| PATIENT INFORMATION | SPECIMEN DETAILS | PROVIDER INFORMATION |
|---|---|---|
| **NAME : Sample Report,Psych** | **SPECIMEN TYPE**: Buccal Swab | **ORDERING PHYSCIAN**: Doctor Test |
| **ACC # :** 1234 | **COLLECTION DATE:** 2/27/2024 12:37 PM | |
| **DOB :** 1/1/2001 | **RECEIVED DATE:** | **PROVIDER**: |
| **SEX :** | **REPORT DATE :** 2/27/2024 | |

# 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 - Psychiatry Panel Report

**PATIENT INFORMATION**
**NAME :** Sample Report,Psych
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**SEX :**

## **Current Patient Medications:** All provided medications as of 2/27/2024

| | |
|---|---|
| **alprazolam (Xanax)** | **alprazolam (Xanax) - Standard Precautions** |
| **atorvastatin (Lipitor, Caduet)** | **atorvastatin (Lipitor, Caduet) - Standard Precautions** |
| **Suboxone (buprenorphine and naloxone)** | **Suboxone (buprenorphine and naloxone) - 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.

**PATIENT INFORMATION**
**NAME :** Sample Report,Psych
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# Condition Risk Factor

**Antipsychotic-Induced Hyperprolactinemia, Tardive Dyskinesia, Weight Gain**

**ANKK1**
**A/G**
**Increased Risk of Addiction**

This genotype is associated with mental illness and addictive behaviors. This genotype is associated with altered dopamine function and antipsychotic-induced weight gain.

**Antipsychotic-Induced Hyperprolactinemia, Tardive Dyskinesia, Weight Gain**

**DRD2 (rs1799978)**
**T/C**
**Intermediate Responder**

Schizophrenics with the TC genotype and are treated with risperidone may be less likely to have a clinical response as compared to TT carriers, and more likely to have improvement in symptoms as compared to patients with the CC genotype.

**Hyperhomocysteinemia - Thrombosis**

**MTHFR**
**CC-677/AC-1298**
**Impaired Function**

This genotype predicts impaired function of the enzyme methylenetetrahydrofolate reductase (MTHFR). This enzyme plays a crucial role in converting dietary folate into methylfolate, the active form of this critical B vitamin. Impaired MTHFR function is associated with methylfolate deficiency which can lead to impaired neurotransmitter synthesis and other biochemical abnormalities. Patients with these MTHFR variants are associated with improved depression treatment outcomes with L-methylfolate treatment adjunctive to SSRI/SNRI therapy. This genotype is also associated with increased plasma homocysteine levels which may be associated with an increased risk of premature cardiovascular disease. Dietary supplementation with L-methylfolate supplements may be beneficial to your health.

## 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) | | |
| **Anti-Infectives** | | efavirenz (Sustiva)<br>indinavir (Crixivan)<br>ritonavir (Norvir) | nelfinavir (Viracept) | |
| **Cardiovascular** | **Antianginal** | | | |
| **Cardiovascular** | **Antihypertensive** | metoprolol (Lopressor, Toprol)<br>nebivolol (Bystolic)<br>carvedilol (Coreg)<br>timolol (Blocadren)<br>propanolol (Inderal) | | |
| **Cardiovascular** | **Antiarrhythmic** | flecainide (Tambocor)<br>propafenone (Rythmol)<br>quinidine (Various brands) | | |
| **Cardiovascular** | **Cholesterol Lowering** | | | |
| **Cardiovascular** | **Anticoagulant** | | | clopidogrel ++ (Plavix) |
| **Cholinesterase Inhibitors** | | Rivastigmine (Exelon)<br>Galantamine (Razadyne, Reminyl)<br>Donepezil (Aricept) | | |

