GENOMIND®

PROFESSIONAL PGx™

PERSONAL. PROVEN. PRECISE.

Patient:	**Addy Hadad**	Sample ID:	**0000096272**
Patient DOB:	**12/25/1985**	Accession ID:	**10101010**
Ordering Clinician:	**Joe Clinician**	Sample Collection Date:	**9/10/2018**
Sample Type:	**Buccal**	Sample Received Date:	**9/14/2018**
Assay Ordered:	**Genomind Professional PGx 3.0**	Report Date:	**9/17/2018 10:17 AM**

Electronically Signed By
David Robbins, PhD, DABCC, MT (AAB), Lab Director for Genomind, Inc.

Literature Information Reviewed By
David Krause, M.D., Chief Medical Officer for Genomind, Inc.

Genomind Professional PGx is intended to assist health care professionals in the selection of safe and appropriate pharmaceuticals and other treatment modalities for patients with mental illness and other brain disorders. This report is designed to be adjunctive to a complete patient assessment, including, but not limited to, proper diagnosis, clinical history, assessment of concomitant co-morbidities and medications, family history, and other factors.

Personalized Consultation Available for Clinicians

A complimentary consultation, performed by our expert psychopharmacologists, is included with all Genomind® Professional PGx™ tests. Consultations can be scheduled directly from the Genomind Clinician Portal.

CONTACT INFORMATION
Phone: 877-895-8658
E-mail: customerservice@genomind.com
www.genomind.com

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*Diagnosis specific summaries are available for the diagnoses of depression, anxiety & related disorders, bipolar disorder, pain management and ADHD. The provided pages in this report are the closest fit for this individual's diagnosis, as provided to us. All 5 summaries, however, are available to you on the Genomind Clinician Portal.

Disclaimer: The following report provides a summary of the pharmacokinetic and pharmacodynamic impact certain genes can have on particular drugs. This report is intended to serve as a guide for health care professionals to compare different medication options based on an individual patient's genetics. This report is not intended to recommend a particular course of treatment or medication for a patient. Prescribing health care professionals must use their independent medical judgment and are solely responsible for determining the most appropriate medication for their patients. The clinician must consider other relevant clinical factors in determining which is the most appropriate medication. The test results in this report are intended to be prognostic and not diagnostic. The understanding of the relationship between genetics and pharmacokinetics and pharmacodynamics changes periodically; this report will not be updated to reflect new information. A White Paper summarizing individual gene-drug associations, strength of evidence and effect size is available upon request from Genomind Customer Service.

G-DIG

GENOMIND DRUG INTERACTION GUIDE

You have access to G-DIG, the Genomind Drug Interaction Guide. You may utilize this CYP450 Gene-Drug-Environmental checker at any time by selecting the icon next to your patient's name on the Genomind Results Manager screen after signing onto portal.genomind.com from your computer or smart phone. The G-DIG technology is included and available at no additional cost for any patient tested with Genomind Professional PGx.

