GENOMIND® PROFESSIONAL PGx™ ANALYZES TWO TYPES OF GENES TO INFORM OPTIMAL TREATMENT.

The FDA currently includes pharmacogenetic biomarker labeling on over 200 medications due to specific actionable gene-drug associations[3]

Pharmacodynamic genes indicate the effect a drug has on the body and may inform drug candidate selection.

	Gene	Physiological Role	Impact of Mutation	Treatment Impact
Pharmacodynamic	**Serotonin Transporter (SLC6A4)**	Protein responsible for reuptake of serotonin from the synapse	Associated with increased side effects or poorer response to SSRIs	Monitor for adverse events with SSRIs, or **assess alternatives to SSRIs.** SNRIs or other non-SSRI antidepressants may be considered if clinically indicated
	Serotonin Receptor 2A (HTR2A)	A serotonin receptor which is a target for several serotonergic drugs	Associated with response to certain antidepressants	May prompt consideration of **citalopram or non-SSRIs**
	Brain-derived Neurotrophic Factor (BDNF)	Important protein for proper neuronal development and neural plasticity	Impaired BDNF secretion, which may be associated with response to some antidepressants or exercise	**Increased physical activity/exercise** may be more beneficial for **Met carriers** if clinically indicated. Ethnicity dependent **response to SSRIs vs SNRIs**
	Major Histocompatibility Complex 1,A (HLA-A 31:01)	Human Leukocyte Antigen-A	Associated with risk of skin reactions to carbamazepine	**Do not initiate carbamazepine**
	Major Histocompatibility Complex 1,B (HLA-B 15:02)	Human Leukocyte Antigen-B	Associated with risk of skin reactions to carbamazepine, oxcarbazepine, phenytoin, fosphenytoin and possibly lamotrigine, phenobarbital and eslicarbazepine	**Do not initiate carbamazepine, oxcarbazepine, phenytoin or fosphenytoin. Caution with lamotrigine, eslicarbazepine, or phenorbarbital**
	Calcium Channel (CACNA1C)	A subunit of the calcium channel which mediates excitatory signaling	Associated with conditions characterized by mood instability/lability	2nd generation antipsychotics and/or mood stabilizers may be considered if clinically indicated
	Sodium Channel (ANK3)	Protein that plays a role in sodium channel function and regulation of excitatory signaling	Associated with conditions characterized by mood instability/lability	2nd generation antipsychotics and/or mood stabilizers and/or may be considered if clinically indicated
	Serotonin Receptor 2C (5HT2C)	Receptor involved in regulation of satiety	Associated with differential weight gain risk with 2nd generation antipsychotics	Assess **weight gain risk with 2nd generation antipsychotics;** anti-obesity therapies may be considered to mitigate weight gain if clinically indicated
	Melanocortin 4 Receptor (MC4R)	Receptor that plays a role in the control of food intake	Associated with differential weight gain risk with 2nd generation antipsychotics	Assess **weight gain risk with 2nd generation antipsychotics;** anti-obesity therapies may be considered to mitigate weight gain if clinically indicated
	Dopamine Receptor D2 (DRD2)	Receptor affected by dopamine in the brain	Associated with slower or poorer response to antipsychotics. Associated with small increased risk of opioid dependecne in Asians	**Assess** dose, alternatives or adjuncts to **antipsychotics.** Assess non-genetic risk factors for **opioid dependence** in Asians
	Catechol-O-Methyltransferase (COMT)	Enzyme primarily responsible for the degradation of dopamine in the frontal lobes of the brain	Altered dopamine states can have emotional/ behavioral effects and impact response to dopaminergic agents or opioids	**Val/Val: Dopaminergic stimulants,** COMT inhibitors and/or TMS/ECT may be considered if clinically indicated **Decreased sensitivity to opioids** **Met/Met:** Assess alternatives to dopaminergic stimulants. **2nd generation antipsychotics** may be considered for psychotic-related disorders if clinically indicated **Increased sensitivity to opioids**
	Alpha-2A Adrenergic Receptor (ADRA2A)	Receptor involved in norepinephrine signaling	Associated with variable response to methylphenidate	**Methylphenidate** may be used if clinically indicated
	Methylenetetrahydrofolate Reductase (MTHFR, A1298C, C677T)	Predominant enzyme that converts folic acid/folate to its active form (methylfolate) needed for synthesis of serotonin, dopamine, and norepinephrine	Associated with variable activity and conversion of folic acid/folate to methylfolate	Supplementation with **L-methylfolate** may be considered if clinically indicated
	Glutamate Receptor Kainate 1 (GRIK1)	An excitatory neurotransmitter receptor in the brain	Associated with response to topiramate for alcohol abuse	**Topiramate** may be considered for treatment of **alcohol abuse** if clinically indicated
	μ-Opioid Receptor (OPRM1)	Opioid receptor affected by endogenous and exogenous opioids	Associated with differential opioid sensitivity. Associated with response to naltrexone for alcohol use disorder	Monitor **opioid dose response. Naltrexone** consideration for alcohol use disorder

Pharmacokinetic genes indicate the effect the body has on the drug and may inform drug dosage.

Pharmacokinetic	**Cytochrome P450 (CYP450: 1A2, 2B6, 2C9, 2C19, 2D6, 3A4/5)**	Most psychiatric medications are metabolized by CYP450s	May influence exposure to certain psychotropic medications	**Dose adjustment (an increase or decrease) may be considered**
	UDP Glucoronosyltransferase (UGT: 1A4, 2B15)	Several psychiatric medications are metabolized by CYP450s	May influence exposure to certain psychotropic medications	**Dose adjustment (an increase or decrease) may be considered**
	ATP Binding Cassette B1 (ABCB1)	Proteins that impact absorption or brain penetration of certain drugs	Associated with response or sensitivity to select opioids, antipsychotics or antidepressants	**Increased exposure possible for select opioids & antipsychotics, as well as citalopram, escitalopram, paroxetine, venlafaxine, amitriptyline, nortriptyline and trimipramine.**