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# Personalized Pharmacogenomic Report

## ID: Z77JJ4845A

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## WHAT YOU NEED TO KNOW:

Pharmacogenomics combines pharmacology (the study of drugs) and genomics (the study of genes) and involves how a person's DNA can affect their response or risk for Adverse Drug Reactions (ADRs) to certain medications. This report provides educational information based on the medications you uploaded as well as a common set of medications, based on your RAW DNA data.

### YOUR GENETIC MAKEUP

We analyzed your genetic makeup and found:

**4 genetic signatures**

These genetic signatures suggest you might have drug-gene interactions with certain medications.

### YOUR GENETIC SIGNATURE

Specific pharmacogenomic markers, also known as star (*) alleles, define your genetic signature. The Star Allele naming system uses a combination of letters and numbers rather than genomic positions to describe certain genetic variations. The process allows professionals (like your doctor, pharmacist or genetic counselor) to quickly identify important genetic variations that may alter the functional status of genes (whether they work like normal). The ? denotes that a star allele is present, but without further DNA analysis determination of which star allele is not possible. The *1 allele typically denotes someone with "normal" function, while other star alleles carry DNA variants that may result in proteins that don't function properly.

**The following non-*1/*1 star alleles were identified:**

CYP4F2 *1 / *3
IFNL3 *1 / rs12979860 variant (T)
SLCO1B1 *20 / ?
UGT1A1 *1 / *80

*Please consult a physician about your star alleles. I forgot what to put here. :/*

### YOUR GENE-DRUG ANALYSIS

1. An analysis of your DNA with a database of all FDA-approved medications identified:

**4073 potential pharmacogenomic interactions**

2. From the self-provided list of medications we found:

**One or more DNA variants that may influence your response or risk of adverse side effects to:**

| | | |
|---|---|---|
| **LISINOPRIL** | **METFORMIN** | **SIMVASTATIN** |

3. From a set of 15 medications (listed below) we found:

**One or more DNA variants that may influence your response or risk of adverse side effects to:**

| | | |
|---|---|---|
| **ACETAMINOPHEN** | **AMPHETAMINE / DEXTROAMPHETAMINE** | **ASPIRIN** |
| | | **CODEINE** |
| **ESCITALOPRAM** | **FEXOFENADINE** | **FLUOROURACIL** |
| **IBUPROFEN** | **METHYLPHENIDATE** | **NAPROXEN** |
| **OMEPRAZOLE** | **PAROXETINE** | **PROPOFOL** |
| **SERTRALINE** | **SUCCINYLCHOLINE** | |

*You should discuss these findings with your healthcare provider.*

PLEASE READ THE DISCLAIMERS AT THE END OF THE REPORT. IT IS IMPORTANT THAT YOU DISCUSS THE RESULTS IN THIS REPORT WITH YOUR HEALTH CARE PROVIDER BEFORE STARTING, STOPPING OR MAKING ANY OTHER CHANGES TO ANY PRESCRIPTION REGIMEN, TREATMENT, OR THERAPIES WITH WHICH YOU ARE INVOLVED.

