodulation

cyclophosphamide (Cytosan) *
ifosfamide
zafirlukast (Accolate) *

++ Pro-drug; may not be effective in Poor Metabolizers due to inability to metabolize and produce active metabolite

* The enzyme encoded by this gene is a minor metabolic pathway for this drug (of minor clinical importance)



Detailed Explanation of Findings

Gene	Phenotype (Gene expression)	What it means
CYP2C9	Normal Metabolizer	This genotype predicts normal metabolic activity for the enzyme controlled by this gene.

COMMON MEDICINES METABOLIZED BY CYP2C9

Cardiovascular

carvedilol (Coreg) *	glyburide (Diabeta)
clopidogrel (Plavix) *	losartan (Cozaar)
fluvastatin (Lescol)	rosuvastatin (Crestor)
glimepiride (Amaryl)	tolbutamide (Orinase)
glipizide (Glucotrol)	warfarin (Coumadin)

Steroids

progesterone

Anti-Infectives

efavirenz (Sustiva) *

Pain

carisoprodol celecoxib (Celebrex) ibuprofen (Advil, Motrin)	methadone * naproxen (Aleve) tapentadol (Nucynta)
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Oncology

tamoxifen (Nolvadex) *

Neuropsychiatric

fluoxetine (Prozac) * phenytoin (Dilantin)	phenobarbital
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Other

sildenafil (Viagra) *

Immunomodulation

zarlukast (Accolate)

++ Pro-drug; may not be effective in Poor Metabolizers due to inability to metabolize and produce active metabolite

* The enzyme encoded by this gene is a minor metabolic pathway for this drug (of minor clinical importance)



Detailed Explanation of Findings

Gene	Phenotype (Gene expression)	What it means
CYP1A2	Intermediate Metabolizer	This genotype predicts less than normal metabolic enzyme activity for the enzyme controlled by this gene. Increased potential for drug accumulation and adverse drug reactions.

COMMON MEDICINES METABOLIZED BY CYP1A2

Neuropsychiatric

amphetamine (Adderall) *	paroxetine (Paxil) *
asenapine (Saphris)	perphenazine (Trilafon) *
clomipramine (Anafranil) *	promazine (Sparine) tacrine (Cognex) tiagabine (Gabitril) *
clozapine (Clozaril)	thioridazine (Mellaril)
duloxetine (Cymbalta)	ziprasidone (Geodon) *
mirtazapine (Remeron)	
olanzapine (Zyprexa)	

Miscellaneous

caffeine
carvedilol (Coreg) *
clopidogrel (Plavix) *
estradiol
propranolol (Inderal)
ritonavir (Norvir) *
theophylline

Pain and Local Anesthetics

cyclobenzaprine (Flexeril)	lidocaine (xylocaine, various brands)
naproxen (Aleve)	ropivacaine (Naropin)
tizanidine (Zanaflex)	
zolmitriptan (Zomig)	

++ Pro-drug; may not be effective in Poor Metabolizers due to inability to metabolize and produce active metabolite

* The enzyme encoded by this gene is a minor metabolic pathway for this drug (of minor clinical importance)



Detailed Explanation of Findings

Gene	Phenotype (Gene expression)	What it means
CYP2B6	Normal Metabolizer	The patient is an extensive (normal) metabolizer, and changes in metabolism are not generally expected.

COMMON MEDICINES METABOLIZED BY CYP2B6

Miscellaneous

bupropion	ibuprofen (Advil, Motrin) *	sertraline (Zoloft)
clopidogrel (Plavix) *	ifosfamide	tramadol (Ultram) *
cyclophosphamide (Cytoxan)++	meperidine	
efavirenz (Sustiva)	methadone (Demerol)	

++ Pro-drug; may not be effective in Poor Metabolizers due to inability to metabolize and produce active metabolite

* The enzyme encoded by this gene is a minor metabolic pathway for this drug (of minor clinical importance)



