PROOVE GENOMICS

Proove Genomics, Inc.
655 W. Mitchell Street Arlington TX 76010

PATIENT INFORMATION		SPECIMEN DETAILS		PROVIDER INFORMATION	
NAME:	JACK NIMPTSCH	SAMPLE ID:	km222a-5	PROVIDER:	
DOB:	02/15/2026	SPECIMEN TYPE:	buccal swab	FACILITY:	
SEX:	Male	COLLECTION DATE:	02/10/2026		
DIAGNOSES:	A01.00, B00.521	RECEIVED DATE:	02/17/2026		
		REPORT DATE:	06/29/2026		

Proove Drug Metabolism

1 Current Patient Medications

Note that either no information was provided regarding current medications for this patient, or that pharmacogenomics interpretation is not available for the current medications at this time. It is highly recommend to consult a physician or a pharmacist to determine the pharmacogenomics implications when the patient is prescribed new medication.

Unrecognized Medications: (+)-menthol 1% / Lidocaine 4% Medicated Patch, (+)-menthol 6% / Methyl salicylate 10% / Synthetic camphor 3% Medicated Patch
Defined as medications that are not included in the testing database, medications that were misspelled on the Sonic PGx request form, medications that were listed as drug classes instead of individual medications, and/or medications not available in Australia. Some medications use US spelling.

Outside of Scope Medications: Menthol, Methyl Salicylate
Defined as those that do not have PGx currently have pharmacogenetic guidance available to report.

2 Risk Management

Type III Hyperlipoproteinemia

Unknown Association with Type III Hyperlipoproteinemia

The patient's results for the APOE c.388 T>C (Cys130Arg) mutation and/or APOE c.526 C>T (Arg176Cys) mutations are indeterminate.
The patient's risk for type III hyperlipoproteinemia cannot be estimated accurately.
Consult with a genetic counselor for more information.

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3 Potentially Impacted Medications

Medications are binned according to their respective therapeutic class and specialty, as well as the predicted impact of the patient's genotypes. The drugs that appear in this table are based solely on the patient's genetic results. Please note that there are available alternative medications that do not have PGx guidance and are not included within this report.

Category	Drug Class	Standard Precautions	Use with Caution	Consider Alternatives
Anticancer Agents	Anti-Estrogens	Tamoxifen (Nolvadex®, Soltamox®)		
	Protein Kinase Inhibitors	Erdafitinib (Balversa®) Gefitinib (Iressa®)		
Antihistamines	Histamine (H1) Receptor Antagonists	Meclizine (Antivert®)		
Cardiovascular	Angiotensin II Receptor Antagonists	Azilsartan (Edarbi®, Edarbyclor®) Irbesartan (Avapro®) Losartan (Cozaar®, Hyzaar®)		
	Antianginal Agents	Ranolazine (Ranexa®)		
	Antiarrhythmics	Flecainide (Tambocor®) Mexiletine (Mexitil®) Propafenone (Rythmol®)		
	Anticoagulants		Warfarin (Coumadin®)	
	Antiplatelets	Clopidogrel (Plavix®)		
	Beta Blockers	Carvedilol (Coreg®) Metoprolol (Lopressor®) Nebivolol (Bystolic®) Propranolol (Inderal®) Timolol (Blocadren®)		
	Cardiac myosin inhibitor	Mavacamten (Camzyos®)		
	Diuretics	Torsemide (Demadex®)		

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Category	Drug Class	Standard Precautions	Use with Caution	Consider Alternatives
	Statins		Fluvastatin (Lescol®) Pravastatin (Pravachol®) Rosuvastatin (Crestor®)	Atorvastatin (Lipitor®) Lovastatin (Mevacor®, Altoprev®, Advicor®) Pitavastatin (Livalo®) Simvastatin (Zocor®)
Diabetes	**Meglitinides**	Nateglinide (Starlix®) Repaglinide (Prandin®, Prandimet®)		
Gastrointestinal	**Antiemetics**	Dolasetron (Anzemet®) Dronabinol (Marinol®) Fosnetupitant / Palonosetron (Akynzeo-IV®) Metoclopramide (Reglan®) Netupitant / Palonosetron (Akynzeo-oral®) Ondansetron (Zofran®, Zuplenz®) Palonosetron (Aloxi®)		
	Proton Pump Inhibitors	Esomeprazole (Nexium®) Rabeprazole (Aciphex®)	Dexlansoprazole (Dexilant®, Kapidex®) Lansoprazole (Prevacid®) Omeprazole (Prilosec®) Pantoprazole (Protonix®)	
Gaucher Disease	**Endocrine-Metabolic Agents**	Eliglustat (Cerdelga®)		
Gynecology	**Endometriosis Pain Agents**	Elagolix (Orilissa®)		
Infections	**Anti-HIV Agents**	Efavirenz (Sustiva®)		
	Antifungals	Voriconazole (Vfend®)		
Multiple Sclerosis	**Disease-Modifying Agents**	Siponimod (Mayzent®)		
Pain	**Muscle Relaxants**	Carisoprodol (Soma®)	Tizanidine (Zanaflex®)	

