GeneDose Genetic Response Report

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This report combines (i) an analysis of the patient's DNA by Suretox Laboratory, identifying relevant genetic variants that are informative for medication efficacy, safety, and dosing, with (ii) an interpretation of the identified DNA variants by Coriell Life Sciences to bring you immediately actionable clinical guidance regarding safer, more effective medications and dosages for the patient.

Patient: PGX, 01
Date of Birth: May 10, 2021
Gender: Unknown

Physician: SURETOX
Practice: SURETOX

Date Collected: May 10, 2021
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Specimen type: UT
Sample ID: 2105109995

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Genetic Summary Information

† When multiple activities are listed, check information in Medication Report Details (Pg. 9) for specific medication of interest.
Uncertain = No known diplotype/result (name) or activity for this combination of genetic variants; Uninterpretable Genotype.

Genetic Summary

Gene	Result	Activity †
ApoE	ε3|ε3	See ApoE Genotype Info
COMT(Val158Met)	A|A	Poor function
CYP1A2	*1A|*1A	Normal metabolizer
CYP2B6	*6|*18; or *1A|*18	Multiple statuses; see per-drug detail
CYP2C19	*1|*2	Intermediate metabolizer
CYP2C9	*1|*8; or *14|*14; or *8|*14; or *8|*8; or *8|*27; or *27|*14; or *27|*27; or *1|*1; or *1|*27; or *1|*14	Indeterminate
CYP2D6	*2Ax2|*2A; or *2Ax2|*2B or *2A|*2Bx2	Ultrarapid metabolizer
CYP3A4	*1B|*1B	Ultrarapid metabolizer
CYP3A5	*1A|*6; or *1D|*6	Intermediate metabolizer
Factor V Leiden	Normal	See Thrombosis Profile
MTHFR	GT|GT	Normal function
MTHFR (A1298C)	Normal	See Thrombosis Profile
MTHFR (C677T)	Normal	See Thrombosis Profile
Prothrombin (F2)	Normal	See Thrombosis Profile
SLCO1B1	*1|*1	Normal liver uptake activity

Gene	Result	Activity †
VKORC1	*1|*1	Normal (with respect to Warfarin)

Thrombosis Profile

Tested Gene (Allele)	Genotype	Predicted Phenotype	Clinical Guidance
Prothrombin (F2)	Normal	Normal risk expected based on the patient's genotype.	The absence of these variant alleles of Prothrombin (Factor II) and Factor V Leiden suggests that the patient does not have the elevated risk of thrombosis associated with these genetic markers.
Factor V Leiden	Normal		
MTHFR (A1298C)	Normal		
MTHFR (C677T)	Normal		

General Description

Genetic analyses of three genes (four alleles) considered to increase the risk for venous thromboembolism were performed using molecular genetic techniques. The presence of the Prothrombin (Factor 2) gene allele c.*97G>A (previously designated as 20210G>A) and Factor V Leiden allele c.1601G>A (previously designated as 1691G>A) are risk factors for venous thromboembolism. This risk may be further increased by the use of estrogen therapy, oral contraceptives, pregnancy, and surgery.

Patients who are homozygous for MTHFR C677T or MTHFR A1298C may have a further increased risk for venous thromboembolism if they also possess the Factor V Leiden c.1601G>A allele. However, the MTHFR alleles alone do not predict a significant risk for venous thromboembolism.

References

- Zhang S, et al.; ACMG Laboratory Quality Assurance Committee. Venous thromboembolism laboratory testing (factor V Leiden and factor II c.*97G>A), 2018 update: a technical standard of the American College of Medical Genetics and Genomics (ACMG). Genet Med. 2018 Dec;20(12):1489-1498. doi: 10.1038/s41436-018-0322-z. Epub 2018 Oct 5. PMID: 30297698.
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- Lim MY, et al.; Thrombophilic risk of individuals with rare compound factor V Leiden and prothrombin G20210A polymorphisms: an international case series of 100 individuals. Eur J Haematol. 2016 Oct;97(4):353-60. doi: 10.1111/ejh.12738. Epub 2016 Feb 18. PMID: 26773706.
- Saemundsson Y, et al.; Homozygous factor V Leiden and double heterozygosity for factor V Leiden and prothrombin mutation. J Thromb Thrombolysis. 2013 Oct;36(3):324-31. doi: 10.1007/s11239-012-0824-5. PMID: 23054468.
- Stevens SM, et al.; Guidance for the evaluation and treatment of hereditary and acquired thrombophilia. J Thromb Thrombolysis. 2016 Jan;41(1):154-64. doi: 10.1007/s11239-015-1316-1. PMID: 26780744; PMCID: PMC4715840.

ApoE Genotype Information†

Tested Genes (Alleles)	Genotype	Predicted Phenotype	Clinical Guidance
ApoE (ε2, ε3, ε4)	ε3|ε3	Often associated with normal lipid metabolism.	Typical cardiovascular disease risk expected.

General Description

Genetic analysis in the ApoE gene was performed using molecular genetic techniques. The genotype is based on genotyping results for this patient at SNPs rs429358 and rs7412.

ApoE ε3 is the most common allele—found in about 60% of people. The presence of ε2 or ε4 alleles may be a risk factor for multiple conditions including cardiovascular disease. ApoE ε2 carriers may be more likely to develop familial dysbetalipoproteinemia or type III hyperlipoproteinemia.

† Predicted phenotype, clinical significance, relative risk, and interpretations reported for each genotype are associated with cardiovascular risk only. The interpretations should not be used to determine the relative risk of other diseases. Other factors important to understanding total risk should be considered.

Medication Summary

Cardiac

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Antiarrhythmics		Flecainide Propafenone	
Anticoagulants			
Anticonvulsants			
Antiplatelet Agents	Prasugrel	Ticagrelor	Clopidogrel
Beta Blockers	Nebivolol Propranolol	Carvedilol Metoprolol Timolol	
Statins	Simvastatin	Atorvastatin	

Gastroenterology

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Antidepressants	Mirtazapine	Trazodone	Amitriptyline Clomipramine Desipramine Doxepin Nortriptyline
Antiemetics			Ondansetron Tropisetron
Endocrine-Metabolic Agents			Eliglustat
Immunosuppressants		Cyclosporine	
Nonsteroidal Anti-Inflamatory Drugs (NSAIDs)			
Proton Pump Inhibitors (PPIs)		Dexlansoprazole Esomeprazole Lansoprazole Omeprazole Pantoprazole Rabeprazole	
Selective Serotonin Reuptake Inhibitors (SSRIs)		Citalopram Escitalopram	Paroxetine

Infectious Disease

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Antifungals		Voriconazole	Ketoconazole

Pain

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Analgesics, Opioid			
Anticonvulsants		Brivaracetam Clobazam	
Antidepressants	Mirtazapine	Duloxetine Moclobemide Trazodone Venlafaxine	Amitriptyline Clomipramine Desipramine Doxepin

Pain

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
		Vortioxetine	Nortriptyline Protriptyline
Antipsychotics	Olanzapine		
Beta Blockers	Nebivolol Propranolol	Timolol	
Endocrine-Metabolic Agents			Eliglustat
Immunosuppressants		Cyclosporine Tacrolimus	
Muscle Relaxants		Carisoprodol	
Nonsteroidal Anti-Inflamatory Drugs (NSAIDs)			
Opioids		Buprenorphine Fentanyl Hydrocodone Oxycodone (CYP3A5)	Codeine Oxycodone Tramadol
Selective Serotonin Reuptake Inhibitors (SSRIs)	Fluoxetine	Citalopram Escitalopram Fluvoxamine Sertraline	Paroxetine

Psychotropic

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Anti-ADHD Agents		Amphetamine Atomoxetine Dexmethylphenidate Dextroamphetamine Guanfacine Lisdexamfetamine Methylphenidate (COMT)	
Anticonvulsants		Brivaracetam Clobazam	
Antidementia Agents		Donepezil	
Antidepressants	Mirtazapine	Duloxetine Moclobemide	Amitriptyline Clomipramine

Psychotropic

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
		Trazodone Venlafaxine Vortioxetine	Desipramine Doxepin Nortriptyline Protriptyline
Antipsychotics	Aripiprazole Flupenthixol Olanzapine	Brexpiprazole Clozapine Haloperidol Iloperidone Perphenazine Pimozide Quetiapine Risperidone Thioridazine Zuclopenthixol	
Anxiolytics		Alprazolam Buspirone Clonazepam Diazepam	
Beta Blockers	Propranolol		
Central Monoamine-Depleting Agents		Tetrabenazine	
Central Nervous System Agents		Dextromethorphan-Quinidine	
Cholinesterase Inhibitors		Galantamine	
Hypnotics		Eszopiclone	
Selective Serotonin Reuptake Inhibitors (SSRIs)	Fluoxetine	Citalopram Escitalopram Fluvoxamine Sertraline	Paroxetine

Surgery

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Anticholinergic Agents		Tolterodine	
Antiemetics			Ondansetron Tropisetron
Opioids		Fentanyl	

Other Drugs

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Alpha-1 Blockers		Tamsulosin	
Anticholinergic Agents		Fesoterodine	
Antidiabetics	Gliclazide	Saxagliptin	
Antineoplastic Agents	Methotrexate		
Beta-3 Adrenergic Agonists	Mirabegron		
Cholinergic Agonists		Cevimeline	
Contraceptives	Estrogen-containing oral contraceptives		
EGFR Inhibitors		Gefitinib	
Immunosuppressants		Sirolimus	
Vesicular monoamine transporter 2 inhibitor		Deutetrabenazine	

Legend

- Typical response is expected
- Consider alternative therapy
- Change recommended
- Additional information available
- Response is uncertain

Clinical Evidence Level

- Strong
- Moderate
- Emerging

Medication Report Details (by therapeutic class)

Drug	Finding	Recommendation	Concern	Evidence
Alpha-1 Blockers				
Tamsulosin (Flomax)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	Moderate
Analgesics, Opioid				
Methadone (CYP2B6)	CYP2B6: Intermediate metabolizer. One normal function allele and one little or no function allele.; Poor metabolizer. One decreased function allele and one little or no function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	Strong

Drug	Finding	Recommendation	Concern	Evidence
Anti-ADHD Agents				
Amphetamine (Adzenys, Evekeo)	COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Atomoxetine (Strattera)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Dexmethylphenidate (Focalin)	COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Dextroamphetamine (Zenzedi, Dexedrine)	COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Guanfacine (Tenex, Intuniv)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Lisdexamfetamine (Vyvanse)	COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Methylphenidate (COMT) (Concerta, Metadate, Ritalin, Ritalin LA, Quillivant, Daytrana, Methylin)	COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Antiarrhythmics				
Flecainide (Tambocor)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Propafenone (Rythmol)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing, or consider using an alternative medication.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Anticholinergic Agents				
Fesoterodine (Toviaz) ⚠	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with lower plasma concentrations of the active medication. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Tolterodine (Detrol) ⚠	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Anticoagulants				
Acenocoumarol (Sintrom, Acitrom)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Warfarin (Coumadin)	Multigenic: VKORC1, CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	No recommendation for Warfarin is available for this combination of variants/alleles.		

Drug	Finding	Recommendation	Concern	Evidence
Anticonvulsants				
Brivaracetam	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	
Clobazam (Onfi)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Phenytoin (Cerebyx)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Antidementia Agents				
Donepezil (Aricept)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Antidepressants				
Amitriptyline (Elavil)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Clomipramine (Anafranil)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Desipramine (Norpramin)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Doxepin (Deptran)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Duloxetine (Cymbalta)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Imipramine (Tofranil)	Multigenic CYP2C19: *1|*2 CYP2D6: *2Ax2|*2A; or *2Ax2|*2B or *2A|*2Bx2	Multiple results from uncorrelated genes. CYP2C19: Consider alternative therapy; CYP2D6: Consider alternative therapy		
Mirtazapine	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Typical response expected. No additional therapeutic recommendations.		
Moclobemide (Manerix, Aurorix, Amira, Clobemix, Depnil)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Nortriptyline (Pamelor)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Protriptyline (Vivactil)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Trazodone (Oleptro, Desyrel)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Venlafaxine (Effexor)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Vortioxetine (Brintellix)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider adjusting the dose, or monitoring the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Antidiabetics				
Gliclazide	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Glimepiride	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Glyburide (Glibenclamide)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Saxagliptin (Onglyza)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Tolbutamide (Orinase)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Antiemetics				
Ondansetron (Zofran)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Tropisetron (Navoban, Setrovel)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Antifungals				
Ketoconazole (Nizoral)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Voriconazole (Vfend)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing, or consider using an alternative medication.	Efficacy	
Antineoplastic Agents				
Methotrexate (Rheumatrex, Trexall)	MTHFR: Normal function. Two normal function alleles.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Antiplatelet Agents				
Clopidogrel	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication frequently present with lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Prasugrel	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Typical response expected. No additional therapeutic recommendations.		
Ticagrelor (Brilinta)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Antipsychotics				
Aripiprazole (Abilify)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Brexpiprazole (Rexulti)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Clozapine	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Flupenthixol	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Typical response expected. No additional therapeutic recommendations.		
Haloperidol (Haldol)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Iloperidone	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Olanzapine (Zalasta, Zyprexa)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Typical response expected. No additional therapeutic recommendations.		
Perphenazine (Trilafon)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Pimozide (Orap)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Quetiapine (Seroquel)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Risperidone (Risperdal)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing, or consider using an alternative medication.	Efficacy	
Thioridazine	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Zuclopenthixol	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; consider alternative medication.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Anti-Retroviral Agents				
Efavirenz	CYP2B6: Intermediate metabolizer. One normal function allele and one little or no function allele.; Poor metabolizer. One decreased function allele and one little or no function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Nevirapine	CYP2B6: Intermediate metabolizer. One normal function allele and one little or no function allele.; Poor metabolizer. One decreased function allele and one little or no function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Anxiolytics				
Alprazolam (Xanax, Niravam)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider adjusting the dose, or using an alternative medication.	Efficacy	
Buspirone (Buspar)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Clonazepam (Klonopin)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing, or consider using an alternative medication.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Diazepam	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Beta-3 Adrenergic Agonists				
Mirabegron (Myrbetriq)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with lower plasma concentrations of the active medication. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Beta Blockers				
Carvedilol (Coreg)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Metoprolol (Lopressor)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Nebivolol (Bystolic)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Typical response expected. No additional therapeutic recommendations.		
Propranolol (Inderal)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Typical response expected. No additional therapeutic recommendations.		
Timolol (Blocadren)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Central Monoamine-Depleting Agents				
Tetrabenazine (Xenazine)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Central Nervous System Agents				
Dextromethorphan-Quinidine (Nuedexta)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Cholinergic Agonists				
Cevimeline (Evoxac)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Cholinesterase Inhibitors				
Galantamine (Razadyne, Razadyne ER, Nivalin, Lycoremine, Reminyl)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Contraceptives				
Estrogen-containing oral contraceptives	F5: Two wild-type alleles.	Individuals with wild type alleles are expected to show typical response. No additional therapeutic recommendations.		
EGFR Inhibitors				
Gefitinib (Iressa)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Endocrine-Metabolic Agents				
Eliglustat	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Hypnotics				
Eszopiclone (Lunesta)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing, or consider using an alternative medication.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Immunosuppressants				
Cyclosporine (Gengraf, Neoral)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Sirolimus (Rapamune)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Tacrolimus (Prograf, Hecoria)	CYP3A5: One allele showing normal activity and one showing little or no activity.	Intermediate metabolizers of this medication frequently present with lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Muscle Relaxants				
Carisoprodol (Soma)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions, or consider alternative medication.	ADR	
Non-drug				
ApoE	ApoE: Often associated with normal lipid metabolism.	Typical cardiovascular disease risk expected.		
COMT(Val158Met)	COMT(Val158Met): Poor function. Two decreased function alleles.	No additional therapeutic recommendations.		
CYP1A2	CYP1A2: Normal metabolizer. Two alleles showing normal activity.	No additional therapeutic recommendations.		
CYP2B6	CYP2B6: Intermediate metabolizer. One normal function allele and one little or no function allele.; Poor metabolizer. One decreased function allele and one little or no function allele.	No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Nonsteroidal Anti-Inflamatory Drugs (NSAIDs)				
Celecoxib (Celebrex)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Diclofenac (Cataflam)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Flurbiprofen (Ocufen)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Ibuprofen (Motrin, Advil)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Lornoxicam (Xefo)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Meloxicam (Mobic)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Piroxicam (Feldene)	CYP2C9: Indeterminate metabolizer. One normal function allele and one uncertain function allele.; Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. Two uncertain function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	Indeterminate metabolizers of this medication may be at increased risk of side effects and/or pharmacotherapy failure. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Opioids				
Buprenorphine (Butrans, Buprenex)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Codeine	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Fentanyl (Duragesic, Sublimaze)	CYP3A4: Ultrarapid metabolizer status. Two alleles showing increased function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Hydrocodone	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Oxycodone (Oxycontin)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Oxycodone (CYP3A5) (Oxycontin)	CYP3A5: One allele showing normal activity and one showing little or no activity.	Intermediate metabolizers of this medication may present with lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Tramadol (Ultracet, Ultram)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Proton Pump Inhibitors (PPIs)				
Dexlansoprazole (Dexilant, Kapidex)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Esomeprazole (Nexium)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Lansoprazole (Prevacid)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Omeprazole (Prilosec, Zegerid)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Pantoprazole (Protonix)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Rabeprazole (Aciphex)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Selective Serotonin Reuptake Inhibitors (SSRIs)				
Citalopram (Celexa)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Monitor the patient's response to guide dosing.	ADR	
Escitalopram (Lexapro)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Monitor the patient's response to guide dosing.	ADR	
Fluoxetine (Prozac)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Typical response expected. No additional therapeutic recommendations.		
Fluvoxamine (Luvox)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; consider alternative medication.	Efficacy	
Paroxetine (Paxil)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Sertraline (Zoloft)	CYP2C19: Intermediate metabolizer. One normal function allele and one little or no function allele.	Intermediate metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Statins				
Atorvastatin (Lipitor, Caduet)	CYP3A4: Ultra-rapid metabolizer. Two alleles showing increased activity.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Consider increasing the dose, or using an alternative medication.	Efficacy	
Simvastatin (Zocor)	SLCO1B1: Normal liver uptake activity.	Individuals with normal SLCO1B1 liver uptake activity are expected to have a typical response to a standard dose of simvastatin.		
Vesicular monoamine transporter 2 inhibitor				
Deutetrabenazine (Austedo)	CYP2D6: Ultra-rapid metabolizer. One allele showing normal function and one duplicated allele showing normal function.	Ultrarapid metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Clinical Evidence Levels

Strong

- Includes gene-drug pairs approved by the Coriell Institute for Medical Research Pharmacogenomics Advisory Group.
- Includes gene-drug pairs supported by multiple studies documenting consistent effects of specific genetic variant(s) on clinical outcomes.
- Includes gene-drug pairs approved by the Dutch Pharmacogenetics Working Group (DPWG) and/or guidelines published in Clinical Pharmacology and Therapeutics by the Clinical Pharmacogenetics Implementation Consortium (CPIC).

Moderate

- Includes gene-drug pairs supported by pharmacokinetic, pharmacodynamic, or molecular/cellular functional studies showing consistent effects of genetic variant(s).
- Includes Drug product information (e.g. This interpretation is based on guidance available in the FDA (Food and Drug Administration) drug label for ABILIFY® (10/2013).
- Includes gene-drug pairs for which potential clinical outcomes are inferred from similar gene-drug interactions approved by the Dutch Pharmacogenetics Working Group (DPWG), and/or guidelines published in Clinical Pharmacology and Therapeutics by the Clinical Pharmacogenetics Implementation Consortium (CPIC), and/or pharmacogenomic reports and submission from the Coriell Institute for Medical Research.

Emerging

- Includes gene-drug pairs supported by published studies of the drug, related drug, or a probing compound of interest involving limited data and/or inconsistent findings.

Patient Information Card

This card contains an abbreviated genetic summary.
It is not intended as a replacement for the complete GeneDose™ report.

Suretox Laboratory

Patient: PGX, 01
DOB: 2021-05-10
Sample ID: 2105109995

This card shows information about your genetics that relate to drug metabolism. Show to your doctors before being prescribed new medications.

Pharmacogenomic Summary		
ApoE	ε3|ε3	See full GeneDose report
COMT(Val158Met)	A|A	Poor function
CYP1A2	*1A|*1A	Normal metabolizer
CYP2B6	*6|*18; or *1A|*18	Multiple statuses; see per-drug detail
CYP2C19	*1|*2	Intermediate metabolizer
CYP2C9	*1|*8; or *14|*14; or *8|*14; or *8|*8; or *8|*27; or *27|*14; or *27|*27; or *1|*1; or *1|*27; or *1|*14	Indeterminate
CYP2D6	*2Ax2|*2A; or *2Ax2|*2B or *2A|*2Bx2	Ultrarapid metabolizer
CYP3A4	*1B|*1B	Ultrarapid metabolizer
CYP3A5	*1A|*6; or *1D|*6	Intermediate metabolizer
Factor V Leiden	Normal	See full GeneDose report
MTHFR	GT|GT	Normal function
MTHFR (A1298C)	Normal	See full GeneDose report
MTHFR (C677T)	Normal	See full GeneDose report
Prothrombin (F2)	Normal	See full GeneDose report
SLCO1B1	*1|*1	Normal liver uptake activity
VKORC1	*1|*1	Normal (with respect to Warfarin)

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