medcheck from dnalife

PATIENT INFORMATION
NAME: Sample Patient
DOB: 15/Nov/1984
SEX AT BIRTH: Female

SPECIMEN DETAILS
BARCODE: TST-NL-000000
SAMPLE ID: 34027
TYPE: DBS
COLLECTED: 01/Oct/2025

ORDERED BY
Sample Practitioner
GENERATED: 11/Nov/2025

This pharmacogenetic information is based on best evidence compiled from guidelines and databases including the FDA Table of Pharmacogenetic Associations and the Clinical Pharmacogenetics Implementation Consortium (CPIC).
Please refer to the Methods, Limitations, and Liability Disclaimer at the end of this report.

Medication Summary

The Medication Summary lists medications with pharmacogenetic associations, organized by therapeutic area and drug-gene interaction severity. The highest severity is prioritized (moderate/severe) from all relevant sources and genes for a medication. See Medication Report for full details.

1 Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

2 Moderate drug-gene interaction

3 Serious drug-gene interaction: avoid/select alternative

Analgesia

1
Carisoprodol
Celecoxib
Codeine
Flurbiprofen
Hydrocodone
Ibuprofen
Meloxicam
Methadone
Oliceridine
Oxycodone
Piroxicam
Tenoxicam
Tramadol
Venlafaxine

2
Alfentanil
Amitriptyline
Desipramine
Fentanyl
Imipramine
Morphine
Nortriptyline

Autoimmune

1
Siponimod

2
Cyclosporine

...Autoimmune

2
Methotrexate
Tacrolimus

Cancer

1
Erdafitinib
Gefitinib

2
Methotrexate
Tamoxifen

Cardiovascular

1
Atorvastatin
Carvedilol
Clopidogrel
Fluvastatin
Lovastatin
Mavacamten
Metoprolol
Nebivolol
Pitavastatin
Pravastatin
Propranolol
Rosuvastatin
Simvastatin

2
Flecainide
Propafenone

...Cardiovascular

2
Warfarin

Endocrinology

1
Nateglinide

Gastroenterology

1
Dronabinol
Esomeprazole
Metoclopramide
Ondansetron
Rabeprazole

2
Dexlansoprazole
Lansoprazole
Meclizine
Methotrexate
Omeprazole
Pantoprazole

Infection

1
Nevirapine
Voriconazole

2
Efavirenz

Mental Health

1
Amoxapine

...Mental Health

1
Amphetamine
Aripiprazole
Aripiprazole lauroxil
Brexpiprazole
Bupropion
Citalopram
Clozapine
Dextromethorphan/ Bupropion
Diazepam
Escitalopram
Fluoxetine
Haloperidol
Iloperidone
Lofexidine
Methadone
Methylphenidate
Mirtazapine
Perphenazine
Pimozide
Protriptyline
Quetiapine
Risperidone
Thioridazine
Venlafaxine
Viloxazine

2
Amitriptyline
Atomoxetine

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...Mental Health

2

Clomipramine
Desipramine
Doxepin
Fluvoxamine
Imipramine
Nicotine replacement therapy
Nortriptyline
Paroxetine
Sertraline
Trimipramine
Vortioxetine
Zuclopenthixol

Neurology

1

Brivaracetam
Clobazam
Deutetrabenazine
Dextromethorphan/ Quinidine
Diazepam
Donepezil
Fosphenytoin
Galantamine
Metoprolol
Phenytoin
Pitolisant
Propranolol
Tetrabenazine
Valbenazine
Venlafaxine

2

Amitriptyline

Rheumatology

1

Celecoxib
Flurbiprofen

...Rheumatology

1

Ibuprofen
Meloxicam
Piroxicam
Tenoxicam

2

Methotrexate

Urology

1

Darifenacin
Fesoterodine
Mirabegron
Tamsulosin
Tolterodine

Other

1

Abrocitinib
Avatrombopag
Cevimeline
Elagolix
Eltrombopag
Flibanserin
Lusutrombopag
Oral contraceptives

3

Eliglustat

Overview

This pharmacogenetic information is based on best evidence compiled from guidelines and databases including the FDA Table of Pharmacogenetic Associations and the Clinical Pharmacogenetics Implementation Consortium (CPIC). In some cases, PharmGKB and the Dutch Pharmacogenetics Working Group (DPWG) may also be referenced.

This document includes:
1. Medication Summary: A list of medications organized by their therapeutic area of use and sorted based on their drug-gene interaction severity.
2. Medication Report: Provides information about factors affecting medication response.
3. Guidelines: A table of guidelines used to produce each interpretation.
4. References: Sources of information used to create this report.
5. Laboratory Report: Contains genetic test results in a technical table.

TreatGx and ReviewGx are clinical decision support tools that expand on the contents on this report.

TreatGx
TreatGx is clinical decision support software for precision prescribing that identifies condition-specific medication options based on multiple patient factors.

ReviewGx
ReviewGx uses patient factors including pharmacogenetics to highlight medication safety issues, help optimize medications, and identify deprescribing opportunities.

Components of the Medication Report

For all medications, clinical factors, medical conditions, lab values, drug-gene and drug-drug interactions may contribute to medication response and should be evaluated for each patient. The kidney and liver icon notations are intended for informational purposes only. The patient's kidney/liver function are not used for the purposes of displaying this information, and the potential interactions for that specific medication may not apply. TreatGx and ReviewGx help integrate this information to support precision prescribing and comprehensive medication management. The final genotype/phenotype call is at the discretion of the laboratory director. Medication changes should only be initiated at the discretion of the patient's healthcare provider after a full assessment.