I. PHARMACODYNAMIC GENE VARIATIONS

GENE RESULT	THERAPEUTIC IMPLICATIONS	GUIDE	CLINICAL IMPACT
SLC6A4 L(A)/L(A) [High Activity]	***Serotonin Transporter (SLC6A4)*** *is a synaptic transporter protein responsible for serotonin reuptake* • Patients with the L(A)/L(A) genotype may have **improved likelihood of remission and/or reduced side effects with SSRIs**		**Therapeutic options:** **SSRIs** if clinically indicated
ADRA2A C/G [Improved response]	***Alpha-2A Adrenergic Receptor (ADRA2A)*** *is a receptor which plays an important role in norepinephrine signaling* • **Improved response to stimulants (mostly methylphenidate studies)** for symptoms of attention deficit/hyperactivity disorder in children and adolescents as compared to those with the C/C genotype		**Therapeutic options:** **methylphenidate** may be considered for attention deficit/hyperactivity disorder if clinically indicated
HTR2A G/G [Normal response]	***Serotonin Receptor 2A (HTR2A)*** *is a serotonin receptor which is a target for several serotonergic drugs* • **This genotype confers normal activity**		No known significant clinical impact
BDNF Val/Val [Normal activity]	***Brain-derived Neurotrophic Factor (BDNF)*** *is a protein involved in neuronal development and neural plasticity* • **This genotype confers normal activity**		No known significant clinical impact
MTHFR C677T: C/C A1298C: A/C [Normal activity]	***Methylenetetrahydrofolate Reductase (MTHFR)*** *is an enzyme responsible for the conversion of folic acid to methylfolate, which is a cofactor needed for serotonin, norepinephrine, and dopamine synthesis* • **This genotype confers normal activity**		No known significant clinical impact
COMT Val/Met [Normal activity]	***Catechol-O-Methyltransferase (COMT)*** *is an enzyme responsible for breakdown of dopamine in the frontal cortex of the brain* • COMT is involved in response to stimulants • **This genotype confers normal activity**		No known significant clinical impact
HLA-A *31:01 Not Detected [Normal]	***Major histocompatibility complex, class I, A (HLA-A)*** *is part of a cluster of genes known as the Human Leukocyte Antigen complex* • Certain variants greatly increase risk of drug induced skin reactions • **This genotype is associated with normal risk of skin reactions with carbamazepine**		Normal risk of skin reactions with carbamazepine
HLA-B *15:02 Not Detected [Normal]	***Major histocompatibility complex, class I, B (HLA-B)*** *is part of a cluster of genes known as the Human Leukocyte Antigen complex* • Certain variants greatly increase risk of drug induced skin reactions • **This genotype is associated with normal risk of skin reactions with carbamazepine, oxcarbazepine, phenytoin and fosphenytoin**		Normal risk of skin reactions with carbamazepine, oxcarbazepine, phenytoin/fosphenytoin
DRD2 C/C [Normal activity]	***Dopamine Receptor D2 (DRD2)*** *is a receptor activated by dopamine in the brain* • DRD2 is involved in response to antipsychotics • **This genotype confers normal activity**		No known significant clinical impact

Alert/Caution PGx Guided Options

I. PHARMACODYNAMIC GENE VARIATIONS

GENE RESULT	THERAPEUTIC IMPLICATIONS	GUIDE	CLINICAL IMPACT
MC4R C/C [Normal activity]	***Melanocortin 4 Receptor (MC4R)*** *is a receptor that plays a central role in the control of food intake* • MC4R is involved in antipsychotic-induced weight gain • **This genotype confers normal activity and average risk of weight gain**		No known significant clinical impact
5HT2C C/C [Standard weight gain risk]	***Serotonin Receptor 2C (5HT2C)*** *is a receptor involved in the regulation of satiety* • Some 2nd generation antipsychotics act by blocking this receptor • Patients with the C/C genotype have **standard risk of weight gain** with 2nd generation antipsychotics. C/C is the most common genotype **Higher risk:** clozapine; olanzapine **Medium risk:** aripiprazole; brexpiprazole; iloperidone; paliperidone; quetiapine; risperidone **Lower risk:** asenapine; cariprazine; lurasidone; ziprasidone		**Assess weight gain risk** with various second generation antipsychotics
ANK3 C/C [Normal activity]	***Sodium Channel (ANK3)*** *is a protein that plays a role in sodium ion channel function and is involved in excitatory signaling in the brain* • **This genotype confers normal activity**		No known significant clinical impact
CACNA1C G/G [Normal activity]	***Calcium Channel (CACNA1C)*** *is a subunit of L-type voltage gated calcium channels which are involved in excitatory signaling in the brain* • **This genotype confers normal activity**		No known significant clinical impact
OPRM1 A/A [Normal activity]	***μ-Opioid Receptor (OPRM1)*** *is an opioid receptor which is affected by endogenous and exogenous opioids* • OPRM1 is involved in response to opioids • **This genotype confers normal activity**		No known significant clinical impact
GRIK1 A/A [Normal activity]	***Glutamate Receptor Kainate 1 (GRIK1)*** *is an excitatory neurotransmitter receptor* • GRIK1 is involved in response to topiramate for alcohol abuse • Patients of European descent with the A allele may be **less likely to respond to topiramate for alcohol use disorder**; future studies, however, are needed to confirm these findings		No known significant clinical impact

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II. PHARMACOKINETIC GENE VARIATIONS