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Category	Drug Class	Standard Precautions	Use with Caution	Consider Alternatives
	NSAIDs	Celecoxib (Celebrex®) Flurbiprofen (Ansaid®) Ibuprofen (Advil®, Motrin®) Meloxicam (Mobic®) Piroxicam (Feldene®)		
	Opioids	Benzhydrocodone (Apadaz®) Codeine (Codeine; Fioricet® with Codeine) Dihydrocodeine (Synalgos-DC®) Hydrocodone (Vicodin®) Methadone (Dolophine®) Morphine (MS Contin®) Oliceridine (Olinvyk) Oxycodone (Percocet®, Oxycontin®) Tramadol (Ultram®)		
Psychotropic	**Anti-ADHD Agents**	Amphetamine (Adderall®, Evekeo®) Dextroamphetamine (Dexedrine®) Lisdexamfetamine (Vyvanse®) Viloxazine (Qelbree®)	Atomoxetine (Strattera®) Dexmethylphenidate (Focalin®) Methylphenidate (Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®)	
	Antiaddictives	Bupropion (Wellbutrin®, Zyban®, Aplenzin®, Contrave®) Lofexidine (Lucemyra®)		
	Anticonvulsants	Brivaracetam (Briviact®) Fosphenytoin (Cerebyx®) Phenobarbital (Luminal®) Phenytoin (Dilantin®) Primidone (Mysoline®) Zonisamide (Zonegran®)		
	Antidementia Agents	Donepezil (Aricept®) Galantamine (Razadyne®)		

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Category	Drug Class	Standard Precautions	Use with Caution	Consider Alternatives
	Antidepressants	Amitriptyline (Elavil®) Amoxapine (Amoxapine®) Citalopram (Celexa®) Clomipramine (Anafranil®) Desipramine (Norpramin®) Desvenlafaxine (Pristiq®) Doxepin (Silenor®) Escitalopram (Lexapro®) Fluoxetine (Prozac®, Sarafem®) Fluvoxamine (Luvox®) Imipramine (Tofranil®) Maprotiline (Ludiomil®) Nefazodone (Serzone®) Nortriptyline (Pamelor®) Paroxetine (Paxil®, Brisdelle®) Protriptyline (Vivactil®) Sertraline (Zoloft®) Trimipramine (Surmontil®) Venlafaxine (Effexor®) Vortioxetine (Trintellix®)		
	Antipsychotics	Aripiprazole (Abilify®, Aristada®) Brexpiprazole (Rexulti®) Chlorpromazine (Thorazine®) Haloperidol (Haldol®) Iloperidone (Fanapt®) Paliperidone (Invega®) Perphenazine (Trilafon®) Pimozide (Orap®) Risperidone (Risperdal®) Thioridazine (Mellaril®)	Clozapine (Clozaril®) Olanzapine (Zyprexa®)	
	Benzodiazepines	Clobazam (Onfi®) Diazepam (Valium®)		
	Other Neurological Agents	Deutetrabenazine (Austedo®) Dextromethorphan / Quinidine (Nuedexta®) Flibanserin (Addyi®) Valbenazine (Ingrezza®)	Tetrabenazine (Xenazine®)	
Rheumatology	**Immunomodulators**	Leflunomide (Arava®)		
Sjogren's Syndrome	**Cholinergic Agonists**	Cevimeline (Evoxac®)		

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Category	Drug Class	Standard Precautions	Use with Caution	Consider Alternatives
Sleep Disorder Agents	**Narcoleptic Agents**	Pitolisant (Wakix®)		
Transplantation	**Immunosuppressants**		Tacrolimus (Prograf®)	
Urologicals	**Alpha-Blockers for Benign Prostatic Hyperplasia**	Tamsulosin (Flomax®)		
	Antispasmodics for Overactive Bladder	Darifenacin (Enablex®) Fesoterodine (Toviaz®) Mirabegron (Myrbetriq®) Tolterodine (Detrol®)		

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4 Dosing Guidance

Atorvastatin
Lipitor®

Increased Atorvastatin Exposure — ACTIONABLE

SLCO1B1: Decreased Function

The patient's genotype is associated with possible increased atorvastatin exposure. Patients may be at an increased myopathy risk.

Consider starting atorvastatin at doses ≤40 mg. If doses >40 mg are needed, consider combination therapy (e.g., atorvastatin plus a non-statin guideline directed therapy).

- Cooper-DeHoff RM, Niemi M, Ramsey LB, Luzum JA, Tarkiainen EK, Straka RJ, Gong L, Tuteja S, Wilke RA, Wadelius M, Larson EA, Roden DM, Klein TE, Yee SW, Krauss RM, Turner RM, Palaniappan L, Gaedigk A, Giacomini KM, Caudle KE, Voora D. The Clinical Pharmacogenetics Implementation Consortium Guideline for SLCO1B1, ABCG2, and CYP2C9 genotypes and Statin-Associated Musculoskeletal Symptoms. Clin Pharmacol Ther 2022 May;111(5):1007-1021.
- Lipitor [package insert]. New York, NY: Pfizer Inc.; 2020.

Lovastatin
Mevacor®, Altoprev®, Advicor®

Increased Lovastatin Exposure — ACTIONABLE

SLCO1B1: Decreased Function

The patient's genotype is associated with possible increased lovastatin exposure. Patients may be at an increased myopathy risk. Consider an alternative statin based on disease-specific guidelines. If lovastatin use is warranted, consider limiting dose to ≤20 mg per day.

- Cooper-DeHoff RM, Niemi M, Ramsey LB, Luzum JA, Tarkiainen EK, Straka RJ, Gong L, Tuteja S, Wilke RA, Wadelius M, Larson EA, Roden DM, Klein TE, Yee SW, Krauss RM, Turner RM, Palaniappan L, Gaedigk A, Giacomini KM, Caudle KE, Voora D. The Clinical Pharmacogenetics Implementation Consortium Guideline for SLCO1B1, ABCG2, and CYP2C9 genotypes and Statin-Associated Musculoskeletal Symptoms. Clin Pharmacol Ther 2022 May;111(5):1007-1021.

Pitavastatin
Livalo®

Increased Pitavastatin Exposure — ACTIONABLE

SLCO1B1: Decreased Function

The patient's genotype is associated with possible increased pitavastatin exposure. Patients may be at an increased myopathy risk with doses >1 mg per day.

Consider starting pitavastatin at doses ≤2 mg. If doses >2 mg are needed, consider an alternative statin or combination therapy (e.g., pitavastatin plus a non-statin guideline directed medical therapy).

- Cooper-DeHoff RM, Niemi M, Ramsey LB, Luzum JA, Tarkiainen EK, Straka RJ, Gong L, Tuteja S, Wilke RA, Wadelius M, Larson EA, Roden DM, Klein TE, Yee SW, Krauss RM, Turner RM, Palaniappan L, Gaedigk A, Giacomini KM, Caudle KE, Voora D. The Clinical Pharmacogenetics Implementation Consortium Guideline for SLCO1B1, ABCG2, and CYP2C9 genotypes and Statin-Associated Musculoskeletal Symptoms. Clin Pharmacol Ther 2022 May;111(5):1007-1021.

Simvastatin
Zocor®

Increased Simvastatin Exposure — ACTIONABLE

SLCO1B1: Decreased Function

The patient's genotype is associated with possible increased simvastatin exposure. Patients may be at an increased myopathy risk with doses >20 mg.

Consider an alternative statin. If simvastatin use is warranted, consider limiting dose to <20 mg.

- Cooper-DeHoff RM, Niemi M, Ramsey LB, Luzum JA, Tarkiainen EK, Straka RJ, Gong L, Tuteja S, Wilke RA, Wadelius M, Larson EA, Roden DM, Klein TE, Yee SW, Krauss RM, Turner RM, Palaniappan L, Gaedigk A, Giacomini KM, Caudle KE, Voora D. The Clinical Pharmacogenetics Implementation Consortium Guideline for SLCO1B1, ABCG2, and CYP2C9 genotypes and Statin-Associated Musculoskeletal Symptoms. Clin Pharmacol Ther 2022 May;111(5):1007-1021.
- Zocor [package insert]. Whitehouse Station, NJ: Merck & Co., Inc.; 2021.

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Atomoxetine
Strattera®

Normal Atomoxetine Exposure
ACTIONABLE

CYP2D6: Normal Metabolizer

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

- Brown JT, Bishop JR, Sangkuhl K, Nurmi EL, Mueller DJ, Dinh JC, Gaedigk A, Klein TE, Caudle KE, McCracken JT, de Leon J, Leeder JS. Clinical Pharmacogenetics Implementation Consortium Guideline for Cytochrome P450 (CYP)2D6 Genotype and Atomoxetine Therapy. Clin Pharmacol Ther 2019 Jul;106(1):94-102.
- Atomoxetine [package insert]. Parsippany, NJ: Teva Pharmaceuticals; 2022.

Clozapine
Clozaril®

Non-Response to Clozapine
INFORMATIVE

CYP1A2: Normal Metabolizer - Higher Inducibility

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

- Bolla E, Bortolaso P, Ferrari M, Poloni N, Callegari C, Marino F, Lecchini S, Vender S, Cosentino M. Are CYP1A2*1F and *1C associated with clozapine tolerability?: a preliminary investigation. Psychiatry Res 2011 Oct;189(3):483.
- Ferrari M, Bolla E, Bortolaso P, Callegari C, Poloni N, Lecchini S, Vender S, Marino F, Cosentino M. Association between CYP1A2 polymorphisms and clozapine-induced adverse reactions in patients with schizophrenia. Psychiatry Res 2012 Dec;200(2-3):1014-7.
- Ozdemir V, Kalow W, Okey AB, Lam MS, Albers LJ, Reist C, Fourie J, Posner P, Collins EJ, Roy R. Treatment-resistance to clozapine in association with ultrarapid CYP1A2 activity and the C-->A polymorphism in intron 1 of the CYP1A2 gene: effect of grapefruit juice and low-dose fluvoxamine. J Clin Psychopharmacol 2001 Dec; 21(6):603-7.
- Koonrungsesomboon N, Khatsri R, Wongchompoo P, Teekachunhatean S. The impact of genetic polymorphisms on CYP1A2 activity in humans: a systematic review and meta-analysis. Pharmacogenomics J 2018 12;18(6):760-768.

Dexlansoprazole
Dexilant®, Kapidex®

Normal or Possible Slightly Decreased Exposure to Dexlansoprazole
INFORMATIVE

CYP2C19: Normal Metabolizer

The patient's genotype is predictive of normal metabolism but may be associated with a slightly decreased dexlansoprazole clinical exposure following standard dosing. Be alert for insufficient response, consider prescribing dexlansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

- Lima JJ, Thomas CD, Barbarino J, Desta Z, Van Driest SL, El Rouby N, Johnson JA, Cavallari LH, Shakhnovich V, Thacker DL, Scott SA, Schwab M, Uppugunduri CRS, Formea CM, Franciosi JP, Sangkuhl K, Gaedigk A, Klein TE, Gammal RS, Furuta T. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2C19 and Proton Pump Inhibitor Dosing. Clin Pharmacol Ther. 2020 Aug 8.

Dexmethylphenidate
Focalin®

Decreased Response to Dexmethylphenidate
INFORMATIVE

COMT: Intermediate COMT Activity

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

- Cheon KA, Jun JY, Cho DY. Association of the catechol-O-methyltransferase polymorphism with methylphenidate response in a classroom setting in children with attention-deficit hyperactivity disorder. Int Clin Psychopharmacol 2008 Sep;23(5):291-8.
- Kereszturi E, Tarnok Z, Bognar E, Lakatos K, Farkas L, Gadoros J, Sasvari-Szekely M, Nemoda Z. Catechol-O-methyltransferase Val158Met polymorphism is associated with methylphenidate response in ADHD children. Am J Med Genet B Neuropsychiatr Genet 2008 Dec;147B(8):1431-5.

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Fluvastatin
Lescol®

Increased Fluvastatin Exposure
ACTIONABLE

SLCO1B1: Decreased Function
CYP2C9: Normal Metabolizer

The patient's genotype is associated with possible increased fluvastatin exposure. Fluvastatin can be prescribed at standard label-recommended dosage and administration, but patients may be at an increased risk for myopathy with doses >40 mg per day.

- Cooper-DeHoff RM, Niemi M, Ramsey LB, Luzum JA, Tarkiainen EK, Straka RJ, Gong L, Tuteja S, Wilke RA, Wadelius M, Larson EA, Roden DM, Klein TE, Yee SW, Krauss RM, Turner RM, Palaniappan L, Gaedigk A, Giacomini KM, Caudle KE, Voora D. The Clinical Pharmacogenetics Implementation Consortium Guideline for SLCO1B1, ABCG2, and CYP2C9 genotypes and Statin-Associated Musculoskeletal Symptoms. Clin Pharmacol Ther 2022 May;111(5):1007-1021.

Lansoprazole
Prevacid®

Normal or Possible Slightly Decreased Exposure to Lansoprazole
ACTIONABLE

CYP2C19: Normal Metabolizer

The patient's genotype is predictive of normal metabolism but may be associated with a slightly decreased lansoprazole clinical exposure following standard dosing. Be alert for insufficient response, consider prescribing lansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

- Lima JJ, Thomas CD, Barbarino J, Desta Z, Van Driest SL, El Rouby N, Johnson JA, Cavallari LH, Shakhnovich V, Thacker DL, Scott SA, Schwab M, Uppugunduri CRS, Formea CM, Franciosi JP, Sangkuhl K, Gaedigk A, Klein TE, Gammal RS, Furuta T. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2C19 and Proton Pump Inhibitor Dosing. Clin Pharmacol Ther. 2020 Aug 8.

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

Decreased Response to Methylphenidate
INFORMATIVE

COMT: Intermediate COMT Activity

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

- Cheon KA, Jun JY, Cho DY. Association of the catechol-O-methyltransferase polymorphism with methylphenidate response in a classroom setting in children with attention-deficit hyperactivity disorder. Int Clin Psychopharmacol 2008 Sep;23(5):291-8.

Olanzapine
Zyprexa®

Non-Response to Olanzapine
INFORMATIVE

CYP1A2: Normal Metabolizer - Higher Inducibility

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

- Perera V, Gross AS, Polasek TM, Qin Y, Rao G, Forrest A, Xu J, McLachlan AJ. Considering CYP1A2 phenotype and genotype for optimizing the dose of olanzapine in the management of schizophrenia. Expert Opin Drug Metab Toxicol 2013 Sep;9(9):1115-37.
- Laika B, Leucht S, Heres S, Schneider H, Steimer W. Pharmacogenetics and olanzapine treatment: CYP1A2*1F and serotonergic polymorphisms influence therapeutic outcome. Pharmacogenomics J 2010 Feb;10(1):20-9.
- Koonrungsesomboon N, Khatsri R, Wongchompoo P, Teekachunhatean S. The impact of genetic polymorphisms on CYP1A2 activity in humans: a systematic review and meta-analysis. Pharmacogenomics J 2018 12;18(6):760-768.

Omeprazole
Prilosec®

Normal or Possible Slightly Decreased Exposure to Omeprazole
ACTIONABLE

CYP2C19: Normal Metabolizer

The patient's genotype is predictive of normal metabolism but may be associated with a slightly decreased omeprazole clinical exposure following standard dosing. Be alert for insufficient response, consider prescribing omeprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

- Lima JJ, Thomas CD, Barbarino J, Desta Z, Van Driest SL, El Rouby N, Johnson JA, Cavallari LH, Shakhnovich V, Thacker DL, Scott SA, Schwab M, Uppugunduri CRS, Formea CM, Franciosi JP, Sangkuhl K, Gaedigk A, Klein TE, Gammal RS, Furuta T. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2C19 and Proton Pump Inhibitor Dosing. Clin Pharmacol Ther. 2020 Aug 8.

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Pantoprazole
Protonix®

Normal or Possible Slightly Decreased Exposure to Pantoprazole
ACTIONABLE

CYP2C19: Normal Metabolizer

The patient's genotype is predictive of normal metabolism but may be associated with a slightly decreased pantoprazole clinical exposure following standard dosing. Be alert for insufficient response, consider prescribing pantoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

- Lima JJ, Thomas CD, Barbarino J, Desta Z, Van Driest SL, El Rouby N, Johnson JA, Cavallari LH, Shakhnovich V, Thacker DL, Scott SA, Schwab M, Uppugunduri CRS, Formea CM, Franciosi JP, Sangkuhl K, Gaedigk A, Klein TE, Gammal RS, Furuta T. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2C19 and Proton Pump Inhibitor Dosing. Clin Pharmacol Ther. 2020 Aug 8.

Pravastatin
Pravachol®

Increased Pravastatin Exposure
ACTIONABLE

SLCO1B1: Decreased Function

The patient's genotype is associated with possible increased pravastatin exposure. Pravastatin can be prescribed at standard label-recommended dosage and administration, but patients may be at an increased myopathy risk with doses >40 mg per day.

- Cooper-DeHoff RM, Niemi M, Ramsey LB, Luzum JA, Tarkiainen EK, Straka RJ, Gong L, Tuteja S, Wilke RA, Wadelius M, Larson EA, Roden DM, Klein TE, Yee SW, Krauss RM, Turner RM, Palaniappan L, Gaedigk A, Giacomini KM, Caudle KE, Voora D. The Clinical Pharmacogenetics Implementation Consortium Guideline for SLCO1B1, ABCG2, and CYP2C9 genotypes and Statin-Associated Musculoskeletal Symptoms. Clin Pharmacol Ther 2022 May;111(5):1007-1021.

Rosuvastatin
Crestor®

Increased Rosuvastatin Exposure
ACTIONABLE

SLCO1B1: Decreased Function

The patient's genotype is associated with possible increased rosuvastatin exposure. Rosuvastatin can be prescribed at standard label-recommended dosage and administration, but patients may be at an increased myopathy risk with doses >20 mg.

- Cooper-DeHoff RM, Niemi M, Ramsey LB, Luzum JA, Tarkiainen EK, Straka RJ, Gong L, Tuteja S, Wilke RA, Wadelius M, Larson EA, Roden DM, Klein TE, Yee SW, Krauss RM, Turner RM, Palaniappan L, Gaedigk A, Giacomini KM, Caudle KE, Voora D. The Clinical Pharmacogenetics Implementation Consortium Guideline for SLCO1B1, ABCG2, and CYP2C9 genotypes and Statin-Associated Musculoskeletal Symptoms. Clin Pharmacol Ther 2022 May;111(5):1007-1021.
- Crestor [package insert]. Wilmington, DE: AstraZeneca; 2020.

Tacrolimus
Prograf®

Insufficient Response to Tacrolimus
ACTIONABLE

CYP3A5: Intermediate Metabolizer

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

- Birdwell KA, Decker B, Barbarino JM, Peterson JF, Stein CM, Sadee W, Wang D, Vinks AA, He Y, Swen JJ, Leeder JS, van Schaik R, Thummel KE, Klein TE, Caudle KE, MacPhee IA. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guidelines for CYP3A5 Genotype and Tacrolimus Dosing. Clin Pharmacol Ther 2015 Jul; 98(1):19-24.

Tetrabenazine
Xenazine®

Normal Sensitivity to Tetrabenazine
ACTIONABLE

CYP2D6: Normal Metabolizer

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

- Xenazine [package insert]. Deerfield, IL: Lundbeck Inc.; 2017.

PROOVE GENOMICS

Proove Genomics, Inc.
655 W. Mitchell Street Arlington TX 76010

PATIENT INFORMATION		SPECIMEN DETAILS		PROVIDER INFORMATION	
NAME:	JACK NIMPTSCH	SAMPLE ID:	km222a-5	PROVIDER:	
DOB:	02/15/2026	SPECIMEN TYPE:	buccal swab	FACILITY:	
SEX:	Male	COLLECTION DATE:	02/10/2026		
DIAGNOSES:	A01.00, B00.521	RECEIVED DATE:	02/17/2026		
		REPORT DATE:	06/29/2026		

Tizanidine
Zanaflex®

Possible Non-Response to Tizanidine

INFORMATIVE

CYP1A2: Normal Metabolizer - Higher Inducibility

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

- Backman JT, Schröder MT, Neuvonen PJ. Effects of gender and moderate smoking on the pharmacokinetics and effects of the CYP1A2 substrate tizanidine. Eur J Clin Pharmacol 2008 Jan;64(1):17-24.
- Granfors MT, Backman JT, Neuvonen M, Ahonen J, Neuvonen PJ. Fluvoxamine drastically increases concentrations and effects of tizanidine: a potentially hazardous interaction. Clin Pharmacol Ther 2004 Apr;75(4):331-41.
- Al-Ghazawi M, Alzoubi M, Faidi B. Pharmacokinetic comparison of two 4 mg tablet formulations of tizanidine. Int J Clin Pharmacol Ther 2013 Mar;51(3):255-62.
- Koonrungsesomboon N, Khatsri R, Wongchompoo P, Teekachunhatean S. The impact of genetic polymorphisms on CYP1A2 activity in humans: a systematic review and meta-analysis. Pharmacogenomics J 2018 12;18(6):760-768.