Example:

Generic Name → Codeine

Brand Names → Codeine Contin Tylenol with Codeine No. 2/3/4

Potential Kidney or Liver Interaction → TreatGx ReviewGx

Codeine	Phenotype	Genetic Test	Results	Source/Evidence Level
Codeine Contin Tylenol with Codeine No. 2/3/4	Poor metabolizer	CYP2D6	*3/*6	CPIC A[6]; FDA 1[34]

2 CYP2D6 poor metabolizer: greatly reduced metabolism of Codeine may result in decreased response

3 Avoid Codeine use

Source/Evidence Level for Drug-Gene Interactions:

For each medication, a source is listed for each drug-gene interaction. This report prioritizes guidance from CPIC if the drug-gene pair is assigned a CPIC Level of A or B. This is the threshold that CPIC defines as having sufficient evidence for at least one prescribing action to be recommended. See cpicpgx.org/prioritization for a full explanation of CPIC Levels for Genes/Drugs.

Pharmacogenetic information from FDA-approved drug labels or the FDA Table of Pharmacogenetic Associations (https://www.fda.gov/medical-devices/precision-medicine/table-pharmacogenetic-associations) is included when available.

If there is no CPIC guideline (level A or B) or FDA guidance, other sources may be referenced, such as DPWG guidelines, PharmGKB clinical annotations, and in some instances, clinical studies. See https://www.pharmgkb.org/page/clinAnnLevels for a full explanation of PharmGKB levels of evidence. Use of any of this information is at the discretion of the health professional.

* Other clinical factors, medical conditions and drug-drug interactions may contribute to medication response.

Medication Report

The **Medication Report** provides information on how pharmacogenetic results affect each medication.

Use TreatGx and ReviewGx to explore personalized medication treatment options, dosing information and medication optimization.

Abrocitinib	Phenotype	Genetic Test	Results	Source/Evidence Level
Cibinqo ReviewGx	Normal metabolizer	CYP2C19	*1/*1	FDA 1[46]; Product monograph (actionable)[36]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Alfentanil	Phenotype	Genetic Test	Results	Source/Evidence Level
Alfenta ReviewGx	Increased analgesic response	OPRM1 rs1799971	A/A	PharmGKB 3[47,48]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose

2 PharmGKB – Clinical Annotation (Level 3 Efficacy): Patients with the OPRM1 rs1799971 A/A genotype may have an increased analgesic response to alfentanil as compared to patients with the A/G or G/G genotypes. Note that one study reported a non-significant association. This drug-variant pair has been assigned a "no recommendation" by CPIC, as it was determined to be not clinically actionable. Other genetic or clinical factors may also affect a patient's response to alfentanil.
PharmGKB – Clinical Annotation (Level 3 Dosage): Patients with the OPRM1 rs1799971 A/A genotype may have reduced alfentanil dose requirements as compared to patients with the A/G or G/G genotypes. This drug-variant pair has been assigned a "no recommendation" by CPIC, as it was determined to be not clinically actionable. Other genetic or clinical factors may also affect a alfentanil dose requirements.

Amitriptyline	Phenotype	Genetic Test	Results	Source/Evidence Level
Elavil Levate TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	CPIC A[24]; FDA 3[46]
	Normal metabolizer	CYP2C19	*1/*1	CPIC A[24]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – CYP2D6 Implication: Reduced metabolism of TCAs to less active compounds compared to normal metabolizers. Higher plasma concentrations of active drug will increase the probability of side effects.

2 CPIC – CYP2C19 Implication: Normal metabolism of tertiary amines.

2 CPIC – Moderate Recommendation: Consider a 25% reduction of recommended starting dose. Patients may receive an initial low dose of TCAs, which is then increased over several days to the recommended steady-state dose. The starting dose in this guideline refers to the recommended steady-state dose. Recommendations above only apply to higher initial doses of TCAs for treatment of conditions such as depression. Lower dosages are often used for neuropathic pain compared to depressive disorders. Because of the lower dosage, it is less likely that CYP2D6 intermediate metabolizers will experience adverse effects due to supratherapeutic plasma concentrations. Therefore, CPIC recommends no dose modifications for intermediate metabolizers when prescribed a lower dose for treatment of neuropathic pain, but these patients should be monitored closely for side effects. If larger doses are warranted, CPIC recommends following the gene-based guidelines presented above.

Amoxapine	Phenotype	Genetic Test	Results	Source/Evidence Level
ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table Section 3 – Potential Impact on Pharmacokinetic Properties Only: May alter systemic concentrations.

Amphetamine	Phenotype	Genetic Test	Results	Source/Evidence Level
Adderall Adzenys Dyanavel Evekeo Mydayis TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Aripiprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Abilify TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]; Product monograph (actionable)[42]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Aripiprazole lauroxil	Phenotype	Genetic Test	Results	Source/Evidence Level
Aristada TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]; Product monograph (actionable)[2]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Atomoxetine	Phenotype	Genetic Test	Results	Source/Evidence Level
Strattera	Intermediate metabolizer (AS 0.25-0.75)	CYP2D6 (Activity Score)	*4/*41	CPIC A[11]; FDA 1[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may reduce efficacy, may increase adverse events

2 CPIC – Implication: Decreased metabolism of atomoxetine and higher atomoxetine concentrations as compared to normal metabolizers. Intermediate metabolizers may be at an increased risk of discontinuation as compared to poor metabolizers.