GENE RESULT	THERAPEUTIC IMPLICATIONS	GUIDE	CLINICAL IMPACT
CYP2D6 **IM** *4/*10 Duplication [Intermediate activity]	***Intermediate metabolizer:*** *Risk of* ***elevated serum levels*** *& drug interactions, or decreased production of active metabolites* • **A dose adjustment or alternate therapy may be considered**	⚠	Be advised that there may be altered exposure to medications metabolized by CYP2D6 Use G-DIG for a more complete drug-gene-environment interaction assessment
CYP1A2 **EM** *1Dc/*1Vc [Normal activity]	*Variations in the CYP1A2 liver enzyme can result in altered drug metabolism and unexpected drug serum levels* • **This genotype confers normal activity** • Each of the CYP1A2 variants detected in this patient sample is well characterized, although this specific combination of alleles has not been formally named. We have adopted a modified (*)star allele naming system that identifies all the variants detected for this gene. (Adapted from Soyama et al 2005. PMID: 15770072; Gunes et al 2009. PMID: 19450128)		Normal metabolism is expected (other factors may influence metabolism) Use G-DIG for a more complete drug-gene-environment interaction assessment
CYP2B6 **EM** *1/*1 [Normal activity]	*Variations in the CYP2B6 liver enzyme can result in altered drug metabolism and unexpected drug serum levels* • **This genotype confers normal activity**		Normal metabolism is expected (other factors may influence metabolism) Use G-DIG for a more complete drug-gene-environment interaction assessment
CYP2C9 **EM** *1/*1 [Normal activity]	*Variations in the CYP2C9 liver enzyme can result in altered drug metabolism and unexpected drug serum levels* • **This genotype confers normal activity**		Normal metabolism is expected (other factors may influence metabolism) Use G-DIG for a more complete drug-gene-environment interaction assessment
CYP2C19 **EM** *1/*1 [Normal activity]	*Variations in the CYP2C19 liver enzyme can result in altered drug metabolism and unexpected drug serum levels* • **This genotype confers normal activity**		Normal metabolism is expected (other factors may influence metabolism) Use G-DIG for a more complete drug-gene-environment interaction assessment
CYP3A4 ***1/*1** **CYP3A5** ***7/*3** [Normal activity]	*Variations in the CYP3A4/5 liver enzymes can result in altered drug metabolism and unexpected drug serum levels* • 3A5 non-expresser • CYP3A activity is determined by the sum activity of the CYP3A family of genes; in adults the most influential are 3A4 and 3A5 • **This genotype confers normal activity**		Normal metabolism is expected (other factors may influence metabolism) Use G-DIG for a more complete drug-gene-environment interaction assessment

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II. PHARMACOKINETIC GENE VARIATIONS

GENE RESULT	THERAPEUTIC IMPLICATIONS	GUIDE	CLINICAL IMPACT
UGT1A4 **EM** *1a/*1a [Normal activity]	*Variations in the UGT1A4 liver enzyme can result in altered drug metabolism and unexpected drug serum levels* • **This genotype confers normal activity**		Normal metabolism is expected (other factors may influence metabolism) Use G-DIG for a more complete drug-gene-environment interaction assessment
UGT2B15 **EM** *1/*1 [Normal activity]	*Variations in the UGT2B15 liver enzyme can result in altered drug metabolism and unexpected drug serum levels* • **This genotype confers normal activity**		Normal metabolism is expected (other factors may influence metabolism) Use G-DIG for a more complete drug-gene-environment interaction assessment
ABCB1 **(rs2032583)** A/A [Normal activity]	***ATP Binding Cassette B1 (ABCB1)*** *encodes for P-glycoprotein (P-gp). P-gp is a drug efflux pump that reduces the intestinal absorption and blood-brain barrier penetration of certain drugs* • **This genotype is associated with normal activity of P-gp**		Normal exposure is expected (other factors may influence drug exposure) Use G-DIG for a more complete drug-gene-environment interaction assessment
ABCB1 **(rs1045642)** G/G [Normal activity]	***ATP Binding Cassette B1 (ABCB1)*** *encodes for P-glycoprotein (P-gp). P-gp is a drug efflux pump that reduces the intestinal absorption and blood-brain barrier penetration of certain drugs* • **This genotype is associated with normal activity of P-gp**		Normal exposure is expected (other factors may influence drug exposure) Use G-DIG for a more complete drug-gene-environment interaction assessment

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III. GENE DRUG INTERACTION SUMMARY

