

PATIENT INFORMATION

NAME : Report,ID
ACC # : P241070004
DOB : 1/1/2001
SEX :

SPECIMEN DETAILS

SPECIMEN TYPE: Buccal Swab
COLLECTION DATE: 4/16/2024 4:21 PM
RECEIVED DATE: 4/16/2024 4:25 PM
REPORT DATE : 4/16/2024

PROVIDER INFORMATION

ORDERING PHYSICIAN: Doctor Test

PROVIDER:



Pharmacogenomic Test

Thank you for choosing Omni Health Diagnostics Test. This report contains four color-coded sections to easily show whether there is a genetic predisposition that may affect the patient's response to drugs or indicate the potential for adverse effects.



Rx Medication Review

a list of prescribed drugs and any gene or drug interactions



Drug Guide

a drug focused report by therapeutic category



Summary of Genes Tested

a summary of your results for all genes tested.



Detailed Explanation of Findings

a more informative view of drug and gene relationships

This is a matrix of all drugs currently prescribed and contemplated. The matrix determines if there is any drug-to-drug or drug-to-gene interaction for the medications provided. Visit the online portal to view how any changes to these drugs may impact risk of drug-to-drug or drug-to-gene interactions.

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

We show the patient's genotype and phenotype for each of the genes tested. This summary helps to quickly understand how your genes are impacting your medication's effectiveness.

We look at each gene separately and explains how the genotype and phenotype may impact drug responses. For each tested gene, the report shows how the phenotype impacts drugs, along with a list of the most commonly prescribed drugs affected by each gene.

Molecular PGX PGx - Infectious Disease Panel Report

Current Patient Medications: All provided medications as of 4/16/2024

	Azithromycin	Azithromycin - Standard Precautions
	Clindamycin	Clindamycin - Standard Precautions
	Clotrimazole	Clotrimazole - Standard Precautions
	Oseltamivir	Oseltamivir - Standard Precautions
	Tetracycline	Tetracycline - Standard Precautions

*Note: DDI = Drug-Drug Interactions as found by DrugBank

GUIDANCE LEVELS



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



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



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

Potentially Impacted Medications:

DRUG GUIDE

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

Category	Drug Class	Standard Precaution	Use With Caution	Consider Alternatives
Antidiabetic		tolbutamide (Orinase) Chlorpropamide (Diabinese) glimepiride (Amaryl) glipizide (Glucotrol) glyburide (Diabeta, Micronase) Nateglinide (Starlix) Repaglinide (Prandin, Prandimet)		
Anti-Infectives		efavirenz (Sustiva) clarithromycin (Biaxin) ritonavir (Norvir) saquinavir (Invirase) telithromycin (Ketek) erythromycin (E-Mycin) indinavir (Crixivan)	nelfinavir (Viracept)	
Cardiovascular	Antianginal	ranolazine (Ranexa)		
	Antiarrhythmics	Amiodarone (Nexterone, Pacerone) Disopyramide (Norpace) dofetilide (Tikosyn) flecainide (Tambocor) Mexiletine (Mexitol) propafenone (Rythmol) quinidine (Quinidine) Sotalol (Betapace, Sorine, Sotylize)		
	Anticoagulants	Apixaban (Eliquis) Betrixaban (Bevyxxa) Prasugrel (Effient) rivaroxaban (Xarelto) ticargelol (Brilinta) Vorapaxar (Zontivity) warfarin (Coumadin, Jantoven)		

DRUG GUIDE

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

Category	Drug Class	Standard Precaution	Use With Caution	Consider Alternatives
	Antihypertensive	carvedilol (Coreg) amlodipine (Norvasc) Atenolol (Tenormin) Bisoprolol (Zebeta) Candesartan cilexetil (Atacand) diltiazem (Cardizem) felodipine (Plendil) Irbesartan (Avapro) Labetalol (Normodyne, Trandate) lercanidipine (Zanidip) losartan (Cozaar, Hyzaar) metoprolol (Lopressor, Toprol) nebivolol (Bystolic) nifedipine (Adalat, Procardia) nisoldipine (Sular) nitrendipine (Baypress) Olmesartan (Benicar) propanolol (Inderal) Telmisartan (Micardis) timolol (Blocadren) Valsartan (Diovan, Entresto)	Azilsartan medoxomil (Edarbi, Edarbyclor)	
	Cholesterol Lowering	atorvastatin (Lipitor, Caduet) fluvastatin (Lescol) lovastatin (Mevacor, Altoprev, Advior) pravastatin (Pravachol) rosuvastatin (Crestor) simvastatin (FloLip, Zocor)		
	Cholinesterase Inhibitors	Donepezil (Aricept) Galantamine (Razadyne, Reminyl) Memantine (Namenda) Rivastigmine (Exelon)		
	Gastrointestinal		Dexlansoprazole (Dexilant, Kapidex) esomeprazole (Nexium) lansoprazole (Prevacid) omeprazole (Prilosec) pantoprazole (Protonix) rabeprazole (Aciphex)	

DRUG GUIDE

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

Category	Drug Class	Standard Precaution	Use With Caution	Consider Alternatives
	Antiemetics	Aprepitant (Emend-oral) Dolasetron (Anzemet) Dronabinol (Marinol) Granisetron (Sancuso, Sustol) Metoclopramide (Reglan) Ondansetron (Zofran, Zuplenz) Rolapitant (Varubi)		
Immunological		cyclosporine (Gengraf) hydrocortisone tacrolimus (Prograf, Protopic) zafirlukast (Accolate)		
	Cholinergic Agonists	Cevimeline (Evoxac)		
	Selective Immunosuppressants	Siponimod (Mayzent)		
Infections	Antifungals	Fluconazole (Diflucan) Itraconazole (Sporanox)	Voriconazole (Vfend)	
Miscellaneous Metabolic Agents		Eliglustat (Cerdelga)		
Neuropsychiatric	ADHD Drug	amphetamine (Adderall, Evekeo) atomoxetine (Strattera) Clonidine (Kapvay) Dextroamphetamine (Dexadrine) Guanfacine (Intuniv) Lisdexamfetamine (Vyvanse) Methylphenidate (Ritalin, Aptensio XR, Concerta, Metadate, Quillivant ER)		
	Antiaddictives	Lofexidine (Lucemyra)		

DRUG GUIDE

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

Category	Drug Class	Standard Precaution	Use With Caution	Consider Alternatives
	Anticonvulsants	tiagabine (Gabitril) carbamazepine (Tegretol, Carbatrol, Eptol) Felbamate (Felbatol) Lamotrigine (Lamictal) Levetiracetam (Keppra) Oxcarbazepine (Trileptal, Oxtellar XR) phenytoin (Dilantin) Pregabalin (Lyrica) Primidone (Mysoline) Topiramate (Topamax) Valproic acid (Topamax) zonisamide (Zonegran)		
	Antidepressant	venlafaxine (Effexor) vilazodone (Viibryd) paroxetine (Paxil, Brisdelle) amitriptyline (Elavil) bupropion (Wellbutrin, Zyban) desipramine (Norpramin) desvenlafaxine (Pristiq) Maprotiline (Ludiomil) mirtazapine (Remeron) nefazodone (Serzone) nortriptyline (Aventyl, Pamelor) fluoxetine (Prozac, Sarafem) Fluvoxamine (Luvox) Protriptyline (Vivactil) Vortioxetine (Trintellix) trazodone (Oleptro)	citalopram (Celexa) clomipramine (Anafranil) doxepin (Sinequan, Silenor, Prudoxin, Zonalon) escitalopram (Lexapro) sertraline (Zoloft) imipramine (Tofranil) Trimipramine (Surmontil)	
	Antiemetics	Meclizine (Antivert)		