2 ADULTS: CPIC – Moderate Recommendation: Initiate with a dose of 40 mg/day and if no clinical response and in the absence of adverse events after 2 weeks increase dose to 80 mg/day. If response is inadequate after 2 weeks consider obtaining a plasma concentration 2-4 h after dosing. If concentration is <200 ng/mL, consider a proportional dose increase to achieve a concentration to approach 400 ng/mL. If unacceptable side effects are present at any time, consider a reduction in dose.
PEDIATRICS: CPIC – Moderate Recommendation: Initiate with a dose of 0.5 mg/kg/day and if no clinical response and in the absence of adverse events after 2 weeks, consider obtaining a plasma concentration 2 to 4 hours after dosing. If response is inadequate and concentration is < 200 ng/mL, consider a proportional dose increase to achieve a concentration to approach 400 ng/mL. If unacceptable side effects are present at any time, consider a reduction in dose.
Notes (Adult & Pediatrics): Therapeutic range of 200 to 1000 ng/mL has been proposed (PMID 29493375). Limited data are available regarding the relationship between atomoxetine plasma concentrations and clinical response. Available information suggests that clinical response is greater in poor metabolizers (PMs) compared to non-PMs and may be related to the higher plasma concentrations 1 to 1.5 hours after dosing in PMs compared to non-PMs administered a similar dose. Furthermore, modest improvement in response, defined as reduction in ADHD-rating scale, is observed at peak concentrations greater than 400 ng/mL.

Atorvastatin	Phenotype	Genetic Test	Results	Source/Evidence Level
Lipitor	Normal function	SLCO1B1	*1/*1	CPIC A[13]; FDA 3[46]
	Increased response compared to C/C	ApoE rs7412	C/T	PharmGKB 2B[47,48]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – SLCO1B1 Implication: Typical myopathy risk and Atorvastatin exposure.

1 CPIC – SLCO1B1 Strong Recommendation: Prescribe desired starting dose and adjust doses based on disease-specific guidelines.
The potential for drug-drug interactions and dose limits based on renal and hepatic function and ancestry should be evaluated prior to initiating a statin.

1 PharmGKB – ApoE Clinical Annotation (Level 2B Efficacy): Patients with Coronary Disease and Hyperlipidemias and the ApoE rs7412 C/T or T/T genotype may have increased response to atorvastatin as compared to patients with the C/C genotype. Other genetic and clinical factors may also influence response to atorvastatin treatment.

Avatrombopag	Phenotype	Genetic Test	Results	Source/Evidence Level
Doptelet ReviewGx	Normal metabolizer	CYP2C9	*1/*1	FDA 3[46]
	Normal Factor II	Factor II rs1799963	G/G	Product monograph (actionable)[1]
	Normal Factor V Leiden	Factor V rs6025	C/C	Product monograph (actionable)[1]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2C9 phenotype in the FDA PGx Table

1 FDA Product Monograph: No recommended changes or information for normal Factor II (i.e. Prothrombin 20210A mutation absent) in the FDA Product Monograph.

1 FDA Product Monograph: No recommended changes or information for normal Factor V in the FDA Product Monograph.

Brexpiprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Rexulti TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]; Product monograph (actionable)[3]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Brivaracetam	Phenotype	Genetic Test	Results	Source/Evidence Level
Briviact Brivlera ReviewGx	Normal metabolizer	CYP2C19	*1/*1	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C19 alleles do not indicate changes from recommended dose

Bupropion	Phenotype	Genetic Test	Results	Source/Evidence Level
Wellbutrin Zyban TreatGx ReviewGx	More likely to quit smoking	ANKK1/DRD2 rs1800497	G/G	PharmGKB 3[47,48]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 PharmGKB – Clinical Annotation (Level 3 Efficacy): Patients with the ANKK1 rs1800497 G/G genotype who are treated with bupropion may be more likely to quit smoking as compared to patients with the A/A or A/G genotypes, however contradictory findings about abstinence exist. Other genetic and clinical factors may also influence a patient's chance for quitting smoking.

Carisoprodol	Phenotype	Genetic Test	Results	Source/Evidence Level
ReviewGx	Normal metabolizer	CYP2C19	*1/*1	FDA 3[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C19 alleles do not indicate changes from recommended dose

Carvedilol	Phenotype	Genetic Test	Results	Source/Evidence Level
Coreg	Intermediate metabolizer	CYP2D6	*4/*41	FDA 2[46]

TreatG
ReviewG

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Celecoxib	Phenotype	Genetic Test	Results	Source/Evidence Level
Celebrex	Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	CPIC A[45]; FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

TreatG
ReviewG

1 CYP2C9 alleles do not indicate changes from recommended dose

Cevimeline	Phenotype	Genetic Test	Results	Source/Evidence Level
Evoxac	Intermediate metabolizer	CYP2D6	*4/*41	FDA 2[46]

ReviewG

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Citalopram	Phenotype	Genetic Test	Results	Source/Evidence Level
Celexa	Normal metabolizer	CYP2C19	*1/*1	CPIC A[10]; FDA 1[46]

Drug-Gene Interactions:

TreatG
ReviewG

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 Normal CYP2C19 metabolism

1 Initiate therapy with recommended starting dose (per CPIC strong recommendation).

Clobazam	Phenotype	Genetic Test	Results	Source/Evidence Level
Onfi Sympazan	Normal metabolizer	CYP2C19	*1/*1	FDA 1[46]; Product monograph (actionable)[30]

Drug-Gene Interactions:

ReviewG

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2C19 phenotype in the FDA PGx Table

Clomipramine	Phenotype	Genetic Test	Results	Source/Evidence Level
Anafranil ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[24]; FDA 3[46]
	Normal metabolizer	CYP2C19	*1/*1	CPIC B[24]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – CYP2D6 Implication: Reduced metabolism of TCAs to less active compounds compared to normal metabolizers. Higher plasma concentrations of active drug will increase the probability of side effects.

