Interpretive Report

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Patient Name:	[redacted] [redacted]	*Lab Number:*	[redacted]
Birth Date:	[redacted]	*Sex:*	**F**
Ordered By:	**Reed, Jody**	*Date Collected:*	**05/12/2023**
Specimen Type:	**Buccal Swab**	*Date Received:*	**05/22/2023**
Client Order #:	[redacted]		
Patient ID:	[redacted]		
Indication:	**Schizoaffective disorder, manic type**		
Tests Ordered:	**PGDx- Comprehensive Panel; PGDx-Comprehensive DDI**		

Result

See Attached Report

Interpretation

See Attached Report

This report **electronically signed by Frances Hannan, Ph.D. at 05/31/2023 04:42:06 PM**

PATIENT INFORMATION		SPECIMEN DETAILS		PROVIDER INFORMATION
NAME: [redacted]		**SPECIMEN TYPE:**	Buccal Swab	Jody Reed
ACC #: [redacted]		**COLLECTION DATE:**	5/12/2023	Jackson Park Hospital
DOB: [redacted]		**RECEIVED DATE:**	5/22/2023	
SEX:	Female	**REPORT DATE:**	5/31/2023	

Comprehensive Pharmacogenetic Report

Current Patient Medications

Depakote

Medications outside the scope of the report: Depakote

PATIENT INFORMATION

NAME: [redacted]
ACC #: [redacted]
DOB: [redacted]
SEX: Female

Risk Management

Antipsychotic-Induced Hyperprolactinemia

Moderate Risk of Antipsychotic-induced Hyperprolactinemia

The patient carries one copy of the Taq1A variant (heterozygous for the A1 allele).

The genotype results predict that the patient may have reduced dopamine receptor DRD2 density and hypodopaminergic functioning. The patient has moderate risk of hyperprolactinemia when treated with antipsychotics.

Monitor patient closely for signs of hyperprolactinemia. An evaluation of the risk-benefit profile of the antipsychotic medication may be required.

Antipsychotic-Induced Tardive Dyskinesia

Moderate Risk of Antipsychotic-Induced Tardive Dyskinesia

The patient carries one copy of the Taq1A variant (heterozygous for the A1 allele).

The genotype results predict that the patient may have reduced dopamine receptor DRD2 density and hypodopaminergic functioning. The patient has moderate risk for tardive dyskinesia when treated with antipsychotics.

Monitor the patient for any signs of tardive dyskinesia.

Antipsychotic-Induced Weight Gain

Moderate Risk of Antipsychotic-Induced Weight Gain

The patient carries one copy of the Taq1A variant (heterozygous for the A1 allele).

The genotype results predict that the patient may have reduced dopamine receptor DRD2 density and hypodopaminergic functioning. The patient has moderate risk for weight gain when treated with antipsychotics.

Monitor patient closely for signs of weight gain.

Hyperhomocysteinemia - Depression

No Increased Risk of Hyperhomocysteinemia

The patient does not carry the MTHFR c.665C>T variant. MTHFR enzyme activity is normal.

Patients diagnosed with depression often have low folate levels and homocysteine is a highly sensitive marker of folate status. Functional folate deficiency is indicated by elevated homocysteine. With a normal MTHFR activity, this patient can process folate normally and is unlikely to have elevated plasma levels of homocysteine.

Patients diagnosed with depression: as lower folate levels are associated with poorer antidepressant response, and baseline levels of folate within the normal range predict antidepressant response, testing for homocysteine levels and serum folate levels may be informative for this patient before prescribing methylfolate as an antidepressant-augmenting agent.

Hyperhomocysteinemia - Thrombosis

No Increased Risk of Hyperhomocysteinemia

The patient does not carry the MTHFR c.665C>T variant or MTHFR c.1286A>C variant. MTHFR enzyme activity is normal.

Based on results for the MTHFR c.665C>T and c.1286A>C variants, the patient has normal MTHFR activity and is unlikely to have elevated plasma levels of homocysteine. Hyperhomocysteinemia is associated with a risk for venous thromboembolism (VTE). Unless other risk factors are present, the patient is not expected to have an increased risk for VTE.

MTHFR enzyme activity is normal.

Thrombophilia

Normal Risk of Thrombosis

The patient does not carry the F5 c.1601G>A variant (also known as Factor V Leiden) or the F2 c.*97G>A variant (also known as Factor II 20210G>A).

The patient's risk of thrombosis is not increased (average risk of clotting is about 1 in 1000 for anyone in a year). However, because this test cannot find all of the inherited reasons for abnormal clotting, other factors may affect this risk assessment.

Assess thrombotic risk based on other genetic and/or circumstantial risk factors such as smoking, obesity, malignancy, prolonged immobilization or surgery.

Estrogen-containing contraceptive and hormone replacement therapy: unless other genetic and/or circumstantial risk factors are present, consider standard prescribing and monitoring practices.

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✓ Type III Hyperlipoproteinemia

Not Associated with Type III Hyperlipoproteinemia

The patient is positive for the APOE c.388 T>C (Cys130Arg) mutation and negative for the APOE c.526 C>T (Arg176Cys) mutation. The patient's genotype is ε3/ε4 (frequency: 15-28%).

The APOE E3 is the normal APOE. The APOE E4 confers a limitation of HDL binding to its receptor, and is associated with increased plasma cholesterol, LDL, and triglycerides. Individuals that are heterozygous for this allele may have higher total cholesterol levels and elevated LDL cholesterol levels. The APOE ε3/ε4 genotype is associated with an increased risk for developing atherosclerosis and cardiovascular disease.

Consider dietary adjustments (very low fat diet) and lipid-lowering therapy based on lipid profiles and other risk factors.

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Potentially Impacted Medications

CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
Anticancer Agents	**Antifolates**	Methotrexate (Trexall®)		
Cardiovascular	**Angiotensin II Receptor Antagonists**	Azilsartan (Edarbi®, Edarbyclor®) Candesartan (Atacand®) Eprosartan (Teveten®) Irbesartan (Avapro®) Losartan (Cozaar®, Hyzaar®) Olmesartan (Benicar®) Telmisartan (Micardis®) Valsartan (Diovan®, Entresto®)		
	Antianginal Agents	Ranolazine (Ranexa®)		
	Antiarrhythmics	Amiodarone (Nexterone®, Pacerone®) Disopyramide (Norpace®) Flecainide (Tambocor®) Mexiletine (Mexitil®) Propafenone (Rythmol®) Quinidine (Quinidine®) Sotalol (Betapace®, Sorine®, Sotylize®)		
	Anticoagulants	Apixaban (Eliquis®) Betrixaban (Bevyxxa®) Dabigatran Etexilate (Pradaxa®) Edoxaban (Savaysa®) Fondaparinux (Arixtra®) Rivaroxaban (Xarelto®) Warfarin (Coumadin®)		
	Antiplatelets	Prasugrel (Effient®) Ticagrelor (Brilinta®) Vorapaxar (Zontivity®)		Clopidogrel (Plavix®)
	Beta Blockers	Atenolol (Tenormin®) Bisoprolol (Zebeta®) Carvedilol (Coreg®) Labetalol (Normodyne®, Trandate®) Metoprolol (Lopressor®) Nebivolol (Bystolic®) Propranolol (Inderal®) Timolol (Blocadren®)		
	Cardiac myosin inhibitor		Mavacamten (Camzyos®)	
	Diuretics	Torsemide (Demadex®)		

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CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
	Statins	Atorvastatin (Lipitor®) Fluvastatin (Lescol®) Lovastatin (Mevacor®, Altoprev®, Advicor®) Pitavastatin (Livalo®) Pravastatin (Pravachol®) Rosuvastatin (Crestor®) Simvastatin (Zocor®)		
Diabetes	Meglitinides	Nateglinide (Starlix®) Repaglinide (Prandin®, Prandimet®)		
	Sulfonylureas	Chlorpropamide (Diabinese®) Glimepiride (Amaryl®) Glipizide (Glucotrol®) Glyburide (Micronase®) Tolbutamide (Orinase®)		
Gastrointestinal	Antiemetics	Aprepitant (Emend-oral®) Dolasetron (Anzemet®) Dronabinol (Marinol®) Fosaprepitant (Emend-IV®) Fosnetupitant / Palonosetron (Akynzeo-IV®) Granisetron (Sancuso®, Sustol®) Metoclopramide (Reglan®) Netupitant / Palonosetron (Akynzeo-oral®) Ondansetron (Zofran®, Zuplenz®) Palonosetron (Aloxi®) Rolapitant (Varubi®)		
	Proton Pump Inhibitors	Dexlansoprazole (Dexilant®, Kapidex®) Esomeprazole (Nexium®) Lansoprazole (Prevacid®) Omeprazole (Prilosec®) Pantoprazole (Protonix®) Rabeprazole (Aciphex®)		
Infections	Antifungals	Amphotericin B (AmBisome®, Abelcet®) Anidulafungin (Eraxis®) Caspofungin (Cancidas®) Fluconazole (Diflucan®) Isavuconazonium (Cresemba®) Itraconazole (Sporanox®) Micafungin (Mycamine®) Posaconazole (Noxafil®) Voriconazole (Vfend®)		
	Anti-HIV Agents	Dolutegravir (Tivicay®, Triumeq®) Doravirine (Pifeltro®) Etravirine (Edurant®) Raltegravir (Isentress®, Dutrebis®) Rilpivirine (Intelence®)	Efavirenz (Sustiva®)	
	Antimalarials	Proguanil (Malarone®)		

CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
Pain	Fibromyalgia Agents	Milnacipran (Savella®)		
	Muscle Relaxants	Carisoprodol (Soma®) Cyclobenzaprine (Flexeril®, Amrix®) Metaxalone (Skelaxin®) Methocarbamol (Robaxin®)	Tizanidine (Zanaflex®)	
	NSAIDs	Celecoxib (Celebrex®) Diclofenac (Voltaren®) Flurbiprofen (Ansaid®) Ibuprofen (Advil®, Motrin®) Indomethacin (Indocin®) Ketoprofen (Orudis®) Ketorolac (Toradol®) Meloxicam (Mobic®) Nabumetone (Relafen®) Naproxen (Aleve®) Piroxicam (Feldene®) Sulindac (Clinoril®)		
	Opioids	Alfentanil (Alfenta®) Benzhydrocodone (Apadaz®) Buprenorphine (Butrans®, Buprenex®) Codeine (Codeine; Fioricet® with Codeine) Dihydrocodeine (Synalgos-DC®) Fentanyl (Actiq®) Hydrocodone (Vicodin®) Hydromorphone (Dilaudid®, Exalgo®) Levorphanol (Levo Dromoran®) Meperidine (Demerol®) Morphine (MS Contin®) Oliceridine (Olinvyk) Oxycodone (Percocet®, Oxycontin®) Oxymorphone (Opana®, Numorphan®) Sufentanil (Sufenta®) Tapentadol (Nucynta®) Tramadol (Ultram®)	Methadone (Dolophine®)	
	Antiaddictives	Lofexidine (Lucemyra®)	Bupropion (Wellbutrin®, Zyban®, Aplenzin®, Contrave®) Naltrexone (Vivitrol®, Contrave®)	
	Anti-ADHD Agents	Amphetamine (Adderall®, Evekeo®) Clonidine (Kapvay®) Dextroamphetamine (Dexedrine®) Guanfacine (Intuniv®) Lisdexamfetamine (Vyvanse®)	Atomoxetine (Strattera®) Dexmethylphenidate (Focalin®) Methylphenidate (Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®)	

CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
Psychotropic	Anticonvulsants	Brivaracetam (Briviact®) Cannabidiol (Epidiolex®) 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®) Phenytoin (Dilantin®) Pregabalin (Lyrica®) Rufinamide (Banzel®) Tiagabine (Gabitril®) Topiramate (Topamax®) Valproic Acid (Depakene®) Vigabatrin (Sabril®)	Phenobarbital (Luminal®) Primidone (Mysoline®) Zonisamide (Zonegran®)	
	Antidementia Agents	Donepezil (Aricept®) Galantamine (Razadyne®) Memantine (Namenda®)		
	Antidepressants	Amitriptyline (Elavil®) Amoxapine (Amoxapine®) Clomipramine (Anafranil®) Desipramine (Norpramin®) Desvenlafaxine (Pristiq®) Doxepin (Silenor®) Duloxetine (Cymbalta®) Fluoxetine (Prozac®, Sarafem®) Fluvoxamine (Luvox®) Imipramine (Tofranil®) Levomilnacipran (Fetzima®) Maprotiline (Ludiomil®) Mirtazapine (Remeron®) Nefazodone (Serzone®) Nortriptyline (Pamelor®) Paroxetine (Paxil®, Brisdelle®) Protriptyline (Vivactil®) Trazodone (Oleptro®) Trimipramine (Surmontil®) Venlafaxine (Effexor®) Vilazodone (Viibryd®) Vortioxetine (Trintellix®)	Citalopram (Celexa®) Escitalopram (Lexapro®) Sertraline (Zoloft®)	

CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
	Antipsychotics	Aripiprazole (Abilify®, Aristada®) Asenapine (Saphris®) Brexpiprazole (Rexulti®) Cariprazine (Vraylar®) Chlorpromazine (Thorazine®) Fluphenazine (Prolixin®) Haloperidol (Haldol®) Iloperidone (Fanapt®) Loxapine (Loxitane®, Adasuve®) Lurasidone (Latuda®) Paliperidone (Invega®) Perphenazine (Trilafon®) Pimavanserin (Nuplazid®) Pimozide (Orap®) Quetiapine (Seroquel®) Risperidone (Risperdal®) Thioridazine (Mellaril®) Thiothixene (Navane®) Trifluoperazine (Stelazine®) Ziprasidone (Geodon®)	Clozapine (Clozaril®) Olanzapine (Zyprexa®)	
	Benzodiazepines	Alprazolam (Xanax®) Clobazam (Onfi®) Clonazepam (Klonopin®) Diazepam (Valium®)		
	Other Neurological Agents	Deutetrabenazine (Austedo®) Dextromethorphan / Quinidine (Nuedexta®) Flibanserin (Addyi®) Valbenazine (Ingrezza®)	Tetrabenazine (Xenazine®)	
Rheumatology	Anti-Hyperuricemics and Anti-Gout Agents	Colchicine (Mitigare®) Febuxostat (Uloric®)		
	Immunomodulators	Apremilast (Otezla®) Tofacitinib (Xeljanz®)	Leflunomide (Arava®)	
Transplantation	Immunosuppressants		Tacrolimus (Prograf®)	
Urologicals	5-Alpha Reductase Inhibitors for Benign Prostatic Hyperplasia	Dutasteride (Avodart®) Finasteride (Proscar®)		
	Alpha-Blockers for Benign Prostatic Hyperplasia	Alfuzosin (UroXatral®) Doxazosin (Cardura®) Silodosin (Rapaflo®) Tamsulosin (Flomax®) Terazosin (Hytrin®)		
	Antispasmodics for Overactive Bladder	Darifenacin (Enablex®) Fesoterodine (Toviaz®) Mirabegron (Myrbetriq®) Oxybutynin (Ditropan®) Solifenacin (Vesicare®) Tolterodine (Detrol®) Trospium (Sanctura®)		

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SEX: Female

CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
	Phosphodiesterase Inhibitors for Erectile Dysfunction	Avanafil (Stendra®) Sildenafil (Viagra®) Tadalafil (Cialis®) Vardenafil (Levitra®)		

Dosing Guidance

Atomoxetine
Strattera®

Normal Atomoxetine Exposure (CYP2D6: Normal Metabolizer) — ACTIONABLE

The genotype result indicates that the patient is likely to have an insufficient response due to inadequate drug exposure following standard dosing as compared with poor metabolizers.
Consider the following dosing strategy:
- Initiate treatment at 40 mg/day, then increase to 80 mg/day after 3 days.
- If after 2 weeks, optimal clinical response is not observed and adverse events are not present, consider a dose increase to 100 mg/day.
- If after an additional 2 weeks, optimal clinical response is not observed, consider therapeutic drug monitoring 1-2 hours post dose. If the plasma concentration is < 200 ng/mL, consider a proportional dose increase to approach 400 ng/mL. Doses > 100 mg/day may be needed to achieve a target therapeutic concentration (therapeutic range: 200-1,000 ng/mL). Note: doses above 120 mg/day have not been evaluated.

Bupropion
Wellbutrin®, Zyban®, Aplenzin®, Contrave®

Altered Bupropion Exposure (CYP2B6: Poor Metabolizer) — INFORMATIVE

The genotype result indicates that the patient is likely to have increased bupropion exposure, but decreased exposure to the active metabolite (hydroxybupropion). This metabolite contributes to the therapeutic effects of bupropion when used as a smoking cessation agent or as an antidepressant. This decrease in exposure of hydroxybupropion may result in decreased therapeutic efficacy.

Smoking Cessation: There is insufficient data to allow calculation of dose adjustment. Consider standard prescribing and closer monitoring.

Major Depressive Disorder and Prevention of Seasonal Affective Disorder: There is insufficient data to allow calculation of dose adjustment. Therapeutic monitoring of bupropion-hydroxybupropion levels may be considered to guide dosing adjustments.

Bupropion
Wellbutrin®, Zyban®, Aplenzin®, Contrave®

Decreased Response to Bupropion for Smoking Cessation (ANKK1: Altered DRD2 function) — INFORMATIVE

Smoking Cessation: The patient's genotype result is associated with a positive response to nicotine replacement therapy and a lesser response to bupropion treatment.

Citalopram
Celexa®

Increased Citalopram Exposure (CYP2C19: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype is associated with an increased exposure to citalopram and may increase risk of adverse effects. Citalopram can be initiated at standard label-recommended dosage. Consider slow up-titration and lower than standard maintenance doses.

Clopidogrel
Plavix®

Reduced Exposure to Clopidogrel Active Metabolite (CYP2C19: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype is associated with possible decreased clopidogrel exposure. Patients may be at an increased risk for adverse cardiac and cerebrovascular events.