Detailed Explanation of Findings

Gene	Phenotype (Gene expression)	What it means
Factor II	Normal Risk	The patient is wildtype for Factor II Prothrombin. Patients with this genotype (G/G) are associated with a normal risk of developing an abnormal blood clot.
Factor V Leiden	Normal Risk	The patient is wildtype for Factor V Leiden. Patients with this genotype (C/C) are associated with a normal risk of developing an abnormal blood clot.
MTHFR	Normal Function	This genotype predicts normal function of the enzyme methylenetetrahydrofolate reductase (MTHFR). This enzyme plays a crucial role in converting dietary folate into methylfolate, the active form of this critical B vitamin. Normal ability to convert dietary folate into active methylfolate. This genotype is associated with normal plasma homocysteine levels and no homocysteine-related increased risk of premature cardiovascular disease.
SLCO1B1	Normal Function	No increased risk of statin-induced myopathy expected at low to moderate doses.
VKORC1	Low Sensitivity	Higher warfarin doses may be required to produce the desired anticoagulant effect. Excessive anticoagulant activity is associated with an increased risk of serious bleeding.
APOE	Significant Risk	This diplotype is associated with decreased risk of Alzheimer's Disease and an increased risk of hyperlipidemia and cardiovascular disease.
BCHE (rs1799807)	Severly Reduced Function	Patients with the CC genotype have an increased risk of post anesthesia apnea when treated with succinylcholine as compared to patients with the TT genotype. Other genetic and clinical factors may also influence risk of post anesthesia apnea.
COMT	Decreased Activity	This genotype is associated with a decrease in COMT activity. Patient may have increased sensitivity to stimulant medications and other drugs that affect norepinephrine and dopamine release. Lower doses of these medications should be tried upon initiation of therapy.

Method Summary:**Loci / Mutations Tested:**

APOE:	E1,E2,E3,E4
BCHE (rs1799807):	C,T
COMT:	A,G
CYP1A2:	*17,*1A,*1B,*1C,*1D,*1E,*1F,*1G,*1J,*1K,*1L,*1N,*1V,*1W,H12,H14,H7,H9
CYP2B6:	*1,*16,*18,*22,*4,*5,*6,*7,*9
CYP2C19:	*1,*10,*17,*2,*3,*4,*5,*6,*7,*8,*9,5
CYP2C9:	*1,*11,*12,*13,*15,*18,*2,*27,*3,*4,*5,*6,*8
CYP2D6:	*1,*10,*100,*101,*102,*103,*104,*105,*106,*107,*108,*109,*10x2,*11,*110,*111,*112,*113,*114,*115,*116,*117,*118,*119,*12,*120,*121,*122,*123,*124,*125,*126,*127,*128,*129,*13,*130,*131,*132,*133,*134,*135,*136,*137,*138,*139,*14,*140,*141,*142,*143,*144,*145,*146,*146x2,*15,*17,*17x2,*18,*19,*1x>=3,*1x>=3,*1x2,*2,*20,*21,*22,*23,*24,*25,*26,*27,*28,*29,*29x2,*2x>=3,*2x>=3,*2x2,*3,*30,*31,*32,*33,*34,*35,*35x2,*36,*36x2,*37,*38,*39,*3x2,*4,*40,*41,*41x2,*41x3,*42,*43,*43x2,*44,*45,*45x2,*46,*47,*48,*49,*4x>=3,*4x>=3,*4x2,*5,*50,*51,*52,*53,*54,*55,*56,*58,*59,*6,*60,*61,*62,*63,*64,*65,*68,*69,*6x2,*7,*70,*71,*72,*73,*74,*75,*8,*81,*82,*83,*84,*85,*86,*87,*88,*89,*9,*90,*91,*92,*93,*94,*95,*96,*97,*98,*99,*9x2,CN,47,*148,*149,*152,*153,*154,*155,*156,*157,*158,*159,*160,*161,*162,*163
CYP3A5:	*1,*2,*3,*3A,*6,*7,*8,*9
CYP4F2:	A,C,G,T
Factor II:	A,G
Factor V Leiden:	A,C,G,T
MTHFR:	CC-677,CT-677,TT-677,-1298,AC-1298,CC-1298
SLCO1B1:	*1,*1A,*1B,*5
VKORC1:	A,C,G,T

Patient Information Card

This is summary genetic report for your patient to share with other healthcare providers. Card can be cut out along dashed line, and carried with the patient.



Personalized Genomics

Patient: Sample Report,Urinary **DOB:** 01/01/2006 **Requisition ID** P242050004

Pharmacogenetic Test Summary

APOE	E2/E2	Significant Risk
COMT	A/G	Decreased Activity
CYP2B6	*1/*1	Normal Metabolizer
CYP2C9	*1/*1	Normal Metabolizer
CYP3A5	*1/*3	Intermediate Metabolizer
Factor II	G/G	Normal Risk
MTHFR	CC-677/AA-1298	Normal Function
VKORC1	C/C	Low Sensitivity

BCHE (rs1799807)	G/G	Severly Reduced Function
CYP1A2	*1C/*1F	Intermediate Metabolizer
CYP2C19	*1/*1	Normal Metabolizer
CYP2D6	*1/*1	Normal Metabolizer
CYP4F2	C/C	Normal Warfarin
Factor V Leiden	C/C	Normal Risk
SLCO1B1	*1/*1	Normal Function

↑ **Fold**

Final Report Reviewed and Released By:

Soft Cell Laboratories
Lab Director: David S. Mehr, MD, PC
Address: 453 S 600 E
St. George 84770 UT
Phone: (435) 000-0000
CLIA #: 46D2181769
Note: