

RxMatch™ Comprehensive Report



Intermountain Precision Genomics
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 CLIA ID Number: 46D2094383
 Intermountain.com/RxMatch

This report combines (i) an analysis of the patient's DNA by Quantigen, LLC, 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. The Medication Report section lists the type of PGx guidance present on FDA-approved drug labels. Medications with no established FDA PGx guidance are provided solely for educational purposes.

Patient: Doe, Test
 Date of Birth: Jan 01, 1940
 Gender: Female

Physician: Winston Brasor
 Practice: Test Practice

Date Collected: Apr 23, 2019
 Date Accessioned: Apr 29, 2019
 Specimen type: Buccal swab
 Sample ID: 7106

Medication Summary (more alternatives discoverable at GeneDose Live)





Secured URL: <https://alpha.genedose.com/?token=TEST>




Therapeutic Class	✔ Standard Precautions	⚠️ ⓘ Caution / Info	❌ Change recommended
Alpha-1 Blockers	Tamsulosin		
Anti-ADHD Agents	Atomoxetine Guanfacine	Amphetamine Clonidine Dexmethylphenidate Dextroamphetamine Lisdexamfetamine Methylphenidate (ADRA2A) Methylphenidate (COMT)	
Antiarrhythmics	Flecainide Propafenone		
Anticholinergic Agents	Fesoterodine Tolterodine		
Anticoagulants	Acenocoumarol	Warfarin	
Anticonvulsants	Carbamazepine Oxcarbazepine Phenytoin		
Antidementia Agents	Donepezil		





7106 - Doe, Test - Reported May 07, 2019 - DRAFT

The information contained in this report is intended to be interpreted by a licensed physician or other licensed healthcare professional. This report is not intended to take the place of professional medical advice. Decisions regarding use of prescribed medications must be made only after consulting with a licensed physician or other licensed healthcare professional, and should consider each patient's medical history and current treatment regimen. Portions © 2014-2019 Coriell Life Sciences, Inc.

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Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Antidepressants	Amitriptyline Clomipramine Desipramine Doxepin Duloxetine Flupenthixol Mirtazapine Nortriptyline Protriptyline Trazodone Venlafaxine Vortioxetine	Bupropion Moclobemide	
Antidiabetics	Glibenclamide Gliclazide Glimepiride Saxagliptin Tolbutamide		
Antiemetics	Ondansetron Tropisetron		
Antifungals	Ketoconazole	Voriconazole	
Antiplatelet Agents	Ticagrelor	Clopidogrel Prasugrel	
Antipsychotics	Aripiprazole Brexpiprazole Clozapine Haloperidol Iloperidone Olanzapine Perphenazine Quetiapine Risperidone Thioridazine Zuclopenthixol	Pimozide	
Anxiolytics	Alprazolam Buspirone Clonazepam	Diazepam	
Beta-3 Adrenergic Agonists	Mirabegron		
Beta Blockers	Carvedilol Metoprolol Nebivolol		



Therapeutic Class	 Standard Precautions	 Caution / Info	 Change recommended
	Propranolol Timolol		
Central Monoamine-Depleting Agents		Tetrabenazine	
Central Nervous System Agents	Dextromethorphan-Quinidine		
Cholinergic Agonists	Cevimeline		
Cholinesterase Inhibitors	Galantamine		
Contraceptives	Estrogen-containing oral contraceptives		
EGFR Inhibitors	Gefitinib		
Endocrine-Metabolic Agents		Eliglustat	
Hypnotics	Eszopiclone		
Immunosuppressants	Cyclosporine Sirolimus	Tacrolimus	
Muscle Relaxants		Carisoprodol	
Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)	Celecoxib Diclofenac Flurbiprofen Meloxicam		
Opioids	Buprenorphine Codeine Fentanyl Hydrocodone Oxycodone Tramadol	Fentanyl (OPRM1) Oxycodone (CYP3A5)	
Proton Pump Inhibitors (PPIs)		Dexlansoprazole Esomeprazole Lansoprazole Omeprazole Pantoprazole Rabeprazole	
Selective Serotonin Reuptake Inhibitors (SSRIs)	Fluvoxamine Paroxetine	Citalopram Escitalopram Fluoxetine	

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
		Sertraline	
Statins	Atorvastatin Simvastatin		

SAMPLE

Legend



-  Typical response is expected
-  Change recommended
-  Consider alternative therapy

-  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) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		

SAMPLE















Drug	Finding	Recommendation	Concern	Evidence
Anti-ADHD Agents				
Amphetamine (Adzenys, Evekeo) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Uncertain function. One allele showing increased activity and one showing decreased activity.	Individuals with the Met variant may be at an increased risk of therapeutic failure and adverse reactions.	ADR & Efficacy	
Atomoxetine (Strattera) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Clonidine (Clonidine, Kapvay) <i>FDA drug label: Not established for PGx</i>	 ADRA2A(C-1291G): C/G	Individuals with rs1800544 GC genotype may be at an increased risk of therapeutic failure due to increased metabolic clearance.	Efficacy	
Dexmethylphenidate (Focalin) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Uncertain function. One allele showing increased activity and one showing decreased activity.	Individuals with the Met variant may be at an increased risk of therapeutic failure.	Efficacy	
Dextroamphetamine (Zenzedi, Dexedrine) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Uncertain function. One allele showing increased activity and one showing decreased activity.	Individuals with the Met variant may be at an increased risk of therapeutic failure and adverse reactions.	ADR & Efficacy	
Guanfacine (Tenex, Intuniv) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Lisdexamfetamine (Vyvanse) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Uncertain function. One allele showing increased activity and one showing decreased activity.	Individuals with the Met variant may be at an increased risk of therapeutic failure and adverse reactions.	ADR & Efficacy	










Drug	Finding	Recommendation	Concern	Evidence
Methylphenidate (ADRA2A) (Concerta, Metadate, Ritalin, Ritalin LA, Quillivant, Daytrana, Methylin) <i>FDA drug label: Not established for PGx</i>	 ADRA2A(C-1291G): C G	Individuals with rs1800544 GC genotype may be at an increased risk of therapeutic failure due to increased metabolic clearance.	Efficacy	
Methylphenidate (COMT) (Concerta, Metadate, Ritalin, Ritalin LA, Quillivant, Daytrana, Methylin) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Uncertain function. One allele showing increased activity and one showing decreased activity.	Individuals with the Met variant may be at an increased risk of therapeutic failure.	Efficacy	
Antiarrhythmics				
Flecainide (Tambocor) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Propafenone (Rythmol) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Anticholinergic Agents				
Fesoterodine (Toviaz) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Tolterodine (Detrol) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		

















Drug	Finding	Recommendation	Concern	Evidence
Anticoagulants				
Acenocoumarol (Sintrom, Acitrom) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Warfarin (Coumadin) <i>FDA drug label: Actionable PGx</i>	 Multigenic: CYP2C9, VKORC1, CYP4F2: Extensive metabolizer. Two alleles showing normal activity.; Normal function. Two alleles with normal activity.	Individuals with this combination of alleles may benefit from a lower than standard therapeutic dose of warfarin. Consider a regimen of 2.1-4 mg/day (15-28 mg/week).	ADR & Efficacy	
Anticonvulsants				
Carbamazepine (Tegretol) <i>FDA drug label: Testing required</i>	 HLA-B*1502: Negative; Absence of *15:02 alleles.	Typical response is expected; no additional therapeutic recommendations. Individuals with no variant alleles detected are at "normal" or reduced risk of carbamazepine-associated cutaneous adverse reactions.		
Clobazam (Onfi) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain; no additional therapeutic recommendations.		
Oxcarbazepine (Trileptal) <i>FDA drug label: Testing recommended</i>	 HLA-B*1502: WT WT	Typical response is expected; no additional therapeutic recommendations.		
Phenytoin (Dilantin) <i>FDA drug label: Actionable PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		









Drug	Finding	Recommendation	Concern	Evidence
Antidementia Agents				
Donepezil (Aricept) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		







SAMPLE

Drug	Finding	Recommendation	Concern	Evidence
Antidepressants				
Amitriptyline (Elavil) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Bupropion (Wellbutrin) <i>FDA drug label: Not established for PGx</i>	 ANKK1: Normal function. Two alleles with normal activity.	Individuals with the A2 A2 diplotype are expected to respond well to therapy.	Efficacy	
Clomipramine (Anafranil) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Desipramine (Norpramin) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Doxepin (Deptran) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Duloxetine (Cymbalta) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Flupenthixol <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		











Drug	Finding	Recommendation	Concern	Evidence
Imipramine (Tofranil) <i>FDA drug label: Actionable PGx</i>	 Multigenic: CYP2C19, CYP2D6: CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.; CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Multiple results from uncorrelated genes. CYP2C19: The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. No additional therapeutic recommendations.; CYP2D6: Typical response is expected; no additional therapeutic recommendations.		
Mirtazapine <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Moclobemide <i>FDA drug label: Not established for PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. No additional therapeutic recommendations.		
Nortriptyline (Pamelor) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Protriptyline (Vivactil) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		











Drug	Finding	Recommendation	Concern	Evidence
Trazodone (Oleptro, Desyrel) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Venlafaxine (Effexor) <i>FDA drug label: Informative PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Vortioxetine (Brintellix) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Antidiabetics				
Glibenclamide (Glyburide) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Gliclazide <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Glimepiride <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Saxagliptin (Onglyza) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Tolbutamide (Orinase) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		















Drug	Finding	Recommendation	Concern	Evidence
Antiemetics				
Ondansetron (Zofran) <i>FDA drug label: Informative PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Tropisetron <i>FDA drug label: Not established for PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Antifungals				
Ketoconazole (Nizoral) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Voriconazole <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. No additional therapeutic recommendations.		












Drug	Finding	Recommendation	Concern	Evidence
Antiplatelet Agents				
Clopidogrel (Plavix) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Ultra-rapid metabolizer. One allele showing normal activity and one showing increased activity.	Individuals with ultrarapid metabolizer status may benefit from the elevated plasma concentration of the active compound when taking a standard dose. They may also be at increased risk of bleeding due to elevated plasma concentrations of the active compound. No additional therapeutic recommendations.	Efficacy	
Prasugrel (Effient) <i>FDA drug label: Informative PGx</i>	 CYP2C19: Uncertain metabolizer status. One allele showing normal activity and one showing increased activity.	Individuals with uncertain functional status may be at an increased risk of adverse drug reactions and/or therapeutic failure. Insufficient evidence to allow calculation of dose adjustment. Be alert to adverse reactions and/or symptoms of insufficient therapy.		
Ticagrelor (Brilinta) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		









Drug	Finding	Recommendation	Concern	Evidence
Antipsychotics				
Aripiprazole (Abilify) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Brexpiprazole (Rexulti) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Clozapine <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Haloperidol (Haldol) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Iloperidone (Fanapt) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Olanzapine (Zalasta, Zyprexa) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Perphenazine (Trilafon) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		










Drug	Finding	Recommendation	Concern	Evidence
Pimozide (Orap) <i>FDA drug label: Testing required</i>	 CYP2D6: *1 *10	Typical response is expected. For children, the drug label recommends an initial dose of 0.05 mg/kg followed by titration to response up to a maximum of 0.2 mg/kg and not to exceed 10 mg/day. In adults the drug label recommends an initial dose of 1 to 2 mg a day in divided doses followed by titration to response up to a maximum of 0.2 mg/kg/day or 10 mg/day.	ADR	
Quetiapine (Seroquel) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Risperidone (Risperdal) <i>FDA drug label: Informative PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Thioridazine <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Zuclopenthixol <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		









Drug	Finding	Recommendation	Concern	Evidence
Anxiolytics				
Alprazolam (Xanax, Niravam) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Buspirone (Buspar) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Clonazepam (Klonopin) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Diazepam (Diastat, Valium) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Uncertain metabolizer status. One allele showing normal activity and one showing increased activity.	Individuals with uncertain functional status may be at an increased risk of adverse drug reactions and/or therapeutic failure. Insufficient evidence to allow calculation of dose adjustment. Be alert to adverse reactions and/or symptoms of insufficient therapy.	ADR & Efficacy	
Beta-3 Adrenergic Agonists				
Mirabegron (Myrbetriq) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		





Drug	Finding	Recommendation	Concern	Evidence
Beta Blockers				
Carvedilol (Coreg) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Metoprolol (Lopressor) <i>FDA drug label: Informative PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Nebivolol (Bystolic) <i>FDA drug label: Informative PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Propranolol (Inderal) <i>FDA drug label: Informative PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Timolol (Blocadren) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Central Monoamine-Depleting Agents				
Tetrabenazine (Xenazine) <i>FDA drug label: Testing required</i>	 CYP2D6: *1 *10	Typical response is expected. The drug label recommends a maximum daily dose of 100 mg and a maximum single dose of 37.5 mg.		
Central Nervous System Agents				
Dextromethorphan-Quinidine (Nuedexta) <i>FDA drug label: Testing recommended</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Cholinergic Agonists				
Cevimeline (Evoxac) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Cholinesterase Inhibitors				
Galantamine (Razadyne, Razadyne ER, Nivalin, Lycoremine, Reminyl) <i>FDA drug label: Informative PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Contraceptives				
Estrogen-containing oral contraceptives <i>FDA drug label: Not established for PGx</i>	 F5: Two wild-type alleles.	Typical response is expected; no additional therapeutic recommendations.		
EGFR Inhibitors				
Gefitinib (Iressa) <i>FDA drug label: Testing required</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Endocrine-Metabolic Agents				
Eliglustat (Cerdelga) <i>FDA drug label: Testing required</i>	 CYP2D6: *1 *10	Typical response is expected. The drug label recommends a dose of 84 mg twice daily.		
Hypnotics				
Eszopiclone (Lunesta) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		





Drug	Finding	Recommendation	Concern	Evidence
Immunosuppressants				
Cyclosporine (Gengraf, Neoral) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Sirolimus (Rapamune) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Tacrolimus (Prograf, Hecoria) <i>FDA drug label: Not established for PGx</i>	 CYP3A5: Two alleles showing little or no activity.	Individuals with poor metabolizer status have higher dose-adjusted trough concentrations of tacrolimus; the resultant increased concentrations may increase the probability of pharmacotherapy success. Consider initiating therapy with the recommended starting dose. In liver transplant patients, donor genotype should be considered as well as the recipient's.		
Muscle Relaxants				
Carisoprodol (Soma) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Such individuals may have reduced exposure to carisoprodol (and subsequent increased exposure to meprobamate) due to increased carisoprodol metabolism. Carisoprodol should be administered with caution.	ADR & Efficacy	







Drug	Finding	Recommendation	Concern	Evidence
Non-drug				
ApoE	 ApoE: Not Tested	No recommendation for ApoE is available due to absent laboratory assay results.		
Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)				
Celecoxib (Celebrex) <i>FDA drug label: Actionable PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Diclofenac (Cataflam) <i>FDA drug label: Not established for PGx</i>	 CYP2C9:rs1057910: Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Flurbiprofen (Ocufen) <i>FDA drug label: Actionable PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Meloxicam (Mobic) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		



Drug	Finding	Recommendation	Concern	Evidence
Opioids				
Buprenorphine (Butrans, Buprenex) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Codeine <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Fentanyl (Duragesic, Sublimaze) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Fentanyl (OPRM1) (Duragesic, Sublimaze) <i>FDA drug label: Not established for PGx</i>	 OPRM1(A118G): Normal function. Two alleles with normal activity.	Individuals with A118G A/A genotype are associated with decreased epidural analgesia satisfaction at standard doses. Consider increasing dose based upon assessment of clinical benefit and tolerability.	Efficacy	
Hydrocodone <i>FDA drug label: Not established for PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Oxycodone (Oxycontin) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Oxycodone (CYP3A5) (Oxycontin) <i>FDA drug label: Not established for PGx</i>	 CYP3A5: Two alleles showing little or no activity.	In a preliminary study, individuals with poor metabolizers status have a significantly higher opioid escalation index compared to normal (extensive) metabolizers. Though the impact of metabolizer status at CYP3A5 on pain relief is currently unknown, consider reducing the initial dose. There does not appear to be an effect of this metabolizer status on the incidence of drowsiness.	ADR & Efficacy	
Tramadol (Ultracet, Ultram) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		





SAMPLE









Drug	Finding	Recommendation	Concern	Evidence
Proton Pump Inhibitors (PPIs)				
Dexlansoprazole (Kapindex, Dexilant) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Such individuals may show increased metabolism to less active compounds; the resultant decreased concentrations may increase the risk of pharmacotherapeutic failure. Consider increasing dose.	Efficacy	
Esomeprazole (Nexium) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Such individuals may show increased metabolism to less active compounds; the resultant decreased concentrations may increase the risk of pharmacotherapeutic failure. Consider increasing dose.	Efficacy	





Drug	Finding	Recommendation	Concern	Evidence
Lansoprazole (Prevacid) <i>FDA drug label: Informative PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Such individuals may show increased metabolism to less active compounds; the resultant decreased concentrations may increase the risk of pharmacotherapeutic failure. Consider increasing dose.	Efficacy	
Omeprazole (Prilosec, Zegerid) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Such individuals may show increased metabolism to less active compounds; the resultant decreased concentrations may increase the risk of pharmacotherapeutic failure. Consider increasing dose.	Efficacy	
Pantoprazole (Protonix) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Such individuals may show increased metabolism to less active compounds; the resultant decreased concentrations may increase the risk of pharmacotherapeutic failure. Consider increasing dose.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Rabeprazole (Aciphex) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Such individuals may show increased metabolism to less active compounds; the resultant decreased concentrations may increase the risk of pharmacotherapeutic failure. Consider increasing dose.	Efficacy	

SAMPLE

Drug	Finding	Recommendation	Concern	Evidence
Selective Serotonin Reuptake Inhibitors (SSRIs)				
Citalopram (Celexa) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Consider monitoring plasma concentration and titrate dose to a maximum of 150% in response to efficacy and adverse drug reaction or select alternative drug (e.g. fluoxetine, paroxetine).	ADR & Efficacy	
Escitalopram (Lexapro) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. Consider monitoring plasma concentration and titrate dose to a maximum of 150% in response to efficacy and adverse drug reaction or select alternative drug (e.g. fluoxetine, paroxetine).	ADR & Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Fluoxetine (Prozac) <i>FDA drug label: Informative PGx</i>	 CYP2D6: *1 *10	Individuals taking fluoxetine should be alert to concomitant use of drugs metabolized by CYP2D6. Briefly, fluoxetine is a potent inhibitor of CYP2D6 enzyme pathway. Fluoxetine inhibits the activity of CYP2D6, and may make individuals with normal CYP2D6 metabolic activity resemble a poor metabolizer. Coadministration of fluoxetine with other drugs that are metabolized by CYP2D6, including certain antidepressants (e.g. TCAs), antipsychotics (e.g. phenothiazines and most atypicals), and antiarrhythmics (e.g. propafenone, flecainide, and others) should be approached with caution.	ADR & Efficacy	
Fluvoxamine (Luvox) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: *1 *10	Typical response is expected; no additional therapeutic recommendations.		
Paroxetine (Paxil) <i>FDA drug label: Informative PGx</i>	 CYP2D6: Extensive metabolizer. One allele showing normal activity and one showing decreased activity.	Typical response is expected; no additional therapeutic recommendations.		
Sertraline (Zoloft) <i>FDA drug label: Not established for PGx</i>	 CYP2C19: Rapid metabolizer status. One allele showing normal activity and one showing increased activity.	The therapeutic outcome of this combination of alleles is uncertain. However, individuals with rapid metabolizer status may show increased enzyme activity compared to normal metabolizers but less than ultrarapid metabolizers. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Statins				
Atorvastatin (Lipitor, Caduet) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Extensive metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
Simvastatin (Zocor) <i>FDA drug label: Informative PGx</i>	 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.		

SAMPLE

Thrombosis Profile

Tested Genes (Alleles)	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)	Homozygous variant		

General Description

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

Patients who are homozygous for MTHFR 677T or MTHFR 1298C may have a further increased risk for venous thrombosis if they also possess the Factor V Leiden 1691A allele. However the MTHFR alleles alone do not predict a significant risk for venous thrombosis.