CLASS	MEDICATION	PHARMACODYNAMIC ASSOCIATIONS	PHARMACODYNAMIC GENE	DRUG EXPOSURE	PHARMACOKINETIC GENE
	ANTIDEPRESSANTS				
SSRIs	**Citalopram** (Celexa®)	Higher odds of remission or response	SLC6A4		2C19, P-gp
	Escitalopram (Lexapro®)	Higher odds of remission or response	SLC6A4		2C19, P-gp
	Fluoxetine (Prozac®)	Higher odds of remission or response	SLC6A4	↑	2D6, 2C9
	Fluvoxamine (Luvox®)	Higher odds of remission or response	SLC6A4	↑	2D6, 1A2, P-gp
	Paroxetine (Paxil®)	Higher odds of remission or response	SLC6A4	↑	2D6, P-gp
	Sertraline (Zoloft®)	Higher odds of remission or response	SLC6A4		2C19, 2B6
SNRIs	**Desvenlafaxine** (Pristiq®)				
	Duloxetine (Cymbalta®)			↑	1A2, 2D6
	Levomilnacipran (Fetzima®)				3A4/5
	Venlafaxine[1] (Effexor®)			↑	2D6, 2C19, 3A4/5, P-gp
Other	**Bupropion[1]** (Wellbutrin®)				2B6
	Esketamine (Spravato®)				2B6, 3A4/5
	Mirtazapine (Remeron®)			↑	2D6, 3A4/5, 1A2
	Nefazodone				3A4/5
	Trazodone (Desyrel®, Oleptro®)			↑	3A4/5, 2D6
	Vilazodone (Viibryd®)				3A4/5
	Vortioxetine (Trintellix®)			↑	2D6, 3A4/5

Alert/Caution | PGx Guided Options | Reduced Drug Exposure with 1A2 Inducers | ↑↓ Drug Exposure

[1] See Gene Drug Interaction Summary footnotes for more information

III. GENE DRUG INTERACTION SUMMARY

CLASS	MEDICATION	PHARMACODYNAMIC ASSOCIATIONS	PHARMACODYNAMIC GENE	DRUG EXPOSURE	PHARMACOKINETIC GENE
	ANTIDEPRESSANTS				
TCAs	**Amitriptyline** (Elavil®)			↑	2D6, 2C19, P-gp
TCAs	**Amoxapine** (Asendin®)			↑	2D6
TCAs	**Clomipramine** (Anafranil®)			↑	2D6, 2C19, 1A2
TCAs	**Desipramine** (Norpramin®)			↑	2D6
TCAs	**Doxepin** (Sinequan®)			↑	2D6, 2C19
TCAs	**Imipramine** (Tofranil®)			↑	2D6, 2C19
TCAs	**Nortriptyline** (Pamelor®)			↑	2D6, P-gp
TCAs	**Protriptyline** (Vivactil®)			↑	2D6
TCAs	**Trimipramine** (Surmontil®)			↑	2D6, 2C19, P-gp
MAOIs	**Phenelzine** (Nardil®)				
MAOIs	**Selegiline** (Eldepryl®, Emsam®)				2B6
MAOIs	**Tranylcypromine** (Parnate®)				
	MOOD STABILIZERS/ANTICONVULSANTS				
	Carbamazepine (Equetro®, Tegretol®)				3A4/5
	Gabapentin (Neurontin®)				
	Lamotrigine (Lamictal®)				UGT1A4
	Lithium (Lithobid®, Eskalith®)				
	Oxcarbazepine (Trileptal®, Oxtellar®)				
	Pregabalin (Lyrica®)				
	Topiramate (Topamax®)				
	Valproate (Depakote®, Depakene®)				2C9

Alert/Caution PGx Guided Options Reduced Drug Exposure with 1A2 Inducers ↑↓ Drug Exposure

[1] See Gene Drug Interaction Summary footnotes for more information

III. GENE DRUG INTERACTION SUMMARY

CLASS	MEDICATION	PHARMACODYNAMIC ASSOCIATIONS	PHARMACODYNAMIC GENE	DRUG EXPOSURE	PHARMACOKINETIC GENE
	ANTIPSYCHOTICS				
2nd Generation Antipsychotics	**Aripiprazole** (Abilify®)			↑	2D6, 3A4/5, P-gp
	Asenapine (Saphris®)				1A2, UGT1A4
	Brexpiprazole (Rexulti®)			↑	2D6, 3A4/5
	Cariprazine (Vraylar®)				3A4/5
	Clozapine (Clozaril®)			↑	1A2, 2D6, 3A4/5, P-gp
	Iloperidone (Fanapt®)			↑	2D6, 3A4/5
	Lurasidone (Latuda®)				3A4/5
	Olanzapine (Zyprexa®)				1A2, P-gp
	Paliperidone (Invega®)				
	Pimavanserin (Nuplazid®)				3A4/5
	Quetiapine (Seroquel®)				3A4/5
	Risperidone (Risperdal®)			↑	2D6, 3A4/5, P-gp
	Ziprasidone (Geodon®)				