DRUG GUIDE

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

Category	Drug Class	Standard Precaution	Use With Caution	Consider Alternatives
	Antipsychotic	perphenazine (Trilafon) aripiprazole (Abilify, Aristada) asenapine (Saphris) Brexipiprazole (Rexulti) Cariprazine (Vraylar) chlorpromazine (Thorazine) clozapine (Clozaril) Fluphenazine (Prolixin) haloperidol (Haldol) lloperidone (Fanapt) lurasidone (Latuda) olanzapine (Zyprexa) Pimozide (Orap) promazine (Sparine) quetiapine (Seroquel) risperidone (Risperdal) thioridazine (Mellaril) ziprasidone (Geodon)		
	Anxiolytic	alprazolam (Xanax) buspirone (BuSpar) Clonazepam (Klonopin) midazolam (Versed) triazolam (Halcion) zolpidem (Ambien)	phenobarbital diazepam (Valium) Clobazam (Onfi)	
	Other	Dextromethorphan (Nuedexta) Tetrabenazine (Xenazine) Valbenazine (Ingrezza)		
	Pain Management	duloxetine (Cymbalta)		
	Precognitive Drug	tacrine (Cognex)		
Oncology		ifosfamide (Ifex) docetaxel (Taxotere) vincristine (Vincasar, Oncovin)		
Other		caffeine theophylline (Theo-24, Elixophylline, Theochron)		
Pain Management		Acetylsalicylic acid (Aspirin)		

DRUG GUIDE

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

Category	Drug Class	Standard Precaution	Use With Caution	Consider Alternatives
Rheumatology	Muscle Relaxant	cyclobenzaprine (Flexaril, Amrix) Methocarbamol (Robaxin) Milnacipran (Savella) tizanidine (Zanaflex)		
	NSAID	ibuprofen (Advil, Motrin) Acetaminophen (Tylenol) celecoxib (Celebrex) Diclofenac (Voltaren) Flurbiprofen (Ansaid, Ocufen) Indomethacin (Indocin, Tivorbex) Ketorolac (Toradol) Meloxicam (Mobic) Nabumetone (Relafen) naproxen (Aleve) Piroxicam (Feldene) ropivacaine (Naropin)		
	Opioids	meperidine (Demerol) methadone (Dolophine) tramadol++ (Ultram) alfentanil (Alfenta) Benzhydrocodone (Apadaz) Buprenorphine (Butrans, Buprenex) buprenorphine/naloxone (Suboxone, Zubsolv, Bunavail) codeine++ (Codeine, Fioricet with codeine) fentanyl (Actiq, Duragesic, Sublimaze) hydrocodone++ (Vicodin) Hydromorphone (Dilaudid, Exalgo) Morphine (MS Contin) oxycodone++ (Oxycontin, Percocet) Oxymorphone (Opana, Numorphan)	tapentadol (Nucynta) carisoprodol++ (Soma)	
	Other	lidocaine (xylocaine, Lidoderm) zolmitriptan (Zomig)		
	Anti Hyperuricemic/Anti-Gout	Colchicine (Mitigare) Febuxostat (Uloric)		
	Immunomodulators	Apremilast (Otezla) Tofacitinib (Xeljanz)	Leflunomide (Arava)	

DRUG GUIDE












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

Category	Drug Class	Standard Precaution	Use With Caution	Consider Alternatives
Steroids		estradiol progesterone testosterone		
Urologicals	5-Alpha Reductase Inhibitors	Finasteride (Proscar)		
	Alpha-Blockers	Doxazosin (Cardura) Silodosin (Rapaflo) Tamsulosin (Flomax) Terazosin (Hytrin)		
	Antispasmodics for OAB	Darifenacin (Enablex) Mirabegron (Myrbetriq) Oxybutynin (Ditropan) Solifenacin (Vesicare) Tolterodine (Tolterodine)		
	Erectile Dysfunction	Avanafil (Stendra) sildenafil (Viagra) Tadalafil (Cialis) Vardenafil (Levitra)		

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

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

	Azilsartan medoxomil (Edarbi, Edarbyclor)	Potential risk (CYP2C19: Intermediate Metabolizer)
	imipramine (Tofranil)	Potential risk (CYP2C19: Intermediate Metabolizer)
	nelfinavir (Viracept)	Potential risk (CYP2C19: Intermediate Metabolizer)
	Trimipramine (Surmontil)	Potential risk (CYP2C19: Intermediate Metabolizer)
	rabeprazole (Aciphex)	Potential risk (CYP2C19: Intermediate Metabolizer)
	clomipramine (Anafranil)	Potential risk (CYP2C19: Intermediate Metabolizer)
	phenobarbital	Potential risk (CYP2C19: Intermediate Metabolizer)