2 CPIC – CYP2C19 Implication: Normal metabolism of tertiary amines.

2 CPIC – Optional Recommendation: Consider a 25% reduction of recommended starting dose. Patients may receive an initial low dose of TCAs, which is then increased over several days to the recommended steady-state dose. The starting dose in this guideline refers to the recommended steady-state dose. Recommendations above only apply to higher initial doses of TCAs for treatment of conditions such as depression. Lower dosages are often used for neuropathic pain compared to depressive disorders. Because of the lower dosage, it is less likely that CYP2D6 intermediate metabolizers will experience adverse effects due to supratherapeutic plasma concentrations. Therefore, CPIC recommends no dose modifications for intermediate metabolizers when prescribed a lower dose for treatment of neuropathic pain, but these patients should be monitored closely for side effects. If larger doses are warranted, CPIC recommends following the gene-based guidelines presented above.

Clopidogrel	Phenotype	Genetic Test	Results	Source/Evidence Level
Plavix TreatGx ReviewGx	Normal metabolizer	CYP2C19	*1/*1	CPIC A[28]; FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – Implication: Normal clopidogrel active metabolite formation; normal on-treatment platelet reactivity.

1 CPIC – Strong Recommendation: If considering clopidogrel, use at standard dose (75 mg/day).

Clozapine	Phenotype	Genetic Test	Results	Source/Evidence Level
Clozaril Fazaclo ODT Versacloz TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Codeine	Phenotype	Genetic Test	Results	Source/Evidence Level
Codeine Contin Tylenol with Codeine No. 2/3/4 TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	CPIC A[14]; FDA 1[46]; FDA 2[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – Implication: Reduced morphine formation.

1 CPIC – Moderate Recommendation: Use codeine label recommended age-specific or weight-specific dosing. If no response and opioid use is warranted, consider a non-tramadol opioid.

Cyclosporine	Phenotype	Genetic Test	Results	Source/Evidence Level
Neoral Sandimmune ReviewGx	Poor metabolizer	CYP3A5	*3/*3	PharmGKB 3[47,48]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose

2 PharmGKB – Clinical Annotation (Level 3 Dosage): Patients who are recipients of a kidney transplant and who carry the *3 allele in combination with another no function allele may have decreased cyclosporine dose requirements as compared to patients carrying two normal function alleles or a normal function allele in combination with a no function allele. However, conflicting evidence has been reported. Other genetic and clinical factors may also affect cyclosporine dose requirements. (PharmGKB does not provide information about other poor metabolizer diplotypes without *3 i.e. *6/*6, *7/*7, *6/*7).

Darifenacin	Phenotype	Genetic Test	Results	Source/Evidence Level
Enablex TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Desipramine	Phenotype	Genetic Test	Results	Source/Evidence Level
Norpramin TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[24]; FDA 3[46]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – CYP2D6 Implication: Reduced metabolism of TCAs to less active compounds compared to normal metabolizers. Higher plasma concentrations of active drug will increase the probability of side effects.

2 CPIC – Optional Recommendation: Consider a 25% reduction of recommended starting dose. Patients may receive an initial low dose of a tricyclic, which is then increased over several days to the recommended steady-state dose. The starting dose in this guideline refers to the recommended steady-state dose. Utilize therapeutic drug monitoring to guide dose adjustments. Titrate dose to observed clinical response with symptom improvement and minimal (if any) side effects.
Recommendations above only apply to higher initial doses of TCAs for treatment of conditions such as depression. Lower dosages are often used for neuropathic pain compared to depressive disorders.
Because of the lower dosage, it is less likely that CYP2D6 intermediate metabolizers will experience adverse effects due to supratherapeutic plasma concentrations. Therefore, CPIC recommends no dose modifications for intermediate metabolizers when prescribed a lower dose for treatment of neuropathic pain, but these patients should be monitored closely for side effects. If larger doses are warranted, CPIC recommends following the gene-based guidelines presented above.

Deutetrabenazine	Phenotype	Genetic Test	Results	Source/Evidence Level
Austedo ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Dexlansoprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Dexilant	Normal metabolizer	CYP2C19	*1/*1	CPIC B[29]; FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require an increased dose, may reduce efficacy

2 CPIC – Implication: Normal PPI metabolism; may be at increased risk of therapeutic failure compared with CYP2C19 IMs and PMs.

2 CPIC – Moderate Recommendation: Initiate standard starting daily dose. Consider increasing dose by 50–100% for the treatment of Helicobacter pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.

Dextromethorphan/ Bupropion	Phenotype	Genetic Test	Results	Source/Evidence Level
Auvelity	Intermediate metabolizer	CYP2D6	*4/*41	Product monograph (actionable)[6]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA Product Monograph: no recommended changes or information for this CYP2D6 phenotype in the FDA Product Monograph.

Dextromethorphan/ Quinidine	Phenotype	Genetic Test	Results	Source/Evidence Level
Nuedexta	Intermediate metabolizer	CYP2D6	*4/*41	Product monograph (actionable)[5]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA Product Monograph: no recommended changes or information for this CYP2D6 phenotype in the FDA Product Monograph.