References and Useful Information:

- Factor V Leiden Working Group; ACMG Laboratory Quality Assurance Molecular Subcommittee of the ACMG Laboratory Quality Assurance Committee AMERICAN COLLEGE OF MEDICAL GENETICS; Standards and Guidelines for Clinical Genetics Laboratories; 2006 Edition
 - Middeldorp S, Henkens CM, Koopman MM, van Pampus ECM, Hamulyák K, van der Meer J, Prins MH, Büller HR. The incidence of venous thromboembolism in family members of patients with factor V Leiden mutation and venous thrombosis. *Ann Intern Med* 1998;128:15-20.
 - Vandenbroucke JP, Koster T, Briet E, Reitsma PH, Bertina RM, Rosendaal FR. Increased risk of venous thrombosis in oral contraceptive users who are carriers of factor V Leiden mutation. *Lancet* 1994;344:1453-1457.
 - Rosendaal FR, Koster T, Vandenbroucke JP, Reitsma PH. High risk of thrombosis in patients homozygous for factor V Leiden (activated protein C resistance). *Blood* 1995;85(6):1504-1508.
 - Reich LM, Bower M, Key NS. Role of the geneticist in testing and counseling for inherited thrombophilia. *Genet Med* 2003;5:133-143.
 - Tosetto A, Rodeghiero F, Martinelli I, De Stefano V, Missiaglia E, Chiusolo P, Mannucci PM. Additional genetic risk factors for venous thromboembolism in carriers of the factor V Leiden mutation. *Br J Haematol* 1998;103:871-876.
 - De Stefano V, Martinelli I, Mannucci PM, Paciaroni K, Chiusolo P, Casorelli I, Rossi E, Leone G. The risk of recurrent deep venous thrombosis among heterozygous carriers of both factor V Leiden and the G20210A prothrombin mutation. *N Engl J Med* 1999;341:801-806.
- M. Adams, P.D. Smith, D. Martin, J.R. Thompson, D. Lodwick, N.J. Samani. Genetic analysis of thermolabile methylenetetrahydrofolate reductase as a risk factor for myocardial infarction. *QJM*. 1996 Jun;89(6):437-44.

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.

Disclaimer: These tests were developed and characterized by Quantigen Laboratory. The tests in Quantigen's pharmacogenetics panel have not been approved by the Food and Drug Administration. The FDA has determined that such approval is not necessary, provided that the laboratory both (1) maintains its good standing as a clinical testing laboratory with all mandatory accrediting bodies, and (2) continually demonstrates that its testing protocols and procedures achieve a high degree of analytical accuracy.

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.

Methodology: TaqMan-based PCR array and TaqMan-based qPCR assays.

RxMatch™ Comprehensive Report



Reference Laboratory: Quantigen, LLC, 7340 Crossing Place, Suite 50, Fishers, IN 46038
Laboratory Certification: CLIA # 15D2076283
Laboratory Director: Ted Schutzbank, Ph.D., D(ABMM)

SAMPLE

7106 - Doe, Test - Reported May 07, 2019 - DRAFT

The information contained in this report is intended to be interpreted by a licensed physician or other licensed healthcare professional. This report is not intended to take the place of professional medical advice. Decisions regarding use of prescribed medications must be made only after consulting with a licensed physician or other licensed healthcare professional, and should consider each patient's medical history and current treatment regimen. Portions © 2014-2019 Coriell Life Sciences, Inc.

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Genetic Summary

Gene	Result	Activity †
ADRA2A(C-1291G)	C G	Unknown Metabolizer
ANKK1	G G	Normal function
ApoE	Not Tested	See ApoE Genotype Info.
COMT(Val158Met)	G A	Altered function
CYP2C19	*1 *17	Multiple statuses; see per-drug detail
CYP2C9	*1 *1	Extensive metabolizer
CYP2D6	*1 *10	Extensive metabolizer
CYP3A4	*1A *1A	Multiple statuses; see per-drug detail
CYP3A5	*3B *3C; or *3A *3B	Poor metabolizer
CYP4F2	*1 *1	Normal function
Factor V Leiden	Normal	See Thrombosis Profile
HLA-B*1502	WT WT	WT
MTHFR (A1298C)	Normal	See Thrombosis Profile
MTHFR (C677T)	Variant	See Thrombosis Profile
OPRM1(A118G)	A A	Altered function
Prothrombin (F2)	Normal	See Thrombosis Profile
SLCO1B1	*1 *1	Normal liver uptake activity
VKORC1	*2 *2	Reduced (with respect to Warfarin)

GeneDose Live

Individualized, additional therapeutic decision support information based on Test Doe's genetics, drug regimen, indications, demographics, and lifestyle indicators are available at GeneDose Live via this secured URL: <https://alpha.genedose.com/?token=prompt>



GeneDose Key: TEST

Sample ID: 7106

7106 - Doe, Test - Reported May 07, 2019 - DRAFT

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