ACS, PCI, and Neurovascular Indications:
Consider an alternative such as prasugrel (contraindicated in TIA/stroke) or ticagrelor. In patients with ACS or PCI, if clopidogrel cannot be avoided, alternative dosing strategies exist and may be considered.

Clozapine
Clozaril®

Possible Non-Response to Clozapine (CYP1A2: Normal Metabolizer- Possible Inducibility) — INFORMATIVE

Smokers may be at risk for non-response at standard doses and may require higher doses. There is an association between high clozapine doses and the risk of seizures, and therefore careful monitoring is recommended during dosing adjustment. Smoking cessation may increase plasma drug levels, leading to adverse events. Therefore, therapeutic drug monitoring accompanied by dose reduction is recommended in patients who have quit smoking.

Dexmethylphenidate
Focalin®

Decreased Response to Dexmethylphenidate (COMT: Intermediate COMT Activity) — INFORMATIVE

The patient's genotype result predicts a less optimal response to dexmethylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.

Efavirenz
Sustiva®

Increased Efavirenz Exposure (CYP2B6: Poor Metabolizer) — ACTIONABLE

The genotype result indicates that the patient is likely to have higher dose-adjusted trough concentrations of efavirenz following standard dosing. This may result in significantly increased risk of CNS adverse events leading to treatment discontinuation. Consider initiating efavirenz with a decreased dose of 200 to 400 mg/day. If therapeutic drug monitoring is available and a decreased efavirenz dose is prescribed, consider obtaining steady-state plasma efavirenz concentrations to ensure concentrations are in the suggested therapeutic range (~1 to 4 µg/mL). Dose adjustment may require prescribing more than one pill once daily.

Escitalopram
Lexapro®

Increased Escitalopram Exposure (CYP2C19: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype is associated with an increased exposure to escitalopram and may increase risk of adverse effects. Escitalopram can be initiated at standard label-recommended dosage. Consider slow up-titration and lower than standard maintenance doses.

Leflunomide
Arava®

Increased Exposure to Leflunomide (CYP2C19: Intermediate Metabolizer) — INFORMATIVE

Leflunomide is metabolized by CYP2C19 and CYP1A2 to its active metabolite teriflunomide. Preliminary studies indicate that patients with decreased CYP2C19 activity have a higher risk of developing gastrointestinal side effects and hepatotoxicity. There is insufficient data to calculate dose adjustment. If leflunomide is prescribed at standard dosing, monitor closely the patient's response and be alert to increased side effects.

Full blood cell count (CBC) and liver function parameters should be checked no more than 6 months before beginning treatment, and every month for the initial 6 months of therapy. Blood pressure should be checked before beginning treatment and periodically thereafter.

Mavacamten
Camzyos®

Increased Mavacamten Exposure (CYP2C19: Intermediate Metabolizer) — ACTIONABLE

The genotype result indicates increased exposure to mavacamten and a possible increased risk of adverse effects including heart failure. Dosages are titrated to individual response and CYP2C19 genetic variation is accounted for in FDA dose titration and monitoring schedules. Mavacamten can be prescribed at standard label-recommended dosage and monitoring.

Methadone
Dolophine®

Increased Methadone Exposure (CYP2B6: Poor Metabolizer) — INFORMATIVE

The patient's genotype may be associated with an increased methadone exposure and increased risk of adverse effects in the treatment of opioid use disorder, but overall evidence is weak. Methadone can be prescribed at standard label-recommended dosage with close monitoring.

Methylphenidate
Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®

Decreased Response to Methylphenidate (COMT: Intermediate COMT Activity) — INFORMATIVE

The patient's genotype result predicts a less optimal response to methylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.

Naltrexone
Vivitrol®, Contrave®

Altered Response to Naltrexone (OPRM1: Normal OPRM1 Function) — INFORMATIVE

Treatment of alcohol dependence: the patient has the OPRM1 118AA wild-type genotype that is associated with a poorer outcome with naltrexone therapy. Naltrexone-treated patients not carrying the OPRM1 118A>G G allele are less likely to respond to this drug, and may have higher relapse rates than those who are carriers of this allele. This association has not been reported consistently across studies.

Olanzapine
Zyprexa®

Possible Non-Response to Olanzapine (CYP1A2: Normal Metabolizer- Possible Inducibility) — INFORMATIVE

There is little evidence regarding the impact of CYP1A2 genetic variants on olanzapine response. Smokers may be at risk for non-response at standard doses. Careful monitoring is recommended during dosing adjustment. Smoking cessation may increase plasma drug levels, leading to adverse events. Therefore, therapeutic drug monitoring accompanied by dose reduction may be needed in patients who have quit smoking.

Phenobarbital
Luminal®

Possible Sensitivity to Phenobarbital (CYP2C19: Intermediate Metabolizer) — INFORMATIVE

CYP2C19 is partly involved in the metabolism of phenobarbital, and although CYP2C19 intermediate metabolizers have a lower clearance of phenobarbital than normal metabolizers, no significant changes in clinical outcome has been reported with this antiepileptic drug. Therefore, phenobarbital can be prescribed at standard label-recommended dosage and administration with a closer monitoring for adverse events.

Primidone
Mysoline®

Possible Sensitivity to Primidone (CYP2C19: Intermediate Metabolizer) — INFORMATIVE

CYP2C19 is partly involved in the metabolism of primidone, and although CYP2C19 intermediate metabolizers have a lower clearance of phenobarbital (active metabolite) than normal metabolizers, no significant changes in clinical outcome has been reported with this antiepileptic drug. Therefore, primidone can be prescribed at standard label-recommended dosage and administration with a closer monitoring for adverse events.

Sertraline
Zoloft®

Increased Sertraline Exposure (CYP2C19: Intermediate Metabolizer; CYP2B6: Poor Metabolizer) — INFORMATIVE

The patient's genotype is associated with an increased exposure to sertraline and may increase risk of adverse effects. Consider a lower initial dose and slow up-titration with a 50% reduction of the standard label-recommended maintenance dose.

Tacrolimus
Prograf®

Insufficient Response to Tacrolimus (CYP3A5: Intermediate Metabolizer) — ACTIONABLE

The genotype result predicts that the patient expresses the CYP3A5 protein. Therefore, the patient may metabolize tacrolimus more rapidly, resulting in low tacrolimus trough levels. Studies have shown patients with this genotype may be at increased risk for acute transplant rejection while taking a standard dose of tacrolimus. Therefore, increasing starting dose 1.5 to 2 times recommended starting dose with close monitoring is strongly recommended to achieve therapeutic effect. Total starting dose should not exceed 0.3mg/kg/day.

Tetrabenazine
Xenazine®

Normal Sensitivity to Tetrabenazine (CYP2D6: Normal Metabolizer) — ACTIONABLE

For treating chorea associated with Huntington's disease: Individualization of dose with careful weekly titration is required. The first week's starting dose is 12.5 mg daily; second week, 25 mg (12.5 mg twice daily); then slowly titrate at weekly intervals by 12.5 mg to a tolerated dose. **The maximum daily dose in CYP2D6 normal metabolizers is 100 mg, with a maximum single dose of 37.5 mg**. If serious adverse events occur, titration should be stopped and the dose of tetrabenazine should be reduced. If the adverse event(s) do not resolve, consider withdrawal of tetrabenazine.

Tizanidine
Zanaflex®

Possible Non-Response to Tizanidine (CYP1A2: Normal Metabolizer- Possible Inducibility) — INFORMATIVE

There is little evidence regarding the impact of CYP1A2 genetic variants on tizanidine response. Smokers may be at risk for non-response and may require higher doses. There is an association between high tizanidine plasma concentrations and the risk of hypotension and excessive sedation. Therefore, careful monitoring is recommended during dosing adjustment. Smoking cessation may increase plasma drug levels, leading to excessive hypotension and sedation. Careful monitoring accompanied by dose reduction may be needed in patients who have quit smoking.

Zonisamide
Zonegran®

Possible Sensitivity to Zonisamide (CYP2C19: Intermediate Metabolizer) — INFORMATIVE

CYP2C19 is partly involved in the metabolism of zonisamide, and although preliminary studies show that CYP2C19 intermediate metabolizers have a slightly lower (15%) zonisamide clearance than normal metabolizers, no significant change in the clinical outcome has been reported with this antiepileptic drug. Therefore, zonisamide can be prescribed at standard label-recommended dosage and administration with a closer monitoring for adverse events.

PATIENT INFORMATION
NAME: [redacted]
ACC #: [redacted]
DOB: [redacted]
SEX: Female

Test Details

Gene	Genotype	Phenotype	Clinical Consequences
ABCB1	3435C>T T/T	Homozygous Mutant - Variant Allele Present	Consistent with decreased transporter expression.
ANKK1/DRD2	DRD2:Taq1A A/G	Altered DRD2 function	Consistent with a reduced dopamine receptor D2 function.
APOE	ε3/ε4	Altered APOE function	Not associated with type III hyperlipoproteinemia - Increased risk of cardiovascular disease
COMT	Val158Met A/G	Intermediate COMT Activity	Consistent with a reduced catechol O-methyltransferase (COMT) function.
CYP1A2	*1A/*1L	Normal Metabolizer- Possible Inducibility	Consistent with a typical CYP1A2 activity in absence of inducing substances. Rapid metabolism may occur in presence of inducers such as barbiturates, cruciferous vegetables, carbamazepine, rifampin and smoking.
CYP2B6	*6/*6	Poor Metabolizer	Consistent with a significant deficiency in CYP2B6 drug metabolism. Increased risk for side effects or loss of efficacy with drug substrates.
CYP2C19	*2/*17	Intermediate Metabolizer	Consistent with a moderate deficiency in CYP2C19 enzyme activity.
CYP2C9	*1/*1	Normal Metabolizer	Consistent with a typical CYP2C9 enzyme activity.
CYP2D6	*1/*10	Normal Metabolizer	Consistent with a typical CYP2D6 enzyme activity.
CYP3A4	*1/*1	Normal Metabolizer	Consistent with a typical CYP3A4 activity. Caution is advised when prescribing narrow therapeutic index drugs. Alternative drugs or dose adjustment may be required if CYP3A inhibitors or inducers are co-prescribed.
CYP3A5	*1/*3	Intermediate Metabolizer	Consistent with an intermediate CYP3A5 activity (Expresser). Exercise caution if CYP3A5 drug substrates are prescribed.
F2 F5	rs1799963 GG rs6025 CC	Normal Risk of Thrombosis	Unless other genetic or circumstantial risk factors are present, the patient is not expected to have an increased risk for thrombosis.
GLP1R	c.502G>C G/G	Homozygous for G allele	
GLP1R	c.502G>A G/G	Homozygous for G allele	
GLP1R	c.510-1135T>G T/T	Homozygous for T allele	
GLP1R	c.780A>C A/C	Heterozygous for C allele	
MTHFR	c.665C>T CC	Normal MTHFR Activity	The patient does not carry the MTHFR c.665C>T variant, and the patient's MTHFR activity is normal. This is not associated with an increased risk of hyperhomocysteinemia.
MTHFR	c.1286A>C AA c.665C>T CC	No Increased Risk of Hyperhomocysteinemia	The patient does not carry the MTHFR c.665C>T or c.1286A>C variant. Therefore, the patient has normal MTHFR function, and no elevation of plasma homocysteine levels is expected.
OPRM1	A118G A/A	Normal OPRM1 Function	Consistent with a normal OPRM1 receptor signaling efficiency induced by exogenous opioids. This is associated with a good analgesia following standard opioid doses and a poor response to naltrexone.
PNPLA5	c.608-169G>A C/T	Heterozygous for A allele	
SLCO1B1	*1/*1	Normal Function	Consistent with a typical SLCO1B1 transporter function.
SULT4A1	c.743-374A>G T/C	Heterozygous for G allele	
VKORC1	-1639G>A G/G	Low Warfarin Sensitivity	Consistent with a typical VKORC1 expression.

Alleles Tested: **ABCB1** 3435C>T; **ANKK1/DRD2** DRD2:Taq1A; **APOE** ε2, ε4, (ε3 is reference); **COMT** Val158Met; **CYP1A2** *1C, *1F, *1K, *1L, *7, *11; **CYP2B6** *6, *9, *18, *18.002; **CYP2C19** *2, *3, *4A, *4B, *5, *6, *7, *8, *17; **CYP2C9** *2, *3, *4, *5, *6, *8, *11, *12, *13, *15, *25; **CYP2D6** *2, *3, *4, *4M, *6, *7, *8, *9, *10, *11, *12, *14, *15, *17, *18, *19, *20, *29, *41, *114, *5 (gene deletion), XN (gene duplication); **CYP3A4** *2, *17, *22; **CYP3A5** *3, *6, *7; **F2** rs1799963; **F5** rs6025; **GLP1R** c.780A>C, c.510-1135T>G, c.502G>A, c.502G>C; **MTHFR** c.1286A>C, c.665C>T; **OPRM1** A118G; **PNPLA5** c.608-169G>A; **SLCO1B1** *5; **SULT4A1** c.743-374A>G; **VKORC1** -1639G>A

Limitation: This test will not detect all the known alleles that result in altered or inactive tested genes. This test does not account for all individual variations in the individual tested. Absence of a detectable gene mutation does not rule out the possibility that a patient has different phenotypes due to the presence of an undetected polymorphism or due to other factors such as drug-drug interactions, comorbidities and lifestyle habits. Technical limitations include the possibility of laboratory error and inaccuracy of the test due to unknown rare variants.

Methodology: Mass spectrometer-based assays detect listed alleles and most rare variants with known clinical significance and analytical sensitivity and specificity >99%.

Lab Disclaimer: Genesys Diagnostics Inc. has validated the Genotype Test. This test is a Lab Developed Test, the performance characteristics of this test were determined by Genesys Diagnostics Inc.

Translational Software Disclaimer: The information presented on this report is provided as general educational health information. The content is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Only a physician, pharmacist or other healthcare professional should advise a patient on the use of the medications prescribed.

The pharmacogenetic assay involves use of reporting software and genotype-phenotype associations performed by Translational Software (www.translationalsoftware.com). The software has not been evaluated by the Food and Drug Administration. The software, and the report generated by the software, is not intended to diagnose, treat, cure, or prevent any disease. A qualified designee within the lab uses Translational Software to generate and subsequently review the report. The pharmacogenetic report is one of multiple pieces of information that clinicians should consider in guiding their therapeutic choice for each patient. It remains the responsibility of the health-care provider to determine the best course of treatment for a patient. Adherence to dose guidelines does not necessarily assure a successful medical outcome.

Report was signed out electronically by Frances Hannan, PHD on 5/31/2023.

Patient Information Card

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

GENESYS Diagnostics INC.

REPORT DETAILS

Name: [redacted]
DOB: [redacted]
ACC #: [redacted]

Pharmacogenetic Test Summary

ABCB1	3435C>T T/T	Homozygous Mutant - Variant Allele Present
ANKK1/DRD2	DRD2:Taq1A A/G	Altered DRD2 function
APOE	ε3/ε4	Altered APOE function
COMT	Val158Met A/G	Intermediate COMT Activity
CYP1A2	*1A/*1L	Normal Metabolizer- Possible Inducibility
CYP2B6	*6/*6	Poor Metabolizer
CYP2C19	*2/*17	Intermediate Metabolizer
CYP2C9	*1/*1	Normal Metabolizer
CYP2D6	*1/*10	Normal Metabolizer
CYP3A4	*1/*1	Normal Metabolizer
CYP3A5	*1/*3	Intermediate Metabolizer
F2	rs1799963 GG	Normal Thrombosis Risk
F5	rs6025 CC	Normal Thrombosis Risk
GLP1R	c.502G>C G/G	Homozygous for G allele
GLP1R	c.502G>A G/G	Homozygous for G allele
GLP1R	c.510-1135T>G T/T	Homozygous for T allele
GLP1R	c.780A>C A/C	Heterozygous for C allele
MTHFR	c.1286A>C AA	Normal MTHFR Activity
MTHFR	c.665C>T CC	Normal MTHFR Activity
OPRM1	A118G A/A	Normal OPRM1 Function
PNPLA5	c.608-169G>A C/T	Heterozygous for A allele
SLCO1B1	*1/*1	Normal Function
SULT4A1	c.743-374A>G T/C	Heterozygous for G allele
VKORC1	-1639G>A G/G	Low Warfarin Sensitivity

For a complete report contact Genesys Diagnostics
www.gdilabs.com

Powered By Translational software

GENESYS Diagnostics INC.

PATIENT INFORMATION		SPECIMEN DETAILS		ORDERED BY
NAME: [redacted]		**SPECIMEN TYPE:**	Buccal Swab	Jody Reed
ACC #: [redacted]		**COLLECTION DATE:**	5/12/2023	
DOB: [redacted]		**RECEIVED DATE:**	5/22/2023	
SEX:	Female	**REPORT DATE:**	5/31/2023	

Comprehensive Pharmacogenetic Report with DDI

Current Patient Medications

Depakote

Unrecognized Medications: *None*

Highly elevated risk for indicated condition or adverse drug reaction. Medication can be prescribed with monitoring; alternative therapy may be needed.

Moderately elevated risk for indicated condition or adverse drug reaction. Medication can be prescribed with monitoring; therapy adjustment may be needed.

Typical risk for indicated condition or adverse drug reaction. Medication can be prescribed according to standard dosing guidelines.

PHARMACOGENETIC RESULTS

DRUG-DRUG INTERACTIONS

ACTIONABLE Recommendations are suitable for implementation in a clinical setting. Recommendations extracted from evidence based guidelines issued by international pharmacogenetic consortia, professional societies or regulatory bodies (CPIC, DPWG, FDA, EMA, CPNDA, ACMG).

INFORMATIVE Recommendations are informative and implementation in a clinical setting is optional. The evidence documenting these drug-gene associations may be limited or insufficient and may require further investigation. There are no established evidence based guidelines issued by international pharmacogenetic consortia, professional societies or regulatory bodies.

MODERATE Drug interactions of moderate severity. The clinician should assess the patient's characteristics and take action as needed.

SERIOUS Severe drug interaction or contraindicated drug combination which may produces serious consequences in most patients. This drug combination generally should not be dispensed or administered to the same patient. Action is required to reduce risk of severe adverse interaction.

Risk Management

Antipsychotic-Induced Tardive Dyskinesia

Moderate Risk of Antipsychotic-Induced Tardive Dyskinesia

The patient carries one copy of the Taq1A variant (heterozygous for the A1 allele).

The genotype results predict that the patient may have reduced dopamine receptor DRD2 density and hypodopaminergic functioning. The patient has moderate risk for tardive dyskinesia when treated with antipsychotics.

Monitor the patient for any signs of tardive dyskinesia.

Antipsychotic-Induced Hyperprolactinemia

Moderate Risk of Antipsychotic-induced Hyperprolactinemia

The patient carries one copy of the Taq1A variant (heterozygous for the A1 allele).

The genotype results predict that the patient may have reduced dopamine receptor DRD2 density and hypodopaminergic functioning. The patient has moderate risk of hyperprolactinemia when treated with antipsychotics.

Monitor patient closely for signs of hyperprolactinemia. An evaluation of the risk-benefit profile of the antipsychotic medication may be required.

Antipsychotic-Induced Weight Gain

Moderate Risk of Antipsychotic-Induced Weight Gain

The patient carries one copy of the Taq1A variant (heterozygous for the A1 allele).

The genotype results predict that the patient may have reduced dopamine receptor DRD2 density and hypodopaminergic functioning. The patient has moderate risk for weight gain when treated with antipsychotics.

Monitor patient closely for signs of weight gain.

Type III Hyperlipoproteinemia

Not Associated with Type III Hyperlipoproteinemia

The patient is positive for the APOE c.388 T>C (Cys130Arg) mutation and negative for the APOE c.526 C>T (Arg176Cys) mutation. The patient's genotype is ε3/ε4 (frequency: 15-28%).

The APOE E3 is the normal APOE. The APOE E4 confers a limitation of HDL binding to its receptor, and is associated with increased plasma cholesterol, LDL, and triglycerides. Individuals that are heterozygous for this allele may have higher total cholesterol levels and elevated LDL cholesterol levels. The APOE ε3/ε4 genotype is associated with an increased risk for developing atherosclerosis and cardiovascular disease.

Consider dietary adjustments (very low fat diet) and lipid-lowering therapy based on lipid profiles and other risk factors.

Hyperhomocysteinemia - Depression

No Increased Risk of Hyperhomocysteinemia

The patient does not carry the MTHFR c.665C>T variant. MTHFR enzyme activity is normal.

Patients diagnosed with depression often have low folate levels and homocysteine is a highly sensitive marker of folate status. Functional folate deficiency is indicated by elevated homocysteine. With a normal MTHFR activity, this patient can process folate normally and is unlikely to have elevated plasma levels of homocysteine.

Patients diagnosed with depression: as lower folate levels are associated with poorer antidepressant response, and baseline levels of folate within the normal range predict antidepressant response, testing for homocysteine levels and serum folate levels may be informative for this patient before prescribing methylfolate as an antidepressant-augmenting agent.

Thrombophilia

Normal Risk of Thrombosis

The patient does not carry the F5 c.1601G>A variant (also known as Factor V Leiden) or the F2 c.*97G>A variant (also known as Factor II 20210G>A).

The patient's risk of thrombosis is not increased (average risk of clotting is about 1 in 1000 for anyone in a year). However, because this test cannot find all of the inherited reasons for abnormal clotting, other factors may affect this risk assessment.

Assess thrombotic risk based on other genetic and/or circumstantial risk factors such as smoking, obesity, malignancy, prolonged immobilization or surgery.

Estrogen-containing contraceptive and hormone replacement therapy: unless other genetic and/or circumstantial risk factors are present, consider standard prescribing and monitoring practices.

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Hyperhomocysteinemia - Thrombosis

No Increased Risk of Hyperhomocysteinemia

The patient does not carry the MTHFR c.665C>T variant or MTHFR c.1286A>C variant. MTHFR enzyme activity is normal.

Based on results for the MTHFR c.665C>T and c.1286A>C variants, the patient has normal MTHFR activity and is unlikely to have elevated plasma levels of homocysteine. Hyperhomocysteinemia is associated with a risk for venous thromboembolism (VTE). Unless other risk factors are present, the patient is not expected to have an increased risk for VTE.

MTHFR enzyme activity is normal.

GENESYS Diagnostics INC.

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Potentially Impacted Medications

CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	!	⊗	INTERACTING DRUGS
5-Alpha Reductase Inhibitors for Benign Prostatic Hyperplasia	*Dutasteride (Avodart®)*	●			
	Finasteride (Proscar®)	●			
Alpha-Blockers for Benign Prostatic Hyperplasia	*Alfuzosin (UroXatral®)*	●			
	Doxazosin (Cardura®)	●			
	Silodosin (Rapaflo®)	●			
	Tamsulosin (Flomax®)	●			
	Terazosin (Hytrin®)	●			
Angiotensin II Receptor Antagonists	Azilsartan (Edarbi®, Edarbyclor®)	●			
	Candesartan (Atacand®)	●			
	Eprosartan (Teveten®)	●			
	Irbesartan (Avapro®)	●			
	Losartan (Cozaar®, Hyzaar®)	●			
	Olmesartan (Benicar®)	●			
	Telmisartan (Micardis®)	●			
	Valsartan (Diovan®, Entresto®)	●			
Antiaddictives	Bupropion (Wellbutrin®, Zyban®, Aplenzin®, Contrave®)		●		
	Lofexidine (Lucemyra®)	●			
	Naltrexone (Vivitrol®, Contrave®)		●		
Anti-ADHD Agents	Amphetamine (Adderall®, Evekeo®)	●			
	Atomoxetine (Strattera®)		●		
	Clonidine (Kapvay®)	●			
	Dexmethylphenidate (Focalin®)		●		
	Dextroamphetamine (Dexedrine®)	●			
	Guanfacine (Intuniv®)	●			
	Lisdexamfetamine (Vyvanse®)	●			
	Methylphenidate (Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®)		●		
Antianginal Agents	Ranolazine (Ranexa®)	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antiarrhythmics	*Amiodarone (Nexterone®, Pacerone®)*	●			
	Disopyramide (Norpace®)	●			
	Flecainide (Tambocor®)	●			
	Mexiletine (Mexitil®)	●			
	Propafenone (Rythmol®)	●			
	Quinidine (Quinidine®)	●			
	Sotalol (Betapace®, Sorine®, Sotylize®)	●			
Anticoagulants	*Apixaban (Eliquis®)*	●			
	Betrixaban (Bevyxxa®)	●			
	Dabigatran Etexilate (Pradaxa®)	●			
	Edoxaban (Savaysa®)	●			
	Fondaparinux (Arixtra®)	●			
	Rivaroxaban (Xarelto®)	●			
	Warfarin (Coumadin®)	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Anticonvulsants	Brivaracetam (Briviact®)	●			
	Cannabidiol (Epidiolex®)	●			
	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 (Depakene®)	●			
	Vigabatrin (Sabril®)	●			
	Zonisamide (Zonegran®)		●		
Antidementia Agents	Donepezil (Aricept®)	●			
	Galantamine (Razadyne®)	●			
	Memantine (Namenda®)	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antidepressants	Amitriptyline (Elavil®)	●			
	Amoxapine (Amoxapine®)	●			
	Citalopram (Celexa®)		●		
	Clomipramine (Anafranil®)	●			
	Desipramine (Norpramin®)	●			
	Desvenlafaxine (Pristiq®)	●			
	Doxepin (Silenor®)	●			
	Duloxetine (Cymbalta®)	●			
	Escitalopram (Lexapro®)		●		
	Fluoxetine (Prozac®, Sarafem®)	●			
	Fluvoxamine (Luvox®)	●			
	Imipramine (Tofranil®)	●			
	Levomilnacipran (Fetzima®)	●			
	Maprotiline (Ludiomil®)	●			
	Mirtazapine (Remeron®)	●			
	Nefazodone (Serzone®)	●			
	Nortriptyline (Pamelor®)	●			
	Paroxetine (Paxil®, Brisdelle®)	●			
	Protriptyline (Vivactil®)	●			
	Sertraline (Zoloft®)		●		
	Trazodone (Oleptro®)	●			
	Trimipramine (Surmontil®)	●			
	Venlafaxine (Effexor®)	●			
	Vilazodone (Viibryd®)	●			
	Vortioxetine (Trintellix®)	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antiemetics	*Aprepitant (Emend-oral®)*	●			
	Dolasetron (Anzemet®)	●			
	Dronabinol (Marinol®)	●			
	Fosaprepitant (Emend-IV®)	●			
	Fosnetupitant / Palonosetron (Akynzeo-IV®)	●			
	Granisetron (Sancuso®, Sustol®)	●			
	Metoclopramide (Reglan®)	●			
	Netupitant / Palonosetron (Akynzeo-oral®)	●			
	Ondansetron (Zofran®, Zuplenz®)	●			
	Palonosetron (Aloxi®)	●			
	Rolapitant (Varubi®)	●			
Antifolates	Methotrexate (Trexall®)	●			
Antifungals	*Amphotericin B (AmBisome®, Abelcet®)*	●			
	Anidulafungin (Eraxis®)	●			
	Caspofungin (Cancidas®)	●			
	Fluconazole (Diflucan®)	●			
	Isavuconazonium (Cresemba®)	●			
	Itraconazole (Sporanox®)	●			
	Micafungin (Mycamine®)	●			
	Posaconazole (Noxafil®)	●			
	Voriconazole (Vfend®)	●			
Anti-HIV Agents	*Dolutegravir (Tivicay®, Triumeq®)*	●			
	Doravirine (Pifeltro®)	●			
	Efavirenz (Sustiva®)		●		
	Etravirine (Edurant®)	●			
	Raltegravir (Isentress®, Dutrebis®)	●			
	Rilpivirine (Intelence®)	●			
Anti-Hyperuricemics and Anti-Gout Agents	*Colchicine (Mitigare®)*	●			
	Febuxostat (Uloric®)	●			
Antimalarials	*Proguanil (Malarone®)*	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antiplatelets	Clopidogrel (Plavix®)			🔴	
	Prasugrel (Effient®)	🟢			
	Ticagrelor (Brilinta®)	🟢			
	Vorapaxar (Zontivity®)	🟢			
Antipsychotics	Aripiprazole (Abilify®, Aristada®)	🟢			
	Asenapine (Saphris®)	🟢			
	Brexpiprazole (Rexulti®)	🟢			
	Cariprazine (Vraylar®)	🟢			
	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®)	🟢			
	Trifluoperazine (Stelazine®)	🟢			
	Ziprasidone (Geodon®)	🟢			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antispasmodics for Overactive Bladder	Darifenacin (Enablex®)	●			
	Fesoterodine (Toviaz®)	●			
	Mirabegron (Myrbetriq®)	●			
	Oxybutynin (Ditropan®)	●			
	Solifenacin (Vesicare®)	●			
	Tolterodine (Detrol®)	●			
	Trospium (Sanctura®)	●			
Benzodiazepines	*Alprazolam (Xanax®)*	●			
	Clobazam (Onfi®)	●			
	Clonazepam (Klonopin®)	●			
	Diazepam (Valium®)	●			
Beta Blockers	*Atenolol (Tenormin®)*	●			
	Bisoprolol (Zebeta®)	●			
	Carvedilol (Coreg®)	●			
	Labetalol (Normodyne®, Trandate®)	●			
	Metoprolol (Lopressor®)	●			
	Nebivolol (Bystolic®)	●			
	Propranolol (Inderal®)	●			
	Timolol (Blocadren®)	●			
Cardiac myosin inhibitor	Mavacamten (Camzyos®)		●		
Diuretics	Torsemide (Demadex®)	●			
Fibromyalgia Agents	*Milnacipran (Savella®)*	●			
Immunomodulators	*Apremilast (Otezla®)*	●			
	Leflunomide (Arava®)		●		
	Tofacitinib (Xeljanz®)	●			
Immunosuppressants	Tacrolimus (Prograf®)		●		
Meglitinides	Nateglinide (Starlix®)	●			
	Repaglinide (Prandin®, Prandimet®)	●			

GENESYS Diagnostics INC.

PATIENT INFORMATION		SPECIMEN DETAILS		ORDERED BY
NAME: [redacted]		SPECIMEN TYPE:	Buccal Swab	Jody Reed
ACC #: [redacted]		COLLECTION DATE:	5/12/2023	
DOB: [redacted]		RECEIVED DATE:	5/22/2023	
SEX:	Female	REPORT DATE:	5/31/2023	

CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Muscle Relaxants	Carisoprodol (Soma®)	●			
	Cyclobenzaprine (Flexeril®, Amrix®)	●			
	Metaxalone (Skelaxin®)	●			
	Methocarbamol (Robaxin®)	●			
	Tizanidine (Zanaflex®)		●		
NSAIDs	Celecoxib (Celebrex®)	●			
	Diclofenac (Voltaren®)	●			
	Flurbiprofen (Ansaid®)	●			
	Ibuprofen (Advil®, Motrin®)	●			
	Indomethacin (Indocin®)	●			
	Ketoprofen (Orudis®)	●			
	Ketorolac (Toradol®)	●			
	Meloxicam (Mobic®)	●			
	Nabumetone (Relafen®)	●			
	Naproxen (Aleve®)	●			
	Piroxicam (Feldene®)	●			
	Sulindac (Clinoril®)	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Opioids	*Alfentanil (Alfenta®)*	●			
	Benzhydrocodone (Apadaz®)	●			
	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®)	●			
	Oliceridine (Olinvyk)	●			
	Oxycodone (Percocet®, Oxycontin®)	●			
	Oxymorphone (Opana®, Numorphan®)	●			
	Sufentanil (Sufenta®)	●			
	Tapentadol (Nucynta®)	●			
	Tramadol (Ultram®)	●			
Other Neurological Agents	Deutetrabenazine (Austedo®)	●			
	Dextromethorphan / Quinidine (Nuedexta®)	●			
	Flibanserin (Addyi®)	●			
	Tetrabenazine (Xenazine®)		●		
	Valbenazine (Ingrezza®)	●			
Phosphodiesterase Inhibitors for Erectile Dysfunction	*Avanafil (Stendra®)*	●			
	Sildenafil (Viagra®)	●			
	Tadalafil (Cialis®)	●			
	Vardenafil (Levitra®)	●			

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DOB: [redacted]		**RECEIVED DATE:**	5/22/2023	
SEX:	Female	**REPORT DATE:**	5/31/2023	

CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Proton Pump Inhibitors	Dexlansoprazole (Dexilant®, Kapidex®)	●			
	Esomeprazole (Nexium®)	●			
	Lansoprazole (Prevacid®)	●			
	Omeprazole (Prilosec®)	●			
	Pantoprazole (Protonix®)	●			
	Rabeprazole (Aciphex®)	●			
Statins	Atorvastatin (Lipitor®)	●			
	Fluvastatin (Lescol®)	●			
	Lovastatin (Mevacor®, Altoprev®, Advicor®)	●			
	Pitavastatin (Livalo®)	●			
	Pravastatin (Pravachol®)	●			
	Rosuvastatin (Crestor®)	●			
	Simvastatin (Zocor®)	●			
Sulfonylureas	*Chlorpropamide (Diabinese®)*	●			
	Glimepiride (Amaryl®)	●			
	Glipizide (Glucotrol®)	●			
	Glyburide (Micronase®)	●			
	Tolbutamide (Orinase®)	●			

*Current patient medications are listed in bold whereas italicized drug names indicate drugs with no pharmacogenetic guidance

Dosing Guidance

Atomoxetine (Strattera®)

Normal Atomoxetine Exposure (CYP2D6: Normal Metabolizer)

ACTIONABLE

The genotype result indicates that the patient is likely to have an insufficient response due to inadequate drug exposure following standard dosing as compared with poor metabolizers.

Consider the following dosing strategy:

- Initiate treatment at 40 mg/day, then increase to 80 mg/day after 3 days.
- If after 2 weeks, optimal clinical response is not observed and adverse events are not present, consider a dose increase to 100 mg/day.
- If after an additional 2 weeks, optimal clinical response is not observed, consider therapeutic drug monitoring 1-2 hours post dose. If the plasma concentration is < 200 ng/mL, consider a proportional dose increase to approach 400 ng/mL. Doses > 100 mg/day may be needed to achieve a target therapeutic concentration (therapeutic range: 200-1,000 ng/mL). Note: doses above 120 mg/day have not been evaluated.

Bupropion (Wellbutrin®, Zyban®, Aplenzin®, Contrave®)

Altered Bupropion Exposure (CYP2B6: Poor Metabolizer)

INFORMATIVE

The genotype result indicates that the patient is likely to have increased bupropion exposure, but decreased exposure to the active metabolite (hydroxybupropion). This metabolite contributes to the therapeutic effects of bupropion when used as a smoking cessation agent or as an antidepressant. This decrease in exposure of hydroxybupropion may result in decreased therapeutic efficacy.

Smoking Cessation: There is insufficient data to allow calculation of dose adjustment. Consider standard prescribing and closer monitoring.

Major Depressive Disorder and Prevention of Seasonal Affective Disorder: There is insufficient data to allow calculation of dose adjustment. Therapeutic monitoring of bupropion-hydroxybupropion levels may be considered to guide dosing adjustments.

Decreased Response to Bupropion for Smoking Cessation (ANKK1: Altered DRD2 function)

INFORMATIVE

Smoking Cessation: The patient's genotype result is associated with a positive response to nicotine replacement therapy and a lesser response to bupropion treatment.

Citalopram (Celexa®)

Increased Citalopram Exposure (CYP2C19: Intermediate Metabolizer)

ACTIONABLE

The patient's genotype is associated with an increased exposure to citalopram and may increase risk of adverse effects. Citalopram can be initiated at standard label-recommended dosage. Consider slow up-titration and lower than standard maintenance doses.

Clopidogrel (Plavix®)

Reduced Exposure to Clopidogrel Active Metabolite (CYP2C19: Intermediate Metabolizer)

ACTIONABLE

The patient's genotype is associated with possible decreased clopidogrel exposure. Patients may be at an increased risk for adverse cardiac and cerebrovascular events.

ACS, PCI, and Neurovascular Indications:

Consider an alternative such as prasugrel (contraindicated in TIA/stroke) or ticagrelor. In patients with ACS or PCI, if clopidogrel cannot be avoided, alternative dosing strategies exist and may be considered.

Clozapine (Clozaril®)

Possible Non-Response to Clozapine (CYP1A2: Normal Metabolizer- Possible Inducibility)

INFORMATIVE

Smokers may be at risk for non-response at standard doses and may require higher doses. There is an association between high clozapine doses and the risk of seizures, and therefore careful monitoring is recommended during dosing adjustment. Smoking cessation may increase plasma drug levels, leading to adverse events. Therefore, therapeutic drug monitoring accompanied by dose reduction is recommended in patients who have quit smoking.

Dexmethylphenidate (Focalin®)

Decreased Response to Dexmethylphenidate (COMT: Intermediate COMT Activity)

INFORMATIVE

The patient's genotype result predicts a less optimal response to dexmethylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.

Efavirenz (Sustiva®)

Increased Efavirenz Exposure (CYP2B6: Poor Metabolizer)

ACTIONABLE

The genotype result indicates that the patient is likely to have higher dose-adjusted trough concentrations of efavirenz following standard dosing. This may result in significantly increased risk of CNS adverse events leading to treatment discontinuation. Consider initiating efavirenz with a decreased dose of 200 to 400 mg/day. If therapeutic drug monitoring is available and a decreased efavirenz dose is prescribed, consider obtaining steady-state plasma efavirenz concentrations to ensure concentrations are in the suggested therapeutic range (~1 to 4 µg/mL). Dose adjustment may require prescribing more than one pill once daily.

Escitalopram (Lexapro®)

Increased Escitalopram Exposure (CYP2C19: Intermediate Metabolizer)

ACTIONABLE

The patient's genotype is associated with an increased exposure to escitalopram and may increase risk of adverse effects. Escitalopram can be initiated at standard label-recommended dosage. Consider slow up-titration and lower than standard maintenance doses.

Leflunomide (Arava®)

Increased Exposure to Leflunomide (CYP2C19: Intermediate Metabolizer)

INFORMATIVE

Leflunomide is metabolized by CYP2C19 and CYP1A2 to its active metabolite teriflunomide. Preliminary studies indicate that patients with decreased CYP2C19 activity have a higher risk of developing gastrointestinal side effects and hepatotoxicity. There is insufficient data to calculate dose adjustment. If leflunomide is prescribed at standard dosing, monitor closely the patient's response and be alert to increased side effects.

Full blood cell count (CBC) and liver function parameters should be checked no more than 6 months before beginning treatment, and every month for the initial 6 months of therapy. Blood pressure should be checked before beginning treatment and periodically thereafter.

Mavacamten (Camzyos®)

Increased Mavacamten Exposure (CYP2C19: Intermediate Metabolizer)

ACTIONABLE

The genotype result indicates increased exposure to mavacamten and a possible increased risk of adverse effects including heart failure. Dosages are titrated to individual response and CYP2C19 genetic variation is accounted for in FDA dose titration and monitoring schedules. Mavacamten can be prescribed at standard label-recommended dosage and monitoring.

Methadone (Dolophine®)

Increased Methadone Exposure (CYP2B6: Poor Metabolizer) — INFORMATIVE

The patient's genotype may be associated with an increased methadone exposure and increased risk of adverse effects in the treatment of opioid use disorder, but overall evidence is weak. Methadone can be prescribed at standard label-recommended dosage with close monitoring.

Methylphenidate (Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®)

Decreased Response to Methylphenidate (COMT: Intermediate COMT Activity) — INFORMATIVE

The patient's genotype result predicts a less optimal response to methylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.

Naltrexone (Vivitrol®, Contrave®)

Altered Response to Naltrexone (OPRM1: Normal OPRM1 Function) — INFORMATIVE

Treatment of alcohol dependence: the patient has the OPRM1 118AA wild-type genotype that is associated with a poorer outcome with naltrexone therapy. Naltrexone-treated patients not carrying the OPRM1 118A>G G allele are less likely to respond to this drug, and may have higher relapse rates than those who are carriers of this allele. This association has not been reported consistently across studies.

Olanzapine (Zyprexa®)

Possible Non-Response to Olanzapine (CYP1A2: Normal Metabolizer- Possible Inducibility) — INFORMATIVE

There is little evidence regarding the impact of CYP1A2 genetic variants on olanzapine response. Smokers may be at risk for non-response at standard doses. Careful monitoring is recommended during dosing adjustment. Smoking cessation may increase plasma drug levels, leading to adverse events. Therefore, therapeutic drug monitoring accompanied by dose reduction may be needed in patients who have quit smoking.

Phenobarbital (Luminal®)

Possible Sensitivity to Phenobarbital (CYP2C19: Intermediate Metabolizer) — INFORMATIVE

CYP2C19 is partly involved in the metabolism of phenobarbital, and although CYP2C19 intermediate metabolizers have a lower clearance of phenobarbital than normal metabolizers, no significant changes in clinical outcome has been reported with this antiepileptic drug. Therefore, phenobarbital can be prescribed at standard label-recommended dosage and administration with a closer monitoring for adverse events.

Primidone (Mysoline®)

Possible Sensitivity to Primidone (CYP2C19: Intermediate Metabolizer) — INFORMATIVE

CYP2C19 is partly involved in the metabolism of primidone, and although CYP2C19 intermediate metabolizers have a lower clearance of phenobarbital (active metabolite) than normal metabolizers, no significant changes in clinical outcome has been reported with this antiepileptic drug. Therefore, primidone can be prescribed at standard label-recommended dosage and administration with a closer monitoring for adverse events.

Sertraline (Zoloft®)

Increased Sertraline Exposure (CYP2C19: Intermediate Metabolizer; CYP2B6: Poor Metabolizer) — INFORMATIVE

The patient's genotype is associated with an increased exposure to sertraline and may increase risk of adverse effects. Consider a lower initial dose and slow up-titration with a 50% reduction of the standard label-recommended maintenance dose.

Tacrolimus (Prograf®)

⚠ Insufficient Response to Tacrolimus (CYP3A5: Intermediate Metabolizer)

ACTIONABLE

The genotype result predicts that the patient expresses the CYP3A5 protein. Therefore, the patient may metabolize tacrolimus more rapidly, resulting in low tacrolimus trough levels. Studies have shown patients with this genotype may be at increased risk for acute transplant rejection while taking a standard dose of tacrolimus. Therefore, increasing starting dose 1.5 to 2 times recommended starting dose with close monitoring is strongly recommended to achieve therapeutic effect. Total starting dose should not exceed 0.3mg/kg/day.

Tetrabenazine (Xenazine®)

⚠ Normal Sensitivity to Tetrabenazine (CYP2D6: Normal Metabolizer)

ACTIONABLE

For treating chorea associated with Huntington's disease: Individualization of dose with careful weekly titration is required. The first week's starting dose is 12.5 mg daily; second week, 25 mg (12.5 mg twice daily); then slowly titrate at weekly intervals by 12.5 mg to a tolerated dose. **The maximum daily dose in CYP2D6 normal metabolizers is 100 mg, with a maximum single dose of 37.5 mg**. If serious adverse events occur, titration should be stopped and the dose of tetrabenazine should be reduced. If the adverse event(s) do not resolve, consider withdrawal of tetrabenazine.

Tizanidine (Zanaflex®)

⚠ Possible Non-Response to Tizanidine (CYP1A2: Normal Metabolizer- Possible Inducibility)

INFORMATIVE

There is little evidence regarding the impact of CYP1A2 genetic variants on tizanidine response. Smokers may be at risk for non-response and may require higher doses. There is an association between high tizanidine plasma concentrations and the risk of hypotension and excessive sedation. Therefore, careful monitoring is recommended during dosing adjustment. Smoking cessation may increase plasma drug levels, leading to excessive hypotension and sedation. Careful monitoring accompanied by dose reduction may be needed in patients who have quit smoking.

Zonisamide (Zonegran®)

⚠ Possible Sensitivity to Zonisamide (CYP2C19: Intermediate Metabolizer)

INFORMATIVE

CYP2C19 is partly involved in the metabolism of zonisamide, and although preliminary studies show that CYP2C19 intermediate metabolizers have a slightly lower (15%) zonisamide clearance than normal metabolizers, no significant change in the clinical outcome has been reported with this antiepileptic drug. Therefore, zonisamide can be prescribed at standard label-recommended dosage and administration with a closer monitoring for adverse events.