Alert/Caution PGx Guided Options Reduced Drug Exposure with 1A2 Inducers ↑↓ Drug Exposure

[1] See Gene Drug Interaction Summary footnotes for more information

III. GENE DRUG INTERACTION SUMMARY

CLASS	MEDICATION	PHARMACODYNAMIC ASSOCIATIONS	PHARMACODYNAMIC GENE	DRUG EXPOSURE	PHARMACOKINETIC GENE
	ANTIPSYCHOTICS				
1st Generation Antipsychotics	**Chlorpromazine** (Thorazine®)			↑	2D6
	Fluphenazine (Prolixin®)			↑	2D6
	Haloperidol (Haldol®)			↑	2D6, 3A4/5
	Loxapine (Adasuve®, Loxitane®)				3A4/5, 1A2
	Perphenazine (Trilafon®)			↑	2D6
	Pimozide (Orap®)			↑	2D6, 3A4/5
	Thioridazine (Mellaril®)			↑	2D6
	Thiothixene (Navane®)				1A2
	Trifluoperazine (Stelazine®)				1A2, UGT1A4
	ANXIOLYTICS				
	Alprazolam (Xanax®)				3A4/5
	Buspirone (Buspar®)				3A4/5
	Chlordiazepoxide (Librium®)				3A4/5, UGT2B15
	Clonazepam (Klonopin®)				3A4/5
	Clorazepate (Tranxene®)				UGT2B15
	Diazepam (Valium®)				2C19, 3A4/5, UGT2B15
	Hydroxyzine (Vistaril®)				
	Lorazepam (Ativan®)				UGT2B15
	Oxazepam (Serax®)				UGT2B15
	Temazepam (Restoril®)				UGT2B15

Alert/Caution PGx Guided Options Reduced Drug Exposure with 1A2 Inducers Drug Exposure

[1] See Gene Drug Interaction Summary footnotes for more information

III. GENE DRUG INTERACTION SUMMARY

CLASS	MEDICATION	PHARMACODYNAMIC ASSOCIATIONS	PHARMACODYNAMIC GENE	DRUG EXPOSURE	PHARMACOKINETIC GENE
	ADHD MEDICATIONS				
Dopaminergic Stimulants	**Amphetamine-Dextroamphetamine** (Adderall®, Evekeo®)			↑	2D6
	Dexmethylphenidate (Focalin®)	Higher odds of response	ADRA2A		
	Dextroamphetamine (Dexedrine®, Procentra®, Zenzedi®)			↑	2D6
	Lisdexamfetamine (Vyvanse®)			↑	2D6
	Methamphetamine (Desoxyn®)			↑	2D6
	Methylphenidate (Ritalin®, Concerta®, Daytrana®, Metadate®)	Higher odds of response	ADRA2A		
Other	**Atomoxetine** (Strattera®)			↑	2D6
	Clonidine (Kapvay®)			↑	2D6
	Guanfacine (Intuniv®)				3A4/5
	SUPPLEMENTS				
	L-methylfolate (Deplin®)				
	SLEEP MODULATORS				
	Armodafinil (Nuvigil®)				3A4/5
	Eszopiclone (Lunesta®)				3A4/5
	Modafinil (Provigil®)				3A4/5
	Ramelteon (Rozerem®)				1A2
	Suvorexant (Belsomra®)				3A4/5, 2C19
	Zaleplon (Sonata®)				3A4/5
	Zolpidem (Ambien®)				3A4/5

Alert/Caution PGx Guided Options Reduced Drug Exposure with 1A2 Inducers ↑↓ Drug Exposure