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## 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 |
|---|---|---|---|---|
| **Gastrointestinal** | | | | esomeprazole (Nexium)<br>lansoprazole (Prevacid)<br>omeprazole (Prilosec)<br>pantoprazole (Protonix)<br>rabeprazole (Aciphex) |
| **Immunological** | | | | |
| **Neuropsychiatric** | **Antipsychotic** | haloperidol (Haldol)<br>thioridazine (Mellaril)<br>ziprasidone (Geodon)<br>chlorpromazine (Thorazine)<br>Iloperidine (Fanapt)<br>aripiprazole (Abilify)<br>perphenazine (Trilafon)<br>quetiapine (Seroquel)<br>risperidone (Risperdal) | promazine (Sparine)<br>Olanzapine [Zyprexa]<br>clozapine (Clozaril)<br>asenapine (Saphris) | |
| **Neuropsychiatric** | **ADHD Drug / Stimulant** | | atomoxetine (Strattera)<br>Dextroamphetamine amphetamine (Adderall) | |
| **Neuropsychiatric** | **Anticonvulsant** | | | |
| **Neuropsychiatric** | **Precognitive Drug** | | tacrine (Cognex) | |
| **Neuropsychiatric** | **Anxiolytic** | | diazepam (Valium)<br>phenobarbital | |
| **Neuropsychiatric** | **Antidepressant** | nortriptyline (Aventyl,Pamelor)<br>fluoxetine (Prozac)<br>trazodone (Oleptro)<br>venlafaxine (Effexor)<br>vilazodone (Viibryd)<br>buproprion<br>paroxetine (Paxil)<br>desipramine (Norpramin)<br>desvenlafaxine (Pristiq) | sertraline (Zoloft)<br>amitriptyline (Elavil)<br>doxepin (Sinequan, Silenor, Prudoxin, Zonalon) | citalopram (Celexa)<br>clomipramine (Anafranil)<br>Escitalopram [Lexapro]<br>imipramine (Tofranil) |
| **Neuropsychiatric** | **Pain Management** | tiagabine (Gabitril) | duloxetine (Cymbalta) | |
| **Oncology** | | ifosfamide | | |
| **Other** | | | caffeine<br>theophylline | |
| **Pain Management** | **Neuropsychiatric** | Buprenorphine<br>methadone | | |
| **Pain Management** | | tramadol++ (Ultram)<br>alfentanil (Alfenta)<br>celecoxib (Celebrex)<br>codeine++<br>oxycodone++ (Oxycontin)<br>meperidine (Demerol)<br>fentanyl (Actiq, Duragesic, Sublimaze)<br>hydrocodone++<br>ibuprofen (Advil, Motrin) | cyclobenzaprine (Flexaril)<br>lidocaine (xylocaine, various brands)<br>ropivacaine (Naropin)<br>naproxen (Aleve)<br>zolmitriptan (Zomig)<br>tapentadol (Nucynta)<br>tizanidine (Zanaflex) | carisoprodol++ (Soma)<br>Dexlansoprazole |
| **Steroids** | | | estradiol | |

++ 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)

| | |
|---|---|
| **citalopram (Celexa)** | **High Risk ( CYP2D6: Normal Metabolizer, CYP2C19: Ultra Rapid Metabolizer)** |
| **clomipramine (Anafranil)** | **High Risk ( CYP2D6: Normal Metabolizer, CYP2C19: Ultra Rapid Metabolizer, CYP1A2: Rapid Metabolizer)** |
| **Dexlansoprazole** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **clopidogrel ++ (Plavix)** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer, CYP1A2: Rapid Metabolizer, CYP2B6: Extensive Metabolizer)** |
| **carisoprodol++ (Soma)** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **Escitalopram [Lexapro]** | **High Risk ( CYP2D6: Normal Metabolizer, CYP2C19: Ultra Rapid Metabolizer)** |
| **imipramine (Tofranil)** | **High Risk ( CYP2D6: Normal Metabolizer, CYP2C19: Ultra Rapid Metabolizer)** |
| **esomeprazole (Nexium)** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **lansoprazole (Prevacid)** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **omeprazole (Prilosec)** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **pantoprazole (Protonix)** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **rabeprazole (Aciphex)** | **High Risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **diazepam (Valium)** | **Potential risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **doxepin (Sinequan, Silenor, Prudoxin, Zonalon)** | **Potential risk ( CYP2D6: Normal Metabolizer, CYP2C19: Ultra Rapid Metabolizer)** |
| **duloxetine (Cymbalta)** | **Potential risk ( CYP2D6: Normal Metabolizer, CYP1A2: Rapid Metabolizer)** |