## WHAT YOUR HEALTHCARE PROVIDER NEEDS TO KNOW:

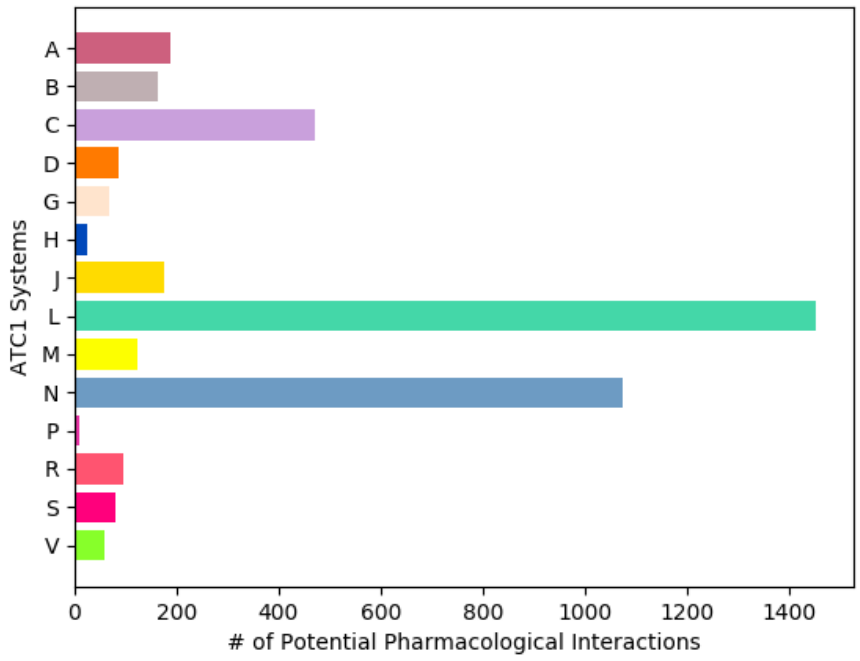
### GENETIC OVERVIEW

The MyGenome$_{Rx}$ platform analyzes DNA for PharmGKB Level 1, Level 2, and Level 3 potential drug-gene interactions using a database of all FDA-approved medications. PharmGKB Level 1 clinical Rx annotation levels have the most evidence[2], and in some cases medication guidelines have been established based on a persons' genetic background. MyGenome$_{Rx}$ analysis of the raw DNA file provided identified:

**4073 potential pharmacogenomics interactions**

The potential pharmacogenomic interactions have been classified based on the Anatomical Therapeutic Chemical (ATC) system 3 that classifies active ingredients of drugs according to the organ or system on which they act. A single drug may have more than one ATC code, and so potential drug-gene interactions may be listed in more than one ATC group. For example, aspirin is listed in categories A (for local oral treatment, B (for use as a platelet inhibitor, N (for use as analgesic and antipyretic); and C (when in combination with perindopril and amlodipine).

The graph shows the **4073** potential pharmacogenomics interactions using ATC single letters: A, GI (Alimentary) tract and metabolism; B, Blood and blood forming organs; C, Cardiovascular system; D, Dermatologicals: G, Genito-urinary system and sex hormones; H, Systemic hormonal preparations excluding sex hormones and insulin; J, Anti-infectives; L, Oncology and immunomodulating agents; M, Musculoskeletal system; N, Nervous system; P, Antiparasitic products, insecticides, and repellents; R, Respiratory system; S, Sensory organs; V, various.



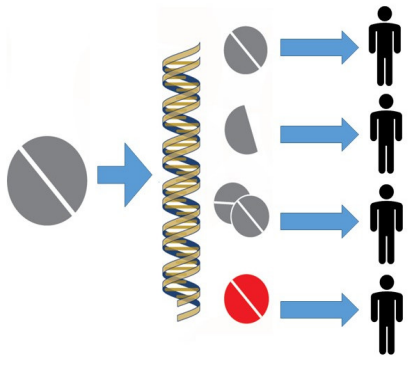
## GENETIC SIGNATURE

The star (*) allele nomenclature system is used to describe important pharmacogenetic alleles. The *1 allele typically denotes the most common allele found across populations. All other star alleles carry one or more variants. For the purposes of this report, *1/*1 is assumed if no star alleles were identified. The table below indicates the star alleles identified and the medications whose side effects or response may be altered.

| Gene | Star Allele/Gene Variant | Medications whose side effects/response may be altered |
|---|---|---|
| CYP4F2 | *1 / *3 | ACENOCOUMAROL, ASPIRIN, CLOPIDOGREL, PHENPROCOUMON, PHYTONADIONE, VITAMIN E, VITAMIN K, WARFARIN |
| IFNL3 | *1 / rs12979860 variant (T) | INTERFERONS, PEGINTERFERON ALFA-2A, PEGINTERFERON ALFA-2B, RIBAVIRIN, TELAPREVIR |
| SLCO1B1 | *20 / ? | AMPRENAVIR, ATORVASTATIN, CERIVASTATIN, CYCLOPHOSPHAMIDE, CYTARABINE, DAUNORUBICIN, DOCETAXEL, DOXORUBICIN, ENALAPRIL, EPIRUBICIN, ETOPOSIDE, FLUDARABINE, FLUOROURACIL, FLUVASTATIN, HMG COA REDUCTASE INHIBITORS, IDARUBICIN, IRINOTECAN, MERCAPTOPURINE, METHOTREXATE, MITOXANTRONE, MYCOPHENOLATE MOFETIL, MYCOPHENOLIC ACID, PITAVASTATIN, PRAVASTATIN, REPAGLINIDE, RIFAMPIN, ROCURONIUM, ROSIGLITAZONE, ROSUVASTATIN, SIMVASTATIN, SORAFENIB |
| UGT1A1 | *1 / *80 | ATAZANAVIR, CARVEDILOL, DEFERASIROX, INDINAVIR, RISPERIDONE, WARFARIN |