[1] See Gene Drug Interaction Summary footnotes for more information

III. GENE DRUG INTERACTION SUMMARY

CLASS	MEDICATION	PHARMACODYNAMIC ASSOCIATIONS	PHARMACODYNAMIC GENE	DRUG EXPOSURE	PHARMACOKINETIC GENE
PAIN					
Non-opioid analgesics	**Acetaminophen** (Tylenol®)				
	Celecoxib (Celebrex®)				2C9
	Diclofenac (Voltaren®, Cataflam®)				2C9
	Flurbiprofen (Ansaid®)				2C9
	Ibuprofen (Advil®, Motrin®)				2C9
	Ketorolac (Toradol®)				
	Meloxicam (Mobic®)				2C9
	Naproxen (Aleve®, Naprosyn®)				1A2, 2C9
	Piroxicam (Feldene®)				2C9
Opioid analgesics	**Alfentanil** (Alfenta®)				3A4/5
	Codeine[1]			↑	2D6, P-gp
	Fentanyl (Duragesic®)				3A4/5, P-gp
	Hydrocodone[1] (Vicodin®, Norco®, Lorcet®)			↑	2D6, 3A4/5
	Hydromorphone (Dilaudid®)				
	Meperidine (Demerol®)				2B6, 3A4/5
	Methadone (Dolophine®, Methadose®)				3A4/5, 2B6
	Morphine (MS Contin®, Kadian®)				P-gp
	Oxycodone (Oxycontin®)			↑	2D6, 3A4/5, P-gp
	Oxymorphone (Opana®)				
	Tapentadol (Nucynta®)				
	Tramadol[1] (Ultram®)			↑	2D6, 3A4/5, P-gp

Alert/Caution PGx Guided Options Reduced Drug Exposure with 1A2 Inducers ↑↓ Drug Exposure

[1] See Gene Drug Interaction Summary footnotes for more information

III. GENE DRUG INTERACTION SUMMARY

CLASS	MEDICATION	PHARMACODYNAMIC ASSOCIATIONS	PHARMACODYNAMIC GENE	DRUG EXPOSURE	PHARMACOKINETIC GENE
MISCELLANEOUS					
	Dextromethorphan/Quinidine (Nuedexta®)			↑	2D6, 3A4/5
	Baclofen (Lioresal®)				
	Buprenorphine/Naloxone (Suboxone®)				3A4/5
	Buprenorphine (Butrans®)				3A4/5
	Cannibidiol (CBD) (Epidiolex®)				3A4/5, 2C19
	Carisoprodol (Soma®)				2C19
	Cyclobenzaprine (Flexeril®)				1A2
Rx	**Deutetrabenazine** (Austedo®)			↑	2D6
	Metaxalone (Skelaxin®)				
	Methocarbamol (Robaxin®)				
	Naltrexone (Revia®, Vivitrol®)				
Rx [1]	**Phenytoin/Fosphenytoin** (Dilantin®, Cerebyx®)				2C19, 2C9
	Tizanidine (Zanaflex®)				1A2
Rx	**Valbenazine** (Ingrezza®)			↑	3A4/5, 2D6

Alert/Caution | PGx Guided Options | Reduced Drug Exposure with 1A2 Inducers | Drug Exposure