**PATIENT INFORMATION**
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| | |
|---|---|
| **phenobarbital** | **Potential risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **nelfinavir (Viracept)** | **Potential risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **cyclobenzaprine (Flexaril)** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **lidocaine (xylocaine, various brands)** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **naproxen (Aleve)** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **ropivacaine (Naropin)** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **caffeine** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **theophylline** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **sertraline (Zoloft)** | **Potential risk ( CYP2D6: Normal Metabolizer, CYP2C19: Ultra Rapid Metabolizer, CYP2B6: Extensive Metabolizer)** |
| **tacrine (Cognex)** | **Potential risk ( CYP2D6: Normal Metabolizer, CYP1A2: Rapid Metabolizer)** |
| **tapentadol (Nucynta)** | **Potential risk ( CYP2C19: Ultra Rapid Metabolizer)** |
| **tizanidine (Zanaflex)** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **zolmitriptan (Zomig)** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **estradiol** | **Potential risk ( CYP1A2: Rapid Metabolizer)** |
| **amitriptyline (Elavil)** | **Potential risk ( CYP2D6: Normal Metabolizer, CYP2C19: Ultra Rapid Metabolizer)** |

**PATIENT INFORMATION**
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**SEX :**

# 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 |
|---|---|---|
| **ANKK1 A/G** | **Increased Risk of Addiction** | This genotype is associated with mental illness and addictive behaviors. This genotype is associated with altered dopamine function and antipsychotic-induced weight gain. |
| **CYP2C19 *17/*17** | **Ultra Rapid Metabolizer** | Extremely rapid metabolic enzyme activity expected for the enzyme controlled by this gene. It may be difficult to achieve effective drug concentrations. ++ Caution should be observed with pro-drugs, e.g., clopidogrel. Excessive active metabolite formation may occur and a high risk for adverse drug reactions exists (e.g., for clopidogrel this can lead to increased risk for serious bleeding). |
| **GRIK4 T/T** | **Poor Responder** | Patients with the TT genotype may have a reduced clinical response to citalopram and possibly to other SSRIs. Other genetic and clinical factors may also influence a patient's response to antidepressants. |

**PATIENT INFORMATION**
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**DOB :** 1/1/2001
**SEX :**

# 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 |
|---|---|---|
| **COMT A/G** | **Decreased Activity** | This genotype is associated with a decrease in COMT activity. Patient may have increased sensitivity to stimulant medications and other drugs that affect norepinephrine and dopamine release. Lower doses of these medications should be tried upon initiation of therapy. |
| **CYP1A2 *1A/*1F** | **Rapid Metabolizer** | Rapid metabolic enzyme activity may occur for the enzyme controlled by this gene. It may be difficult to achieve effective drug concentrations. |
| **DRD2 (rs1799978) T/C** | **Intermediate Responder** | Schizophrenics with the TC genotype and are treated with risperidone may be less likely to have a clinical response as compared to TT carriers, and more likely to have improvement in symptoms as compared to patients with the CC genotype. |
| **HTR2C (rs3813929) C/C** | **Increased Risk** | Patients with this genotype who are treated with atypical antipsychotics may have a increased risk of developing metabolic syndrome as compared to patients lacking a C allele. Other genetic and clinical factors may also influence a patient's risk for developing metabolic syndrome. |
| **MTHFR CC-677/AC-1298** | **Impaired Function** | This genotype predicts impaired function of the enzyme methylenetetrahydrofolate reductase (MTHFR). This enzyme plays a crucial role in converting dietary folate into methylfolate, the active form of this critical B vitamin. Impaired MTHFR function is associated with methylfolate deficiency which can lead to impaired neurotransmitter synthesis and other biochemical abnormalities. Patients with these MTHFR variants are associated with improved depression treatment outcomes with L-methylfolate treatment adjunctive to SSRI/SNRI therapy. This genotype is also associated with increased plasma homocysteine levels which may be associated with an increased risk of premature cardiovascular disease. Dietary supplementation with L-methylfolate supplements may be beneficial to your health. |