## DETAILED DRUG-GENE REPORT

The MyGenome platform analyzes over 1 million rsIDs, from 2038 different genes to generate the information for a standard set of mediations as well as any medications provided by the client. A quick summary and more detailed information on drug-gene interactions identified are provided below. Information related to the gene, reference SNP cluster ID numbers (rsID) 1 , PharmGKB Clinical Evidence Level 2 and ATC organ/system classifications 3 are included. If no pharmacogenomic issues were identified, this is noted.

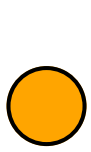


### SUMMARY KEY

Below is a table of the symbols used in the quick summary along with classification information. The symbols in the quick summary are based on the variants identified in the RAW DNA file.

| SYMBOL | CLASSIFICATION INFORMATION |
| --- | --- |
|  | No variants detected in normal drug response expected or no increased risk for side effects. |
|  | One or more variants were identified that are associated with an increased risk for side effects or altered drug response. |
|  | One or more variants were identified that may substantially alter drug response or side effect profile, and a change in dosing or alternative drug may be needed. |

**CLIENT PROVIDED LIST OF MEDICATIONS:**
Lisinopril, Metformin, Simvastatin

| MEDICATION | RESULTS | |
|---|---|---|
| LISINOPRIL<br><br>CARDIOVASCULAR |  | You have 4 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs11122576 (AGT), rs510769 (OPRM1), rs4291 (ACE), rs2281617 (OPRM1), and rs12364283 (DRD2).* |
| |  | You have 5 genes associated with side effects for this drug.<br>*The rsIDs analyzed for the drug were rs11122576 (AGT), rs3788853 (XPNPEP2), rs12143842, rs4291 (ACE), rs4532 (DRD1), and rs1799722 (BDKRB2).* |
| METFORMIN<br><br>ALIMENTARY (GI) TRACT AND METABOLISM |  | You have 11 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs12208357 (SLC22A1), rs5219 (KCNJ11), rs628031 (SLC22A1), rs784888 (SP1), rs510769 (OPRM1), rs316019 (SLC22A2), rs3792269 (CAPN10), rs2281617 (OPRM1), rs12364283 (DRD2), rs8192675 (SLC2A2), rs2282143 (SLC22A1), rs12943590 (SLC47A2), rs34834489 (SLC47A2), rs7541245 (FMO5), rs622342 (SLC22A1), and rs2076828 (SLC22A3).* |
| |  | You have 1 gene associated with side effects for this drug.<br>*One rsID was analyzed for the drug, rs4532 (DRD1).* |
| SIMVASTATIN<br><br>CARDIOVASCULAR<br><br>ALIMENTARY (GI) TRACT AND METABOLISM |  | You have 20 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs5882 (CETP), rs662799 (APOA5), rs1128503 (ABCB1), rs17244841 (HMGCR), rs4823613 (PPARA), rs1800588 (LIPC), rs662 (PON1), rs11716445 (RHOA), rs2231142 (ABCG2), rs717620 (ABCC2), rs510769 (OPRM1), rs1137101 (LEPR), rs17238540 (HMGCR), rs2740574 (CYP3A4), rs2003569 (UGT1A9), rs2281617 (OPRM1), rs20455 (KIF6), rs2306283 (SLCO1B1), rs3917643 (F3), rs4253728 (PPARA), rs4149081 (SLCO1B1), rs12364283 (DRD2), rs12487736 (SCAP), and rs4673 (CYBA).* |
| |  | You have 10 genes associated with side effects for this drug.<br>*The rsIDs analyzed for the drug were rs1532624 (CETP), rs4693075 (COQ2), rs2230806 (ABCA1), rs445925, rs429358 (APOE), rs1008805 (CYP19A1), rs4149056 (SLCO1B1), rs17244841 (HMGCR), rs10455872 (LPA), rs4532 (DRD1), rs1128503 (ABCB1), rs247616, rs1346268, and rs1719247.* |