Diazepam	Phenotype	Genetic Test	Results	Source/Evidence Level
Diastat Valium	Normal metabolizer	CYP2C19	*1/*1	FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2C19 phenotype in the FDA PGx Table

Donepezil	Phenotype	Genetic Test	Results	Source/Evidence Level
Aricept	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Doxepin	Phenotype	Genetic Test	Results	Source/Evidence Level
Silenor Sinequan	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[24]; FDA 3[46]
	Normal metabolizer	CYP2C19	*1/*1	CPIC B[24]; FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – CYP2D6 Implication: Reduced metabolism of TCAs to less active compounds compared to normal metabolizers. Higher plasma concentrations of active drug will increase the probability of side effects.

2 CPIC – CYP2C19 Implication: Normal metabolism of tertiary amines.

2 CPIC – Optional Recommendation: Consider a 25% reduction of recommended starting dose. Patients may receive an initial low dose of TCAs, which is then increased over several days to the recommended steady-state dose. The starting dose in this guideline refers to the recommended steady-state dose. Recommendations above only apply to higher initial doses of TCAs for treatment of conditions such as depression. Lower dosages are often used for neuropathic pain compared to depressive disorders. Because of the lower dosage, it is less likely that CYP2D6 intermediate metabolizers will experience adverse effects due to supratherapeutic plasma concentrations. Therefore, CPIC recommends no dose modifications for intermediate metabolizers when prescribed a lower dose for treatment of neuropathic pain, but these patients should be monitored closely for side effects. If larger doses are warranted, CPIC recommends following the gene-based guidelines presented above.

Dronabinol	Phenotype	Genetic Test	Results	Source/Evidence Level
Marinol Syndros	Normal metabolizer	CYP2C9	*1/*1	FDA 1[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C9 alleles do not indicate changes from recommended dose

Efavirenz	Phenotype	Genetic Test	Results	Source/Evidence Level
Sustiva	Intermediate metabolizer	CYP2B6	*1/*9	CPIC A[15]; FDA 2[46]

ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – Implication: Higher dose-adjusted trough concentrations of efavirenz compared with normal metabolizers; increased risk of CNS adverse events.

2 CPIC – Moderate Recommendation: Consider initiating efavirenz with decreased dose of 400 mg/day (in children ≥40 kg and adult patients).
If therapeutic drug monitoring is available and a decreased efavirenz dose is prescribed, consider obtaining steady-state plasma efavirenz concentrations to ensure concentrations are in the suggested therapeutic range (~1 to 4 µg/mL). To prescribe efavirenz at a decreased dose of 400 mg/day or 200 mg/day in a multidrug regimen may require prescribing more than one pill once daily. If so, the provider should weigh the potential benefit of reduced dose against the potential detrimental impact of increased pill number.

Elagolix	Phenotype	Genetic Test	Results	Source/Evidence Level
Orilissa	Normal function	SLCO1B1	*1/*1	FDA 3[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 SLCO1B1 alleles indicate a typical response to Elagolix

Eliglustat	Phenotype	Genetic Test	Results	Source/Evidence Level
Cerdelga	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

ReviewGx

Drug-Gene Interactions:

Serious drug-gene interaction: avoid/select alternative

- 2 CYP2D6 intermediate metabolizer: reduced metabolism of Eliglustat to less active compounds
- 2 Higher plasma concentrations of active drug may increase the risk of adverse drug reactions
- 3 Concurrent use of a strong or moderate CYP3A inhibitor, use of both a moderate or strong CYP2D6 inhibitor and a moderate or strong CYP3A inhibitor, or use of a strong CYP3A inducer: Avoid Eliglustat use
- 2 Concurrent use of a moderate or strong CYP2D6 inhibitor: Consider reducing eliglustat dose, refer to drug monograph or FDA labelling for dosing recommendations
- 1 No concurrent use of interacting drugs: CYP2D6 alleles do not indicate changes from recommended dose, refer to drug monograph or FDA labelling for dosing recommendations

Eltrombopag	Phenotype	Genetic Test	Results	Source/Evidence Level
Promacta Revolade	Normal Factor V Leiden	Factor V rs6025	C/C	Product monograph (actionable)[35]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

- 1 FDA Product Monograph: No recommended changes or information for normal Factor V in the FDA Product Monograph.

Erdafitinib	Phenotype	Genetic Test	Results	Source/Evidence Level
Balversa	Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	FDA 1[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

- 1 FDA PGx Table: No recommended changes or information for this CYP2C9 star allele result in the FDA PGx Table

Escitalopram	Phenotype	Genetic Test	Results	Source/Evidence Level
Cipralex Lexapro	Normal metabolizer	CYP2C19	*1/*1	CPIC A[10]; FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

- 1 Normal CYP2C19 metabolism
- 1 Initiate therapy with recommended starting dose (per CPIC strong recommendation).

Esomeprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Nexium	Normal metabolizer	CYP2C19	*1/*1	FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

- 1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Fentanyl	Phenotype	Genetic Test	Results	Source/Evidence Level
Actiq Duragesic Fentora Sublimaze	Decreased analgesic response	OPRM1 rs1799971	A/A	PharmGKB 3[47,48]

ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may reduce efficacy

2 PharmGKB – Clinical Annotation (Level 3 Efficacy): Patients with the OPRM1 rs1799971 A/A genotype may have a decreased analgesic response to fentanyl as compared to patients with the A/G or G/G genotypes. However, conflicting evidence has been reported. This drug-variant pair has been assigned a "no recommendation" by CPIC, as it was determined to be not clinically actionable. Other genetic or clinical factors may also affect response to fentanyl.
PharmGKB – Clinical Annotation (Level 3 Dosage): Patients with the OPRM1 rs1799971 A/A genotype may have decreased fentanyl dose requirements as compared to patients with the G/G genotype. However, conflicting evidence has been reported. This drug-variant pair has been assigned a "no recommendation" by CPIC, as it was determined to be not clinically actionable. Other genetic or clinical factors may also affect fentanyl dose requirements.

Fesoterodine	Phenotype	Genetic Test	Results	Source/Evidence Level
Toviaz	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Flecainide	Phenotype	Genetic Test	Results	Source/Evidence Level
Tambocor	Intermediate metabolizer	CYP2D6	*4/*41	DPWG[17]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may reduce efficacy, may increase adverse events

2 CYP2D6 intermediate metabolizer: reduced metabolism of Flecainide to less active compounds

2 Higher plasma concentrations of active drug may increase the risk of adverse drug reactions

2 Reduce the standard dose by 25%, record electrocardiogram, and monitor plasma concentration

Flibanserin	Phenotype	Genetic Test	Results	Source/Evidence Level
Addyi	Normal metabolizer	CYP2C19	*1/*1	FDA 1[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C19 alleles do not indicate changes from recommended dose

Fluoxetine	Phenotype	Genetic Test	Results	Source/Evidence Level
Prozac	Intermediate metabolizer	CYP2D6	*4/*41	Product monograph (actionable)[12]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA Product Monograph: No recommended changes or information for this phenotype in the FDA Product Monograph

Flurbiprofen	Phenotype	Genetic Test	Results	Source/Evidence Level
Ansaid	Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	CPIC A[45]; FDA 1[46]

TreatG: ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C9 alleles do not indicate changes from recommended dose

Fluvastatin	Phenotype	Genetic Test	Results	Source/Evidence Level
Lescol	Normal metabolizer	CYP2C9	*1/*1	CPIC A[13]
	Normal function	SLCO1B1	*1/*1	CPIC A[13]

TreatG: ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – CYP2C9 Implication: Normal exposure.

1 CPIC – SLCO1B1 Implication: Typical myopathy risk and Fluvastatin exposure.

1 CPIC – Strong Recommendation: Prescribe desired starting dose and adjust doses of fluvastatin based on disease-specific guidelines.
The potential for drug-drug interactions and dose limits based on renal and hepatic function and ancestry should be evaluated prior to initiating a statin.

Fluvoxamine	Phenotype	Genetic Test	Results	Source/Evidence Level
Luvox	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[10]; FDA 3[46]

TreatG: ReviewG:

Drug-Gene Interactions:

Moderate drug-gene interaction: may increase adverse events

2 Reduced metabolism of fluvoxamine to less active compounds when compared with CYP2D6 normal metabolizers. Higher plasma concentrations may increase the probability of side effects.

2 Initiate therapy with recommended starting dose (per CPIC moderate recommendation).

Fosphenytoin	Phenotype	Genetic Test	Results	Source/Evidence Level
Cerebyx	Normal metabolizer	CYP2C9	*1/*1	CPIC A[27]; FDA 1[46]

ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – CYP2C9 Implication: Normal Fosphenytoin metabolism

1 CPIC – Strong Recommendation: No adjustments needed from typical dosing strategies. Subsequent doses should be adjusted according to therapeutic drug monitoring, response, and side effects. An HLA-B*15:02 negative test does not eliminate the risk of Fosphenytoin-induced Stevens-Johnson syndrome and toxic epidermal necrolysis (SJS/TEN), and patients should be carefully monitored according to standard practice.

Galantamine	Phenotype	Genetic Test	Results	Source/Evidence Level
Razadyne	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

TreatG: ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Gefitinib	Phenotype	Genetic Test	Results	Source/Evidence Level
Iressa ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Haloperidol	Phenotype	Genetic Test	Results	Source/Evidence Level
Haldol TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	DPWG[17]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 DPWG – Description: The CYP2D6 genetic variation results in a higher plasma concentration, but the effect is small and no clinically significant effects were found.
DPWG – CYP2D6 Recommendation: No action is required for this gene-drug interaction.

Hydrocodone	Phenotype	Genetic Test	Results	Source/Evidence Level
Anexsia Hycodan Hysingla Zohydro TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[14]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – Implication: Minimal evidence for pharmacokinetic or clinical effect.

1 CPIC – Optional Recommendation: Use hydrocodone label recommended age-specific or weight-specific dosing. If no response and opioid use is warranted, consider non-codeine or non-tramadol opioid.

Ibuprofen	Phenotype	Genetic Test	Results	Source/Evidence Level
Advil Caldolor Duexis Motrin IB NeoProfen TreatGx ReviewGx	Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	CPIC A[45]; FDA 3[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C9 alleles do not indicate changes from recommended dose

Iloperidone	Phenotype	Genetic Test	Results	Source/Evidence Level
Fanapt TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Imipramine	Phenotype	Genetic Test	Results	Source/Evidence Level
Tofranil	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[24]; FDA 3[46]
TreatG ReviewG	Normal metabolizer	CYP2C19	*1/*1	CPIC B[24]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – CYP2D6 Implication: Reduced metabolism of TCAs to less active compounds compared to normal metabolizers. Higher plasma concentrations of active drug will increase the probability of side effects.