	pantoprazole (Protonix)	Potential risk (CYP2C19: Intermediate Metabolizer)
	sertraline (Zoloft)	Potential risk (CYP2C19: Intermediate Metabolizer, CYP2B6: Normal Metabolizer)
	omeprazole (Prilosec)	Potential risk (CYP2C19: Intermediate Metabolizer)
	Clobazam (Onfi)	Potential risk (CYP2C19: Intermediate Metabolizer)
	Dexlansoprazole (Dexilant, Kapidex)	Potential risk (CYP2C19: Intermediate Metabolizer)
	doxepin (Sinequan, Silenor, Prudoxin, Zonalon)	Potential risk (CYP2C19: Intermediate Metabolizer)
	esomeprazole (Nexium)	Potential risk (CYP2C19: Intermediate Metabolizer)
	escitalopram (Lexapro)	Potential risk (CYP2C19: Intermediate Metabolizer)
	diazepam (Valium)	Potential risk (CYP2C19: Intermediate Metabolizer)
	lansoprazole (Prevacid)	Potential risk (CYP2C19: Intermediate Metabolizer)
	citalopram (Celexa)	Potential risk (CYP2C19: Intermediate Metabolizer)

SUMMARY OF YOUR EXTREME RISK GENES

The following is a summary of findings, including your genotype and phenotype for each of your Extreme risk genes.

Extreme Risk Genes

Gene (Genotype)	Phenotype (Gene expression)	What it means
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SUMMARY OF YOUR INCREASED RISK GENES

The following is a summary of findings, including your genotype and phenotype for each of your Increased risk genes.

Increased Risk Genes

Gene (Genotype)	Phenotype (Gene expression)	What it means
CYP2C19 *1/*7	Intermediate Metabolizer	This genotype predicts less than normal metabolic enzyme activity for the enzyme controlled by this gene. Increased potential for drug accumulation and adverse drug reactions. ++ Caution should be observed with pro-drugs, e.g., clopidogrel. Less than normal active metabolite formation is expected and a full effect of the drug may not be achieved.
DPYD DPYD: *1/*1 HapB3: C/C rs67376798: T/T	Intermediate Metabolizer	The fluoropyrimidine anticancer drug 5-fluorouracil (5-FU) and its oral prodrug capecitabine are frequently used in the treatment of a variety of cancers, including breast, colorectal, head and neck and gastric cancer. The dihydropyrimidine dehydrogenase enzyme (DPD), encoded by the gene DPYD, converts the active drug 5-FU into an inactive metabolite. This patient has a mutation that results in reduced DPD activity which may result in decreased clearance of the active drug 5-FU leading to increased drug exposure and adverse side effects. Consider reducing initial dose by 25% and monitor closely for adverse effects and clinical efficacy.

SUMMARY OF YOUR NORMAL RISK GENES

The following is a summary of findings, including your genotype and phenotype for each of your Normal risk genes.

Normal Risk Genes

Gene (Genotype)	Phenotype (Gene expression)	What it means
CYP2B6 *1/*1	Normal Metabolizer	The patient is an extensive (normal) metabolizer, and changes in metabolism are not generally expected.

DETAILED EXPLANATION OF YOUR CYP2C19 GENE

The following is a detailed explanation of your CYP2C19 gene, including your genotype, phenotype, and a common medicines metabolized by the gene.

Increased Risk

Gene	Phenotype (Gene expression)	What it means
CYP2C19 *1/*7	Intermediate Metabolizer	This genotype predicts less than normal metabolic enzyme activity for the enzyme controlled by this gene. Increased potential for drug accumulation and adverse drug reactions. ++ Caution should be observed with pro-drugs, e.g., clopidogrel. Less than normal active metabolite formation is expected and a full effect of the drug may not be achieved.