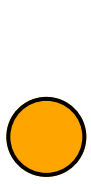
## STANDARD SET OF MEDICATIONS

We analyze a standard set of medications for all clients. They include Analgesics: *acetaminophen*, *codeine*; Anesthetic agents: *propofol*; Anticancer agent: *5-fluorouracil*; Antidepressants: *escitalopram*, *paroxetine*, *sertraline*; Antihistamine: *fexofenadine*; Muscle relaxant: *succinylcholine*; Non-steroidal anti-inflamatory drugs (NSAIDs): *aspirin*, *ibuprofen*, *naproxen*; Proton Pump Inhibitor: *omeprazole*; Stimulants: *amphetamine/dextroamphetamine*, *methylphenidate*.

| MEDICATION | RESULTS | |
|---|---|---|
| ACETAMINOPHEN (TYLENOL)<br>NERVOUS SYSTEM |  | You have 5 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs224534 (TRPV1), rs1902023 (UGT2B15), rs510769 (OPRM1), rs2281617 (OPRM1), rs2070995 (KCNJ6), rs12364283 (DRD2), and rs1799971 (OPRM1).* |
| |  | You have 6 genes associated with side effects for this drug.<br>*The rsIDs analyzed for the drug were rs1042640 (UGT1A), rs2228246 (PLCG1), rs4532 (DRD1), rs10929303 (UGT1A), rs8330 (UGT1A), rs12746200 (PLA2G4A), rs1805034 (TNFRSF11A), and rs8330 (UGT1A;UGT1A9).* |
| AMPHETAMINE / DEXTROAMPHETAMINE (ADDERALL) |  | You have 2 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs2281617 (OPRM1), rs12364283 (DRD2), and rs510769 (OPRM1).* |
| |  | You have 1 gene associated with side effects for this drug.<br>*One rsID was analyzed for the drug, rs4532 (DRD1).* |
| ASPIRIN<br><br>CARDIOVASCULAR NERVOUS SYSTEM BLOOD AND BLOOD FORMING ORGANS ALIMENTARY (GI) TRACT AND METABOLISM MUSCULO-SKELETAL SYSTEM |  | You have 13 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs5985 (F13A1), rs12041331 (PEAR1), rs1105879 (UGT1A6), rs510769 (OPRM1), rs2281617 (OPRM1), rs1613662 (GP6), rs1065776 (P2RY1), rs2070995 (KCNJ6), rs12364283 (DRD2), rs2070959 (UGT1A6), rs1131882 (TBXA2R), rs2108622 (CYP4F2), rs2768759 (NTRK1), rs1062535 (ITGA2), rs10306114 (PTGS1), and rs1126643 (ITGA2).* |