2 CPIC – CYP2C19 Implication: Normal metabolism of tertiary amines.

2 CPIC – Optional Recommendation: Consider a 25% reduction of recommended starting dose. Patients may receive an initial low dose of TCAs, which is then increased over several days to the recommended steady-state dose. The starting dose in this guideline refers to the recommended steady-state dose. Recommendations above only apply to higher initial doses of TCAs for treatment of conditions such as depression. Lower dosages are often used for neuropathic pain compared to depressive disorders. Because of the lower dosage, it is less likely that CYP2D6 intermediate metabolizers will experience adverse effects due to supratherapeutic plasma concentrations. Therefore, CPIC recommends no dose modifications for intermediate metabolizers when prescribed a lower dose for treatment of neuropathic pain, but these patients should be monitored closely for side effects. If larger doses are warranted, CPIC recommends following the gene-based guidelines presented above.

Lansoprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Prevacid	Normal metabolizer	CYP2C19	*1/*1	CPIC A[29]; FDA 3[46]
TreatG ReviewG				

Drug-Gene Interactions:

Moderate drug-gene interaction: may require an increased dose, may reduce efficacy

2 CPIC – Implication: Normal PPI metabolism; may be at increased risk of therapeutic failure compared with CYP2C19 IMs and PMs.

2 CPIC – Moderate Recommendation: Initiate standard starting daily dose. Consider increasing dose by 50–100% for the treatment of Helicobacter pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.

Lofexidine	Phenotype	Genetic Test	Results	Source/Evidence Level
Lucemyra	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]
ReviewG				

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Lovastatin	Phenotype	Genetic Test	Results	Source/Evidence Level
Altoprev	Normal function	SLCO1B1	*1/*1	CPIC A[13]
TreatG ReviewG				

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – SLCO1B1 Implication: Typical myopathy risk and Lovastatin exposure.

1 CPIC – SLCO1B1 Strong Recommendation: Prescribe desired starting dose and adjust doses based on disease-specific guidelines.
The potential for drug-drug interactions and dose limits based on renal and hepatic function and ancestry should be evaluated prior to initiating a statin.

Lusutrombopag	Phenotype	Genetic Test	Results	Source/Evidence Level
Mupleta ReviewGx	Normal Factor II	Factor II rs1799963	G/G	Product monograph (actionable)[43]
	Normal Factor V Leiden	Factor V rs6025	C/C	Product monograph (actionable)[43]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA Product Monograph: No recommended changes or information for normal Factor II (i.e. Prothrombin 20210A mutation absent) in the FDA Product Monograph.

1 FDA Product Monograph: No recommended changes or information for normal Factor V in the FDA Product Monograph.

Mavacamten	Phenotype	Genetic Test	Results	Source/Evidence Level
Camzyos ReviewGx	Normal metabolizer	CYP2C19	*1/*1	FDA 2[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Meclizine	Phenotype	Genetic Test	Results	Source/Evidence Level
Antivert ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may reduce efficacy, may increase adverse events

2 CYP2D6 intermediate metabolizer: reduced metabolism of Meclizine to less active compounds

2 Higher plasma concentrations of active drug may increase the risk of adverse drug reactions

2 This drug has an FDA therapeutic recommendation, refer to drug monograph or FDA labelling for dosing recommendations

Meloxicam	Phenotype	Genetic Test	Results	Source/Evidence Level
Anjeso Mobic Qmiiz ODT Vivlodex TreatGx ReviewGx	Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	CPIC A[45]; FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C9 alleles do not indicate changes from recommended dose

Methadone	Phenotype	Genetic Test	Results	Source/Evidence Level
Methadose	Intermediate metabolizer	CYP2B6	*1/*9	PharmGKB 2A[40,47,48]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – CYP2B6 Level C Implication, as adapted by PharmGKB (Level 2A Metabolism/PK Clinical Annotation): Increased S-methadone plasma concentrations; unknown clinical implications. No difference in steady-state R-methadone plasma concentrations.
PharmGKB: Other genetic and clinical factors may also affect methadone metabolism. This annotation only covers the pharmacokinetic relationship between CYP2B6 and methadone and does not include evidence about clinical outcomes.

1 CPIC – CYP2B6 Moderate Recommendation: Standard dosing, titration, and monitoring of methadone. Clinical guidelines for ECG monitoring in the context of methadone therapy, including risk assessment of other clinical factors, should be followed. None of the pharmacogenetic information in this guideline should be interpreted to influence the use of ECG monitoring guidelines.

Methotrexate	Phenotype	Genetic Test	Results	Source/Evidence Level
Metoject Otrexup Rasuvo Trexall Xatmep	Increased risk of toxicity	MTHFR rs1801133	A/A	PharmGKB 2A[47,48]

Drug-Gene Interactions:

Moderate drug-gene interaction: may increase adverse events

2 PharmGKB – Clinical Annotation (Level 2A Toxicity): Patients with the MTHFR rs1801133 A/A genotype and cancer or arthritis who are treated with methotrexate may have an increased risk of toxicity as compared to patients with the A/G or G/G genotype. However, conflicting evidence has been reported. Other genetic and clinical factors may also influence methotrexate toxicity. This drug-variant pair has been assigned a "no recommendation" by DPWG, as it was determined to be not clinically actionable.