Warfarin
Coumadin®

Dosing Adjustments are Expected

ACTIONABLE

CYP2C9: Normal Metabolizer
VKORC1: High Warfarin Sensitivity
CYP4F2: Reduced Activity

When initiating warfarin treatment for indications with a target INR of 2-3, consider one of the following methods to estimate dosing requirements:

FDA Label: CYP2C9 and VKORC1 genotype results indicate an expected therapeutic dose of 3-4 mg/day

Pharmacogenomics algorithms/calculators available at www.warfarindosing.org:

Caucasians and Asians: Use the patient's demographics and other clinical factors along with CYP2C9 and VKORC1 genotypes to calculate the expected therapeutic dose. Consider an additional 5-10% increase to the calculated dose.

Africans and African Americans: Use the patient's demographics and other clinical factors along with CYP2C9 and VKORC1 genotypes to calculate the expected therapeutic dose.

The provided recommendations in Africans and African Americans apply only when all the following CYP2C9 alleles are tested: *5, *6, *8, *11.

- Johnson JA, Caudle KE, Gong L, Whirl-Carrillo M, Stein CM, Scott SA, Lee MT, Gage BF, Kimmel SE, Perera MA, Anderson JL, Pirmohamed M, Klein TE, Limdi NA, Cavallari LH, Wadelius M. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for Pharmacogenetics-Guided Warfarin Dosing: 2017 Update. Clin Pharmacol Ther 2017 Sep;102(3):397-404.

Legend

Consider Alternatives: A medication has potentially reduced efficacy, increased toxicity or the patient has an increased risk for the indicated condition.

Use with Caution: Guidelines exist for adjusting dosage, increased vigilance or the patient has a moderate risk for the indicated condition.

Standard Precautions: The medication can be prescribed according to standard regimens or the patient's risk for the indicated condition is not increased.

ACTIONABLE — Recommendations based upon publications by international pharmacogenetic expert groups, consortia or regulatory bodies (CPIC, DPWG, FDA. EMA). Recommendations are suitable for implementation in a clinical setting. Guidelines may change as knowledge arises.

INFORMATIVE — There are insufficient or contradictory findings documenting the impact of a given genetic polymorphism or drug interaction. Recommendations are informative and implementation in a clinical setting is optional.

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DIAGNOSES:	A01.00, B00.521	RECEIVED DATE:	02/17/2026		
		REPORT DATE:	06/29/2026		

5 Test Details

Gene	Genotype	Phenotype
APOE	╬Á3/╬Á4	
BCHE	BCHE atypical T/T	**Normal butyrylcholinesterase activity (no atypical variant detected)**
COMT	Val158Met A/G	**Intermediate COMT Activity**
CYP1A2	*1A/*1F	**Normal Metabolizer - Higher Inducibility**
CYP2B6	*1/*1	**Normal Metabolizer**
CYP2C19	*1/*1	**Normal Metabolizer**
CYP2C9	*1/*1	**Normal Metabolizer**
CYP2D6	*1/*2	**Normal Metabolizer**
CYP3A5	*1/*3	**Intermediate Metabolizer**
CYP4F2	c.1297G>A A/G	**Reduced Activity**
F2	20210G>A G/G	**No Factor II (prothrombin) 20210G>A variant detected**
F5	Factor V Leiden C/C	**No Factor V Leiden variant detected**
MTHFR	677 G/A; 1298 T/G	**Reduced MTHFR activity**
SLCO1B1	*1/*5	**Decreased Function**
VKORC1	-1639G>A A/A	**High Warfarin Sensitivity**

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Patient Information Card

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

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PROOVE GENOMICS

REPORT DETAILS

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DOB: 02/15/2026

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CYP2C19	*1/*1	Normal Metabolizer
CYP2C9	*1/*1	Normal Metabolizer
CYP2D6	*1/*2	Normal Metabolizer
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