**PATIENT INFORMATION**
**NAME :** Sample Report,Psych
**ACC # :** 1234
**DOB :** 1/1/2001
**SEX :**

# 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 |
|---|---|---|
| **ADRA2A (rs1800544) C/G** | **Enhanced Response** | Patients carrying the G allele have better clinical response to methylphenidate in treatment of ADHD than those carrying only the C allele. |
| **CYP2B6 *1/*1** | **Extensive Metabolizer** | The patient is an extensive (normal) metabolizer, and changes in metabolism are not generally expected. |
| **CYP2D6 *1/*2** | **Normal Metabolizer** | This genotype predicts normal metabolic activity for the enzyme controlled by this gene. |
| **HTR2A (rs6311) A/G** | **Decreased Toxicity** | Patients with this phenotype are less likely to have adverse drug effects related SSRI therapy and less likely to have antipsychotic-related tardive dyskinesia as compared to paients carrying a copy of the T allele. |
| **HTR2A (rs7997012) A/G** | **Increased Response** | Patients with this phenotype may have an increased response to antidepressants as compared to patients with the AA genotype. Patients with this phenotype are also less likely to have adverse drug reactions to olanzapine therapy than carriers of the G allele. |
| **HTR2C (rs1414334) G/G** | **Decreased Risk** | Patients with this genotype who are treated with atypical antipsychotics may have a decreased, but not absent, risk of developing metabolic syndrome as compared to patients with the carrying the C allele. Other genetic and clinical factors may also influence a patient's risk for developing metabolic syndrome. |
| **OPRM1 A/A** | **Normal Responder** | Normal opiate receptor function expected. Morphine and other active opiates (e.g., oxymorphone, fentanyl) should produce a usual analgesic response. |

**PATIENT INFORMATION**
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**DOB :** 1/1/2001
**SEX :**

## DETAILED EXPLAINATION OF YOUR CYP2D6 GENE

The following is a detailed explaination of your CYP2D6 gene, inclusing your genotype, phenotype, and a common medicines metabolized by the gene.

**Normal Risk**

| Gene (Genotype | Phenotype (Gene expression) | What it means |
|---|---|---|
| **CYP2D6 *1/*2** | **Normal Metabolizer** | This genotype predicts normal metabolic activity for the enzyme controlled by this gene. |

### Common Medicines Metabolized by CYP2D6

| Drug Type | Generic Name (Brand Name) |
|---|---|
| Anti-Infectives | indinavir (Crixivan) *, ritonavir (Norvir) * |
| Cardiovascular | carvedilol (Coreg), flecainide (Tambocor), lercandipine (Zandip), metoprolol (Lopressor,Toprol), nebivolol (Bystolic), propafenone (Rythmol), propanolol (Inderal), quinidine (various brands), timolol (Blocadren) |
| Neuropsychiatric | amitriptyline (Elavil), amphetamine (Adderall), aripiprazole (Abilify), asenapine (Saphris), atomoxetine (Strattera), bupropion (Wellbutrin), chlorpromazine (Thorazine), citalopram (Celexa) *, clomipramine (Anafranil), desipramine (Norpramin), desvenlafaxine (Pristiq)*, doxepin (Sinequan, Silenor,Prudoxin, Zonalon), duloxetine (Cymbalta), escitalopram (Lexapro), fluoxetine (Prozac),haloperidol (Haldol), iloperidone (Fanapt), imipramine (Tofranil), mirtazapine (Remeron) *, nortriptyline (Aventyl,Pamelor), olanzapine (Zyprexa) *, paroxetine (Paxil), perphenazine (Trilafon), quetiapine (Seroquel) *, risperidone (Risperdal), sertraline (Zoloft) *, tacrine (Cognex), thioridazine (Mellaril), trazadone (Oleptro) *, venlafaxine (Effexor) |
| Oncologic | tamoxifen ++ |
| Pain | celecoxib (Celebrex) *, codeine++, cyclobenzaprine (Flexeril) *, hydrocodone++ ibuprofen *, methadone *, oxycodone++ (Oxycontin), tiagabine (Gabitril) *, 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)

**PATIENT INFORMATION**
**NAME :** Sample Report,Psych
**ACC # :** 1234
**DOB :** 1/1/2001
**SEX :**

## DETAILED EXPLAINATION OF YOUR CYP1A2 GENE

The following is a detailed explaination of your CYP1A2 gene, inclusing your genotype, phenotype, and a common medicines metabolized by the gene.

**Increased Risk**

| Gene | Phenotype (Gene expression) | What it means |
|---|---|---|
| **CYP1A2 *1A/*1F** | **Rapid Metabolizer** | Rapid metabolic enzyme activity may occur for the enzyme controlled by this gene. It may be difficult to achieve effective drug concentrations. |