[1] See Gene Drug Interaction Summary footnotes for more information

GENE DRUG INTERACTION SUMMARY FOOTNOTES

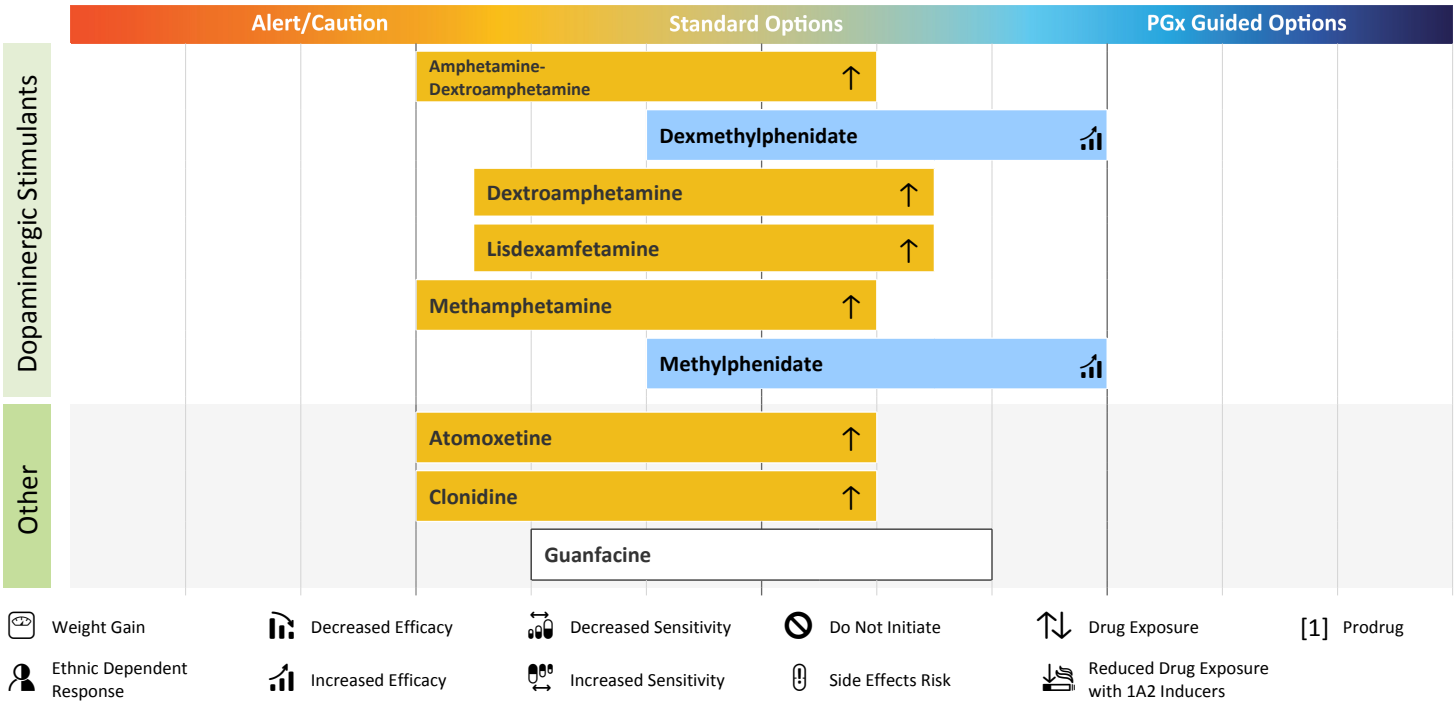
[1] Prodrug or highly active metabolite - requiring activation by the liver; CYP450 IMs/PMs may experience lower efficacy due to reduced conversion to the active metabolite and higher levels of the parent drug; CYP450 UMs may experience increased conversion of the parent drug, and higher levels of the active metabolite

Rx Medication has FDA biomarker guidance available
- https://www.fda.gov/downloads/Drugs/ScienceResearch/UCM578588.pdf

Medication has CPIC® or DPWG biomarker guidance available
- https://cpicpgx.org/guidelines/
- https://www.pharmgkb.org/page/dpwg

*References for the drug interaction summary are available upon request

IV. ADHD SUMMARY



V. TEST METHODOLOGY/LITERATURE REFERENCE

TEST METHODOLOGY

This test was developed and performance characteristics were validated in the Genomind clinical laboratory. This test has not been cleared or approved by the U.S. Food and Drug Administration (FDA). FDA does not require review of this test because it is a Laboratory Developed Test (LDT). This test is used for clinical purposes and should not be regarded as investigational or for research use. This laboratory is certified under the Clinical Laboratory Improvement Amendments (CLIA) as qualified to perform high complexity clinical laboratory testing. Genomind performed the testing using standard and custom TaqMan reagents for all variants. The test results are intended to be used as prognostic and not diagnostic and are not intended as the sole means for patient management decisions.

Test Methodology Limitations: Factors influencing the amount and quality of DNA extracted include but are not limited to the amount of buccal cells extracted, patient oral hygiene, collection technique, and the presence of dietary or microbial sources of nucleic acids and nucleases. DNA quality and quantity are subject to matrix dependent influences. PCR inhibitors, extraneous DNA and nucleic acid degrading enzymes are all factors which may affect the evaluation of assay results. Some single nucleotide polymorphism (SNP) assays are problematic due to multiple base repeats and other sequence aberrations which may hinder proper amplification and analysis. DNA purity can influence the assay. SLC6A4 contains many polymorphisms and the assay was developed and validated according to the current available scientific information. For pharmacogenetics tests like Genomind Professional PGx, undetected genetic and/or non-genetic factors such as drug-drug interactions may impact the phenotype. The Genomind Professional PGx report is based on a current understanding of the clinical relevance of the variant identified, penetrance, phenotype predictions, and recurrence risks.