| MEDICATION | RESULTS | |
|---|---|---|
| |  | You have 32 genes associated with side effects for this drug.<br>*The rsIDs analyzed for the drug were rs11819745 (THRA), rs3856806 (PPARG), rs7862221 (TSC1), rs1126510 (PTGIR), rs1047626 (SLC30A9), rs4291 (ACE), rs3129294 (HLA-DPB2), rs3130100 (ZBTB22), rs1805034 (TNFRSF11A), rs1059288 (TAPBP), rs20417 (PTGS2), rs2108622 (CYP4F2), rs7551789 (PTGER3), rs3097671 (HLA-DPB1), rs1042151 (HLA-DPB1), rs2070959 (UGT1A6), rs2071888 (TAPBP), rs2768759 (NTRK1), rs1131882 (TBXA2R), rs1105879 (UGT1A6), rs11587213 (FCER1G), rs4532 (DRD1), rs2075797 (PTGER2), rs12746200 (PLA2G4A), rs6065 (GP1BA), rs1800469 (TGFB1), rs10279545 (COL26A1), rs4271002 (NAT2), rs1050891 (HNMT), rs1074373, rs2228246 (PLCG1), rs16973225, rs2243250 (IL4), rs730012 (LTC4S), rs3775291 (TLR3), rs4523 (TBXA2R), rs3818822 (CHIA), and rs10306114 (PTGS1).* |
| |  | You have 3 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs510769 (OPRM1), rs2281617 (OPRM1), rs2070995 (KCNJ6), rs12364283 (DRD2), and rs1799971 (OPRM1).* |
| CODEINE<br>(TYLENOL #3)<br>RESPIRATORY SYSTEM<br>NERVOUS SYSTEM |  | You have 13 genes associated with side effects for this drug.<br>*The rsIDs analyzed for the drug were rs9282564 (ABCB1), rs1128503 (ABCB1), rs41269255 (POM121L2), rs1799971 (OPRM1), rs1125394 (DRD2), rs2070762 (TH), rs510769 (OPRM1), rs4680 (COMT), rs1076560 (DRD2), rs2654754 (DRD3), rs4532 (DRD1), rs6928499 (CNR1), rs4633 (COMT), rs589046 (OPRM1), rs3745274 (CYP2A7P1;CYP2B6), rs1051730 (CHRNA3), rs6280 (DRD3), rs7597593 (ZNF804A), rs36024412 (CRYBG2), rs9288993 (DRD3), and rs324029 (DRD3).* |
| ESCITALOPRAM<br>(LEXAPRO)<br>NERVOUS SYSTEM |  | You have 15 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs915120 (GRK5), rs11144870 (RFK), rs1126757 (IL11), rs510769 (OPRM1), rs1360780 (FKBP5), rs2227631 (SERPINE1), rs2069526 (CYP1A2), rs61888800 (BDNF), rs41271330 (BMP5), rs6265 (BDNF), rs11580409 (ERICH3), rs2281617 (OPRM1), rs2235015 (ABCB1), rs4646425 (CYP1A2), rs9316233 (HTR2A), rs4646427 (CYP1A2), rs948854 (GAL), rs10975641 (GLDC), rs9380524 (FKBP5), and rs12364283 (DRD2).* |

| MEDICATION | RESULTS | |
|---|---|---|
| |  | You have 6 genes associated with side effects for this drug.<br>*The rsIDs analyzed for the drug were rs6311 (HTR2A), rs10514475, rs352428, rs4532 (DRD1), rs13306278 (COMT), rs1360780 (FKBP5), rs11568817 (HTR1B), rs962369 (BDNF), and rs6313 (HTR2A).* |
| FEXOFENADINE (ALLEGRA)<br>RESPIRATORY SYSTEM |  | You have 3 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs2281617 (OPRM1), rs2306168 (SLCO2B1), rs12364283 (DRD2), and rs510769 (OPRM1).* |
| |  | You have 1 gene associated with side effects for this drug.<br>*One rsID was analyzed for the drug, rs4532 (DRD1).* |
| FLUOROURACIL<br><br>ANTINEOPLASTIC (ONCOLOGY) AND IMMUNOMODULATING AGENTS |  | You have 27 genes associated with responses for this drug.<br>*The rsIDs analyzed for the drug were rs3917412 (SELE), rs861539 (KLC1;XRCC3), rs2291078 (UMPS), rs1047840 (EXO1), rs2297595 (DPYD), rs12659 (SLC19A1), rs2075685 (TMEM167A;XRCC4), rs662 (PON1), rs115232898 (DPYD), rs6907567 (SLC22A16), rs714368 (SLC22A16), rs1801133 (MTHFR), rs510769 (OPRM1), rs1056836 (CYP1B1), rs3772809 (UMPS), rs2854744 (IGFBP3), rs17160359 (ABCB1), rs1979277 (SHMT1), rs9679162 (GALNT14), rs115632870 (DPYD), rs2281617 (OPRM1), rs1056515 (RGS5), rs13181 (ERCC2), rs351855 (FGFR4), rs2289310 (DLG5), rs9380142 (HLA-G), rs2236722 (CYP19A1), rs3218592 (REV3L), rs17109924 (LGR5), rs3772810 (UMPS), rs17431184 (PTEN), rs1801265 (DPYD), rs72728438 (DPYD), rs12364283 (DRD2), rs12613732 (GALNT14), rs2293347 (EGFR), rs1801160 (DPYD), and rs1801159 (DPYD).* |
| |  | You have 24 genes associated with side effects for this drug.<br>*The rsIDs analyzed for the drug were rs79430272 (PIK3R2), rs17626122 (PARD3B), rs225440 (ABCG1), rs10937158 (ABCC5), rs1801266 (DPYD), rs1801268 (DPYD), rs7325568, rs1800566 (NQO1), rs20572 (CBR1), rs115232898 (DPYD), rs3212986 (ERCC1), rs3740066 (ABCC2), rs6907567 (SLC22A16), rs714368 (SLC22A16), rs59086055 (DPYD), rs2231142 (ABCG2), rs1056836 (CYP1B1), rs1042522 (TP53), rs2960436, rs1801516 (ATM), rs11636687, rs9679162 (GALNT14), rs3918290 (DPYD), rs55886062 (DPYD), rs115457081 (IRS1), rs11615 (ERCC1), rs4149056 (SLCO1B1), rs4532 (DRD1), rs75017182 (DPYD), rs2273697 (ABCC2), rs67376798 (DPYD), rs11479 (TYMP), rs7194667 (ABCC11), rs25487 (XRCC1), rs1695 (GSTP1), rs56022120 (PIK3R2), rs2292997, rs12248560 (CYP2C19), rs1801160 (DPYD), rs4244285 (CYP2C19), and rs2228100 (ALDH3A1).* |