Test Details

Gene	Genotype	Phenotype	Clinical Consequences
ABCB1	3435C>T T/T	Homozygous Mutant - Variant Allele Present	Consistent with decreased transporter expression.
ANKK1/DRD2	DRD2:Taq1A A/G	Altered DRD2 function	Consistent with a reduced dopamine receptor D2 function.
APOE	ε3/ε4	Altered APOE function	Not associated with type III hyperlipoproteinemia - Increased risk of cardiovascular disease
COMT	Val158Met A/G	Intermediate COMT Activity	Consistent with a reduced catechol O-methyltransferase (COMT) function.
CYP1A2	*1A/*1L	Normal Metabolizer- Possible Inducibility	Consistent with a typical CYP1A2 activity in absence of inducing substances. Rapid metabolism may occur in presence of inducers such as barbiturates, cruciferous vegetables, carbamazepine, rifampin and smoking.
CYP2B6	*6/*6	Poor Metabolizer	Consistent with a significant deficiency in CYP2B6 drug metabolism. Increased risk for side effects or loss of efficacy with drug substrates.

CYP2C19	*2/*17	**Intermediate Metabolizer**	Consistent with a moderate deficiency in CYP2C19 enzyme activity.
CYP2C9	*1/*1	**Normal Metabolizer**	Consistent with a typical CYP2C9 enzyme activity.
CYP2D6	*1/*10	**Normal Metabolizer**	Consistent with a typical CYP2D6 enzyme activity.
CYP3A4	*1/*1	**Normal Metabolizer**	Consistent with a typical CYP3A4 activity. Caution is advised when prescribing narrow therapeutic index drugs. Alternative drugs or dose adjustment may be required if CYP3A inhibitors or inducers are co-prescribed.
CYP3A5	*1/*3	**Intermediate Metabolizer**	Consistent with an intermediate CYP3A5 activity (Expresser). Exercise caution if CYP3A5 drug substrates are prescribed.
F2 **F5**	rs1799963 GG rs6025 CC	**Normal Risk of Thrombosis**	Unless other genetic or circumstantial risk factors are present, the patient is not expected to have an increased risk for thrombosis.
GLP1R	c.502G>C G/G	**Homozygous for G allele**	
GLP1R	c.502G>A G/G	**Homozygous for G allele**	
GLP1R	c.510-1135T>G T/T	**Homozygous for T allele**	
GLP1R	c.780A>C A/C	**Heterozygous for C allele**	
MTHFR	c.665C>T CC	**Normal MTHFR Activity**	The patient does not carry the MTHFR c.665C>T variant, and the patient's MTHFR activity is normal. This is not associated with an increased risk of hyperhomocysteinemia.
MTHFR	c.1286A>C AA c.665C>T CC	**No Increased Risk of Hyperhomocysteinemia**	The patient does not carry the MTHFR c.665C>T or c.1286A>C variant. Therefore, the patient has normal MTHFR function, and no elevation of plasma homocysteine levels is expected.
OPRM1	A118G A/A	**Normal OPRM1 Function**	Consistent with a normal OPRM1 receptor signaling efficiency induced by exogenous opioids. This is associated with a good analgesia following standard opioid doses and a poor response to naltrexone.
PNPLA5	c.608-169G>A C/T	**Heterozygous for A allele**	
SLCO1B1	*1/*1	**Normal Function**	Consistent with a typical SLCO1B1 transporter function.
SULT4A1	c.743-374A>G T/C	**Heterozygous for G allele**	
VKORC1	-1639G>A G/G	**Low Warfarin Sensitivity**	Consistent with a typical VKORC1 expression.

Alleles Tested: **ABCB1** 3435C>T; **ANKK1/DRD2** DRD2:Taq1A; **APOE** ε2, ε4, (ε3 is reference); **COMT** Val158Met; **CYP1A2** *1C, *1F, *1K, *1L, *7, *11; **CYP2B6** *6, *9, *18, *18.002; **CYP2C19** *2, *3, *4A, *4B, *5, *6, *7, *8, *17; **CYP2C9** *2, *3, *4, *5, *6, *8, *11, *12, *13, *15, *25; **CYP2D6** *2, *3, *4, *4M, *6, *7, *8, *9, *10, *11, *12, *14, *15, *17, *18, *19, *20, *29, *41, *114, *5 (gene deletion), XN (gene duplication); **CYP3A4** *2, *17, *22; **CYP3A5** *3, *6, *7; **F2** rs1799963; **F5** rs6025; **GLP1R** c.780A>C, c.510-1135T>G, c.502G>A, c.502G>C; **MTHFR** c.1286A>C, c.665C>T; **OPRM1** A118G; **PNPLA5** c.608-169G>A; **SLCO1B1** *5; **SULT4A1** c.743-374A>G; **VKORC1** -1639G>A

GENESYS Diagnostics INC.

PATIENT INFORMATION		SPECIMEN DETAILS		ORDERED BY
NAME: [redacted]		**SPECIMEN TYPE:**	Buccal Swab	Jody Reed
ACC #: [redacted]		**COLLECTION DATE:**	5/12/2023	
DOB: [redacted]		**RECEIVED DATE:**	5/22/2023	
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Limitation: This test will not detect all the known alleles that result in altered or inactive tested genes. This test does not account for all individual variations in the individual tested. Absence of a detectable gene mutation does not rule out the possibility that a patient has different phenotypes due to the presence of an undetected polymorphism or due to other factors such as drug-drug interactions, comorbidities and lifestyle habits. Technical limitations include the possibility of laboratory error and inaccuracy of the test due to unknown rare variants.

Methodology: Mass spectrometer-based assays detect listed alleles and most rare variants with known clinical significance and analytical sensitivity and specificity >99%.

Lab Disclaimer: Genesys Diagnostics Inc. has validated the Genotype Test. This test is a Lab Developed Test, the performance characteristics of this test were determined by Genesys Diagnostics Inc.

Translational Software Disclaimer: The information presented on this report is provided as general educational health information. The content is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Only a physician, pharmacist or other healthcare professional should advise a patient on the use of the medications prescribed.

The pharmacogenetic assay involves use of reporting software and genotype-phenotype associations performed by Translational Software (www.translationalsoftware.com). The software has not been evaluated by the Food and Drug Administration. The software, and the report generated by the software, is not intended to diagnose, treat, cure, or prevent any disease. A qualified designee within the lab uses Translational Software to generate and subsequently review the report. The pharmacogenetic report is one of multiple pieces of information that clinicians should consider in guiding their therapeutic choice for each patient. It remains the responsibility of the health-care provider to determine the best course of treatment for a patient. Adherence to dose guidelines does not necessarily assure a successful medical outcome.

Drug interaction data is provided by First Databank (FDB) and FDB is entirely responsible for its accuracy. The drug interaction report is solely intended to be used by a medical professional. The drug interaction report is based on patient-reported medications and does not account for other factors, such as smoking history, tobacco use, diet and other underlying chronic conditions such as diabetes or heart disease. Unreported medications, herbal medications, over-the-counter supplements and other non-FDA-approved medications are not considered in the drug interaction report, but may cause drug interactions. The treating medical professional bears the ultimate responsibility for all treatment decisions made in regards to the patient, including any decisions based on the drug interaction report.

Report was signed out electronically by Frances Hannan, PHD on 5/31/2023.

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Patient Information Card

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

REPORT DETAILS
Name: [redacted]
DOB: [redacted]
ACC #: [redacted]

Pharmacogenetic Test Summary

ABCB1	3435C>T T/T	Homozygous Mutant - Variant Allele Present
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APOE	ε3/ε4	Altered APOE function
COMT	Val158Met A/G	Intermediate COMT Activity
CYP1A2	*1A/*1L	Normal Metabolizer- Possible Inducibility
CYP2B6	*6/*6	Poor Metabolizer
CYP2C19	*2/*17	Intermediate Metabolizer
CYP2C9	*1/*1	Normal Metabolizer
CYP2D6	*1/*10	Normal Metabolizer
CYP3A4	*1/*1	Normal Metabolizer
CYP3A5	*1/*3	Intermediate Metabolizer
F2	rs1799963 GG	Normal Thrombosis Risk
F5	rs6025 CC	Normal Thrombosis Risk
GLP1R	c.502G>C G/G	Homozygous for G allele
GLP1R	c.502G>A G/G	Homozygous for G allele
GLP1R	c.510-1135T>G T/T	Homozygous for T allele
GLP1R	c.780A>C A/C	Heterozygous for C allele
MTHFR	c.1286A>C AA	Normal MTHFR Activity
MTHFR	c.665C>T CC	Normal MTHFR Activity
OPRM1	A118G A/A	Normal OPRM1 Function
PNPLA5	c.608-169G>A C/T	Heterozygous for A allele
SLCO1B1	*1/*1	Normal Function
SULT4A1	c.743-374A>G T/C	Heterozygous for G allele
VKORC1	-1639G>A G/G	Low Warfarin Sensitivity

For a complete report contact Genesys Diagnostics
www.gdilabs.com