### Common Medicines Metabolized by CYP1A2

| Drug Type | Generic Name (Brand Name) |
|---|---|
| Miscellaneous | caffeine, carvedilol (Coreg) *, clopidogrel (Plavix) *, estradiol, propranolol (Inderal), ritonavir (Norvir) *, theophylline |
| Neuropsychiatric | amphetamine (Adderall) *, asenapine (Saphris), clomipramine (Anafranil) *, clozapine (Clozaril), duloxetine (Cymbalta), mirtazapine (Remeron, olanzapine (Zyprexa), paroxetine (Paxil) *, perphenazine (Trilafon) *, promazine (Sparine) tacrine, (Cognex) tiagabine (Gabitril) *, thioridazine (Mellaril), ziprasidone (Geodon) * |
| Pain and Local Anesthetics | cyclobenzaprine (Flexeril), naproxen (Aleve), tizanidine (Zanaflex), zolmitriptan (Zomig), lidocaine (xylocaine, various brands), ropivacaine (Naropin) |

++ 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)

**PATIENT INFORMATION**
**NAME :** Sample Report,Psych
**ACC # :** 1234
**DOB :** 1/1/2001
**SEX :**

## DETAILED EXPLAINATION OF YOUR CYP2C19 GENE

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

**Extreme Risk**

| Gene | Phenotype (Gene expression) | What it means |
|---|---|---|
| **CYP2C19 *17/*17** | **Ultra Rapid Metabolizer** | Extremely rapid metabolic enzyme activity expected for the enzyme controlled by this gene. It may be difficult to achieve effective drug concentrations. ++ Caution should be observed with pro-drugs, e.g., clopidogrel. Excessive active metabolite formation may occur and a high risk for adverse drug reactions exists (e.g., for clopidogrel this can lead to increased risk for serious bleeding). |

### 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 (Analafril) *, 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)

**PATIENT INFORMATION**
**NAME : Sample Report,Psych**
**ACC # :** 1234
**DOB :** 1/1/2001
**SEX :**

## DETAILED EXPLAINATION OF YOUR CYP2B6 GENE

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

**Normal Risk**

| Gene | Phenotype (Gene expression) | What it means |
|---|---|---|
| **CYP2B6 *1/*1** | **Extensive 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

| | |
|---|---|
| **ADRA2A (rs1800544):** | |
| **ANKK1:** | A, G |
| **COMT:** | A, G |
| **CYP1A2:** | *1A, *1C, *1D, *1E, *1F, *1J, *1K, *1L, *1V, *1W |
| **CYP2B6:** | *1, *5, *7, *9, *18, *22 |
| **CYP2C19:** | *1, *2, *3, *4, *5, *6, *7, *8, *9, *10, *17 |
| **CYP2D6:** | *1, *2, *3, *4, *5, *6, *7, *8, *9, *10, *12, *14, *17, *29, *41 |
| **DRD2 (rs1799978):** | |
| **GRIK4:** | |
| **HTR2A (rs6311):** | |
| **HTR2A (rs7997012):** | |
| **HTR2C (rs1414334):** | |
| **HTR2C (rs3813929):** | |
| **MTHFR:** | A1298C, C677T |
| **OPRM1:** | A, G |

## FINAL REPORT REVIEWED AND RELEASED BY:

Omni Health Diagnostics
Lab Director: Akhtar Afshan Ali
Address: 1840 N Greenville Suite 176 Richardson, TX 75081
Richardson 75081 TX
Phone:
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 orther healthcare providers. Card can be cut out along dashed line, and carried with the patient.

**Patient:** Sample Report,Psych **DOB:** 1/1/2001 **Requisition ID** 1234

**Pharmacogenetic Test Summary**

| | | |
|---|---|---|
| ANKK1 | A/G | Increased Risk of Addiction |
| CYP1A2 | *1A/*1F | Rapid Metabolizer |
| CYP2C19 | *17/*17 | Ultra Rapid Metabolizer |
| DRD2 (rs1799978) | T/C | Intermediate Responder |
| HTR2A (rs6311) | / | Decreased Toxicity |
| HTR2C (rs1414334) | G/G | Decreased Risk |
| MTHFR | CC-677/AC-1298 | Impaired Function |
| ADRA2A (rs1800544) | C/G | Enhanced Response |
| COMT | A/G | Decreased Activity |
| CYP2B6 | *1/*1 | Extensive Metabolizer |
| CYP2D6 | *1/*2 | Normal Metabolizer |
| GRIK4 | T/T | Poor Responder |
| HTR2A (rs7997012) | A/G | Increased Response |
| HTR2C (rs3813929) | C/C | Increased Risk |
| OPRM1 | A/A | Normal Responder |
| | / | See full report |

**Fold**