| MEDICATION | RESULTS | |
|---|---|---|
| IBUPROFEN (ADVIL, MOTRIN, NUPRIN) CARDIOVASCULAR MUSCULO-SKELETAL SYSTEM GENITO-URINARY SYSTEM |  | You have 3 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs20417 (PTGS2), rs2281617 (OPRM1), rs12364283 (DRD2), and rs510769 (OPRM1).* |
| |  | You have 5 genes associated with side effects for this drug. *The rsIDs analyzed for the drug were rs2228246 (PLCG1), rs4532 (DRD1), rs1805034 (TNFRSF11A), rs12746200 (PLA2G4A), and rs616147 (MOBP).* |
| METHYLPHENIDATE (RITALIN) NERVOUS SYSTEM |  | You have 16 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs9901675 (FXR2), rs10420097 (ZNF211), rs1355368 (ADGRL3), rs2071421 (ARSA), rs11552708 (SENP3), rs2070762 (TH), rs510769 (OPRM1), rs757978 (FARP2), rs11559290 (ETFDH), rs2281617 (OPRM1), rs4680 (COMT), rs12364283 (DRD2), rs10413455 (ZNF134), rs4805162 (ZNF565), rs3210967 (ZDHHC7), rs3810818 (CORO7), and rs751655 (OPCML).* |
| |  | You have 3 genes associated with side effects for this drug. *The rsIDs analyzed for the drug were rs2283265 (DRD2), rs6280 (DRD3), and rs4532 (DRD1).* |
| NAPROXEN (ALEVE, MENSTRIDOL) MUSCULO-SKELETAL SYSTEM GENITO-URINARY SYSTEM |  | You have 2 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs2281617 (OPRM1), rs12364283 (DRD2), and rs510769 (OPRM1).* |
| |  | You have 4 genes associated with side effects for this drug. *The rsIDs analyzed for the drug were rs2228246 (PLCG1), rs1805034 (TNFRSF11A), rs12746200 (PLA2G4A), and rs4532 (DRD1).* |
| OMEPRAZOLE (PRILOSEC) ALIMENTARY (GI) TRACT AND METABOLISM |  | You have 3 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs16944 (IL1B), rs2281617 (OPRM1), rs12364283 (DRD2), and rs510769 (OPRM1).* |
| |  | You have 1 gene associated with side effects for this drug. *One rsID was analyzed for the drug, rs4532 (DRD1).* |