Variants tested include 5HT2C rs3813929; ABCB1 C3435T rs1045642; ABCB1 rs2032583; ADRA2A rs1800544; ANK3 rs10994336; BDNF rs6265; CACNA1C rs1006737; COMT rs4680; CYP1A2 *1B, *1C, *1D, *1E, *1F, *1K and *11; CYP2B6 *4, *5, and *6; CYP2C19 *2, *3, *4, *5, *6, *7, *8, *9, *10, *17, and *35; CYP2C9 *2, *3, *4, *5, *6, *8, *11, *13, and *27; CYP2D6 *2, *3, *4, gene deletion (*5), gene duplication, *6, *7, *8, *9, *10, *11, *12, *14, *15, *17, *29 and *41; CYP3A4 *22; CYP3A5 *3, *6, *7; DRD2 rs1799732; GRIK1 rs2832407; HLA-B*15:02 presence with reflex testing for presence of HLA-B*15:13 for all positive samples and Sanger sequencing for all double positive samples; HLA-A*31:01 rs1061235; HTR2A rs7997012; MC4R rs489693; MTHFR rs1801131 and rs1801133; OPRM1 rs1799971; SLC6A4 rs25531 and rs63749047; UGT2B15 rs1902023; and UGT1A4 rs2011425. Other known variants that are not listed are not detected and will not be included in the test report.

Version 3.0 [05/20/2019]

LITERATURE REFERENCES

THE LITERATURE INFORMATION UPON WHICH THIS REPORT RELIES WAS AGGREGATED AND REVIEWED BY GENOMIND, INC. SUMMARIES OF THESE NUMBERED REFERENCES BELOW ARE AVAILABLE UPON REQUEST OF GENOMIND'S COMPREHENSIVE LITERATURE SUMMARY [V2019-05].

Gene	References
5HT2C	10-24
ADRA2A	25-33
ANK3	34-57
BDNF	58-78
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COMT	28, 98-131
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HLA-A *31:01	145-149
HLA-B *15:02	146-147, 150-157
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Gene	References
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ABCB1	215-233
UGT1A4	235-238
UGT2B15	238-241
CYP1A2	20, 164, 247-250, 252, 258-281, 286-288
CYP2B6	247-252, 273, 284, 288-305
CYP2C9	247-257, 261, 288, 306-312
CYP2C19	15, 242, 244, 247-252, 254-255, 273, 284, 288, 306, 311-323
CYP2D6	15, 20, 244-245, 247-252, 254-255, 258, 261, 273-274, 288, 306, 311-314, 322, 324-344
CYP3A4/5	15, 20, 247-252, 258, 261, 273-274, 282-285

VI. PATIENT'S GENOMIND RX METATYPE™ CARD

Your Genomind Rx MetaType™ wallet card includes information on six liver enzymes that are responsible for the metabolism of most drugs, and identifies your unique enzyme profile (your genotype). It is intended for use by your current, additional or future healthcare providers. This genetic information is mentioned in the FDA prescribing information of many drugs, and may provide useful prescribing recommendations. The websites on the back of the card provide more information.

GENOMIND® PROFESSIONAL PGx™

Rx MetaType™ Card

Bob Sample

#0000096272

Gene	Genotype	Phenotype	Clinical Meaning*
CYP1A2	*1Dc/*1Vc	Extensive	Normal Metabolism
CYP2B6	*1/*1	Extensive	Normal Metabolism
CYP2C19	*1/*1	Extensive	Normal Metabolism
CYP2C9	*1/*1	Extensive	Normal Metabolism
CYP2D6	*4/*10 DUP	Intermediate	↓ Metabolism of some drugs
CYP3A4	*1/*1, *7/*3	Normal	Normal Metabolism

GENOMIND® PROFESSIONAL PGx™

Issued Date: 09/17/2018

FOR USE BY HEALTHCARE PROFESSIONALS ONLY

Most medicines are metabolized by liver enzymes. Like blood types, you have a specific genetic profile which can affect the rate of metabolism, and may influence the dose of medicines prescribed for you. You may wish to inform your healthcare provider(s) about your metabolism status, shown on the reverse. More information about specific gene/drug interactions can be found at:

https://drug-interactions.medicine.iu.edu/Clinical-Table.aspx
https://www.pharmgkb.org/guidelines
https://www.fda.gov/downloads/Drugs/ScienceResearch/UCM578588.pdf

***Do not discontinue or change the dose of any medicine without the advice of your healthcare provider. In addition to genetics, other factors may influence your metabolizer status.**

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Rx MetaType™ Card

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