Common Medicines Metabolized by CYP2C19

Drug Type	Generic Name (Brand Name)
Antivirals, Hormones, and Anti-Diabetics	efavirenz (Sustiva) *, nelfinavir (Viracept), progesterone *, tolbutamide (Orinase) *
GERD	esomeprazole (Nexium), lansoprazole (Prevacid), omeprazole (Prilosec), pantoprazole (Protonix), rabeprazole (Aciphex)
Neuropsychiatric	citalopram (Celexa), clomipramine (Anafranil) *, diazepam (Valium), doxepin (Sinequan, Silenor, Prudoxin, Zonalon), escitalopram (Lexapro), imipramine (Tofranil), paroxetine (Paxil) *, perphenazine (Trilafon) *, phenobarbital, phenytoin (Dilantin), sertraline (Zoloft), venlafaxine (Effexor) *, vilazodone (Viibryd) *
Oncologic	tamoxifen ++
Pain	carisoprodol ++ (Soma), ibuprofen *, meperidine (Demerol), methadone, tapentadol (Nucynta)

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

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

DETAILED EXPLANATION OF YOUR CYP2B6 GENE

The following is a detailed explanation of your CYP2B6 gene, including your genotype, phenotype, and a common medicines metabolized by the gene.

Normal Risk

Gene	Phenotype (Gene expression)	What it means
CYP2B6 *1/*1	Normal Metabolizer	The patient is an extensive (normal) metabolizer, and changes in metabolism are not generally expected.

Common Medicines Metabolized by CYP2B6

Drug Type	Generic Name (Brand Name)
Miscellaneous	bupropion, clopidogrel (Plavix) *, cyclophosphamide (Cytoxan)++, efavirenz (Sustiva), ibuprofen (Advil, Motrin) *, ifosfamide meperidine, methadone (Demerol) , sertraline (Zoloft), tramadol (Ultram) *

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

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

METHOD SUMMARY

Genetic analysis was performed via Real-Time Polymerase Chain Reaction (PCR). Genotyping for Single Nucleotide Polymorphism (SNP) was performed using TaqMan® SNP Genotyping Assays, following the extraction of the DNA. For CYP2D6, a separate and distinct PCR reaction was performed, using a TaqMan® Copy Number Assay, to measure the number of CYP2D6 copies. The genetic variation and mutation analysis was performed at Omni Health Diagnostics in accordance with the protocols developed by Omni Health Diagnostics. This test is a Laboratory Developed Test (LDT) and has not been approved by the U.S. Food & Drug Administration.

LOCI / MUTATIONS TESTED

CYP2B6: *1, *5, *7, *9, *18, *22
CYP2C19: *1, *2, *3, *4, *5, *6, *7, *8, *9, *10, *17
DPYD:

FINAL REPORT REVIEWED AND RELEASED BY:

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CLIA #: 45D2089485

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. This assay does not detect the decreased activity CYP2C9*8 (rs7900194) allele and may potentially misclassify CYP2C9 intermediate or poor metabolizers as normal metabolizers. CYP2C9*8 is most prevalent in African populations with an allele frequency of up to 5% (Pratt VM, et al. J Mol Diagn. 2019).

Methodology: PCR based assays detect listed alleles, including all common and most rare variants with known clinical significance at analytical sensitivity and specificity >99%. The assays were developed to detect polymorphisms in genes encoding drug metabolism enzymes (DMEs) and associated transport proteins. This panel provides coverage of essential, commonly studied markers within CYP2D6, CYP2C9, CYP2C19, and other important DME and clinical research genes.

SmartPGx Disclaimer: The information presented on this report is provided as general educational health information. The content is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Only a physician, pharmacist or other healthcare professional should advise a patient on the use of the medications prescribed. The pharmacogenetic assay involves use of reporting software and genotype-phenotype associations performed by SmartPGx. The software has not been evaluated by the Food and Drug Administration. The software, and the report generated by the software, is not intended to diagnose, treat, cure, or prevent any disease. A qualified designee within the lab uses SmartPGx to generate and subsequently review the report. The pharmacogenetic report is one of multiple pieces of information that clinicians should consider in guiding their therapeutic choice for each patient. It remains the responsibility of the health-care provider to determine the best course of treatment for a patient. Adherence to dose guidelines does not necessarily assure a successful medical outcome.

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.

PATIENT INFORMATION CARD

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



Patient: Report,ID	DOB: 1/1/2001	Requisition ID P241070004	CYP2C19	*1/*7	Intermediate Metabolizer
Pharmacogenetic Test Summary					
CYP2B6	*1/*1	Normal Metabolizer			
DPYD	G/A	Intermediate Metabolizer			

↑ **Fold**