| MEDICATION | RESULTS | |
|---|---|---|
| PAROXETINE (PAXIL) NERVOUS SYSTEM |  | You have 15 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs4148740 (ABCB1), rs7787082 (ABCB1), rs2472304 (CYP1A2), rs2216711 (GDNF), rs2470890 (CYP1A2), rs10280101 (ABCB1), rs153560 (REEP5), rs510769 (OPRM1), rs2973049 (GDNF), rs4680 (COMT), rs1360780 (FKBP5), rs6295 (HTR1A), rs2227631 (SERPINE1), rs61888800 (BDNF), rs2235067 (ABCB1), rs6265 (BDNF), rs12720067 (ABCB1), rs2281617 (OPRM1), rs495794 (SRP19), rs2235015 (ABCB1), rs1364043 (HTR1A), rs6280 (DRD3), rs4646427 (CYP1A2), rs948854 (GAL), rs10042486 (HTR1A), rs11983225 (ABCB1), rs11042725 (ADM), rs12364283 (DRD2), rs10248420 (ABCB1), and rs153549 (REEP5).* |
| |  | You have 6 genes associated with side effects for this drug. *The rsIDs analyzed for the drug were rs6311 (HTR2A), rs10514475, rs762551 (CYP1A2), rs4532 (DRD1), rs1360780 (FKBP5), rs13306278 (COMT), rs1160351 (MDGA2), and rs6313 (HTR2A).* |
| PROPOFOL (DIPRIVAN) NERVOUS SYSTEM |  | You have 4 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs3745274 (CYP2B6), rs510769 (OPRM1), rs1128503 (ABCB1), rs2281617 (OPRM1), and rs12364283 (DRD2).* |
| |  | You have 4 genes associated with side effects for this drug. *The rsIDs analyzed for the drug were rs1801133 (MTHFR), rs1042718 (ADRB2), rs4532 (DRD1), rs58597806 (UGT1A9), and rs1801131 (MTHFR).* |
| SERTRALINE (ZOLOFT) NERVOUS SYSTEM |  | You have 9 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs948854 (GAL), rs61888800 (BDNF), rs153560 (REEP5), rs6265 (BDNF), rs510769 (OPRM1), rs2281617 (OPRM1), rs1360780 (FKBP5), rs12364283 (DRD2), rs495794 (SRP19), rs2235015 (ABCB1), rs2227631 (SERPINE1), and rs153549 (REEP5).* |
| |  | You have 4 genes associated with side effects for this drug. *The rsIDs analyzed for the drug were rs6311 (HTR2A), rs10514475, rs4532 (DRD1), rs13306278 (COMT), rs1360780 (FKBP5), and rs6313 (HTR2A).* |

| MEDICATION | RESULTS | |
|---|---|---|
| SUCCINYLCHOLINE (ANECTINE, SUXAMETHONIUM) MUSCULO-SKELETAL SYSTEM |  | You have 2 genes associated with responses for this drug. *The rsIDs analyzed for the drug were rs2281617 (OPRM1), rs12364283 (DRD2), and rs510769 (OPRM1).* |
| |  | You have 3 genes associated with side effects for this drug. *The rsIDs analyzed for the drug were rs193922803 (RYR1), rs28933389 (BCHE), rs63749869 (RYR1), rs1803274 (BCHE), rs4532 (DRD1), rs121918593 (RYR1), rs28933390 (BCHE), and rs1799807 (BCHE).* |

## ADDITIONAL INFORMATION

Adverse drug reactions (ADRs) are the fourth leading cause of death in the US[4] . This Report provides insights on specific variations identified in your DNA that may alter your clinical response to certain medications. Understanding what variants are present in your DNA can help guide health care providers in prescribing the best medicine for you. The educational information provided in the Report is specific to the raw DNA file that was uploaded. When used in collaboration with your healthcare providers, the Report can be used to help optimize your drug therapy choices based on your DNA. However, there are additional non-genetic factors that influence drug response such as age, weight, gender, race, diet, smoking status, comorbidities, and whether you are taking other medications.

Pharmacogenomics combines pharmacology (the study of drugs) and genomics (the study of genes and their functions) and involves how a person's DNA can affect their response to drug as well as their risk for ADRs when they take certain medications. From the moment you take a drug, your body begins to process it, in an effort to eliminate it. Most medications undergo chemical transformations in the body (a process known as metabolism) to facilitate their removal. These chemical transformations can change a drug's pharmacological activity. Modifications can also alter how long a drug stays in your body (half-life). There can be considerable variation in how different people metabolize the same drug. That is because an individual's DNA is an important factor in determining the extent to which drugs are metabolized and the speed at which metabolism occurs. By looking at what bases are present (genotype) in the DNA at certain locations (rsIDs)[1] , one can gather information about the enzymes responsible for the metabolism of a drug.

The MyGenome$_{Rx}$ platform analyzes over 1 million rsIDs from 2038 different genes to determine if there are genetic variants (also known as single nucleotide polymorphisms or SNPs) present. Some of the genes screened are related to how drugs are processed by the body, or pharmacokinetics (absorption, bioavailability, distribution, metabolism, and excretion). Other genes are involved in how the drug interacts with its target, or

pharmacodynamics. Variations in these genes may influence a person’s drug exposure, clinical response, and/or risk for adverse effects. For most drugs, multiple genes are responsible for a person's response to a drug, the appropriate dose level, and/or the toxicity associated with taking a drug.

In the genetic overview, we have included pharmacogenomic interactions for PharmGKB Level 1, Level 2, and Level 3 gene-drug interactions. There are four levels of evidence with Level 1 being the highest level (with the most clinical evidence for drug-gene interaction) and Level 4 being the lowest level (with the least amount of evidence). If no pharmacogenomic issues were identified, this is stated.

The star (*) allele nomenclature system is used to describe important pharmacogenetic alleles. The *1 allele typically denotes the most common allele found in all populations. All other star alleles carry one or more variants. Some star alleles are defined by a single rsID, others are a combination of rsIDs. For example, CYP3A5*3 is a nonfunctional variant of CYP3A5. The CYP3A5*3 allele is defined by a single rsID, namely rs776746; the reference genotype at this position is AA. If an AG is present at this position the person would be a carrier for one CYP3A5*3 allele, if a GG is present the person has two CYP3A5*3 alleles. If someone is AA at the rs776746 position they are considered to be CYP3A5*1/ CYP3A5*1 if no other possible variants of CYP3A5 have been interrogated, even though there may be other variants present. The positions interrogated for each gene are dependent on the platform used by the genetic testing companies. Further information can be found in the FAQ section of the $\text{MyGenome}_{\text{Rx}}$ website. For the purposes of this report, *1/*1 is assumed if no star alleles were identified. As not all genes use the Star Allele naming system this report also provides information about genetic variations using unique reference identification numbers, or rsIDs. The National Center for Biotechnology Information (NCBI) in collaboration with the National Human Genome Research Institute (NHGRI) provide a database on rsIDs (https://www.ncbi.nlm.nih.gov/snp/).

A quick summary and detailed information is provided on drug-gene interactions identified using the $\text{MyGenome}_{\text{Rx}}$ platform for several medications as well as any medications provided by the client. Information related to the gene, rsID[1] , PharmGKB Clinical Evidence Level[2] and ATC organ/system classifications[3] are included. More information on rsIDs[1] can be found using the NCBI dbSNP database (https://www.ncbi.nlm.nih.gov/snp/).

*** Status of Evidence Levels**

The PharmGKB Database and Evidence Levels referenced in this Report are based on information available to $\text{MyGenome}_{\text{Rx}}$ as of the date of this Report. These Evidence Levels may change over time as additional research is completed, additional links between genes and treatment outcomes are identified, studies are evaluated and confirmed by the scientific community, and additional knowledge of gene interactions with pharmaceuticals are understood.

**** General Disclaimer**

The Detailed Drug Gene Report is an educational tool, to be used in collaboration with your healthcare providers. $\text{MyGenome}_{\text{Rx}}$ services provide an individual the potential to optimize their drug therapy choices. This overview is not intended to be a substitute for professional medical advice, diagnosis, or treatment, and nothing in this Report or the services provided by $\text{MyGenome}_{\text{RX}}$ should be construed as medical advice or the practice of medicine by $\text{MyGenome}_{\text{Rx}}$. Patients should seek the advice of their physicians, pharmacists, or other

qualified health care providers with any questions they may have regarding a medical condition or a medication and before starting, stopping or making other changes to your prescription regimen, your treatment or any therapies with which you are involved.

## REFERENCES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