TreatGx
ReviewGx

Methylphenidate	Phenotype	Genetic Test	Results	Source/Evidence Level
Aptensio Concerta Cotempla Daytrana Jornay Metadate Methylin Quillichew Quillivant Relexxiii Ritalin	No significant association to response	COMT rs4680	G/A	PharmGKB 4[47,48]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 PharmGKB – Clinical Annotation (Level 4 Efficacy): The current evidence base suggests that there is no significant association between the COMT rs4680 A/G genotype and response to methylphenidate. However, conflicting evidence has been reported. This drug-variant pair has been assigned a "no recommendation" by DPWG, as it was determined to be not clinically actionable. Other genetic and clinical factors may also influence response to methylphenidate.

TreatGx
ReviewGx

Metoclopramide	Phenotype	Genetic Test	Results	Source/Evidence Level
Metonia Reglan	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

TreatGx
ReviewGx

Metoprolol	Phenotype	Genetic Test	Results	Source/Evidence Level
Kapspargo Sprinkle Lopressor Toprol-XL	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[16]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – Implication: Decreased metabolism of metoprolol leading to increased drug concentrations; however, this does not appear to translate into clinically significant changes in heart rate, blood pressure, or clinical outcomes.

1 CPIC – Moderate Recommendation: Initiate standard dosing.

Mirabegron	Phenotype	Genetic Test	Results	Source/Evidence Level
Myrbetriq	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Mirtazapine	Phenotype	Genetic Test	Results	Source/Evidence Level
Remeron	Intermediate metabolizer	CYP2D6	*4/*41	DPWG[17]; PharmGKB 2A[47,48]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 DPWG: There is insufficient evidence to suggest that the higher plasma concentration of mirtazapine results in an increase in the side effects or efficacy.

1 DPWG "No Recommendation": NO action is required for this gene-drug interaction.

Morphine	Phenotype	Genetic Test	Results	Source/Evidence Level
Kadian M-Eslon Morphabond ER MS Contin MS-IR Statex	Increased analgesic response	OPRM1 rs1799971	A/A	PharmGKB 3[47,48]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose

2 PharmGKB – Clinical Annotation (Level 3 Efficacy): Patients with the OPRM1 rs1799971 A/A genotype may have an increased analgesic response to morphine as compared to patients with the A/G or G/G genotypes. However, conflicting evidence has been reported. This drug-variant pair has been assigned a "no recommendation" by CPIC, as it was determined to be not clinically actionable. Other genetic or clinical factors may also affect response to morphine.
PharmGKB – Clinical Annotation (Level 3 Dosage): Patients with the OPRM1 rs1799971 A/A genotype may have decreased morphine dose requirements as compared to patients with the A/G or G/G genotypes. However, conflicting evidence has been reported. This drug-variant pair has been assigned a "no recommendation" by CPIC, as it was determined to be not clinically actionable. Other genetic or clinical factors may also affect morphine dose requirements.

Nateglinide	Phenotype	Genetic Test	Results	Source/Evidence Level
	Normal metabolizer	CYP2C9	*1/*1	FDA 1[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Nebivolol	Phenotype	Genetic Test	Results	Source/Evidence Level
Bystolic	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Nevirapine	Phenotype	Genetic Test	Results	Source/Evidence Level
Viramune	Decreased risk for SJS/TEN	CYP2B6 rs28399499	T/T	PharmGKB 2A[47,48]
	Decreased clearance and increased exposure compared to G/G	CYP2B6 rs3745274	G/T	PharmGKB 2A[47,48]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 PharmGKB – CYP2B6 Clinical Annotation (Level 2A Toxicity): Patients with the CYP2B6 rs28399499 T/T genotype and HIV may have a decreased risk for Stevens-Johnson Syndrome/toxic epidermal necrolysis (SJS/TEN) when treated with nevirapine as compared to patients with the C/C or C/T genotype. Other genetic and clinical factors may also influence risk for developing SJS/TEN when receiving nevirapine.

1 PharmGKB – CYP2B6 Clinical Annotation (Level 2A Metabolism/PK): Patients with the CYP2B6 rs3745274 G/T genotype and HIV infection may have decreased clearance of and increased exposure to nevirapine as compared to patients with the G/G genotype. However, conflicting evidence has been reported. Other genetic and clinical factors may also influence clearance of nevirapine and exposure to drug. This annotation only covers the pharmacokinetic relationship between CYP2B6 rs3745274 and nevirapine and does not include evidence about clinical outcomes.

Nicotine replacement therapy	Phenotype	Genetic Test	Results	Source/Evidence Level
Nicorette Nicotrol Habitrol Nicoderm Thrive	Decreased likelihood of smoking cessation	ANKK1/DRD2 rs1800497	G/G	PharmGKB 3[47,48]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may reduce efficacy

2 PharmGKB – Clinical Annotation (Level 3 Efficacy): Patients with the ANKK1 rs1800497 G/G genotype may have a decreased likelihood of smoking cessation when treated with nicotine replacement therapy as compared to patients with the A/G and A/A genotype. However, contradictory findings have been reported. Other genetic and clinical factors may influence a patient's likelihood of smoking cessation.

Nortriptyline	Phenotype	Genetic Test	Results	Source/Evidence Level
Aventyl Pamelor TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	CPIC A[24]; FDA 3[46]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – CYP2D6 Implication: Reduced metabolism of TCAs to less active compounds compared to normal metabolizers. Higher plasma concentrations of active drug will increase the probability of side effects.

2 CPIC – Moderate Recommendation: Consider a 25% reduction of recommended starting dose. Patients may receive an initial low dose of a tricyclic, which is then increased over several days to the recommended steady-state dose. The starting dose in this guideline refers to the recommended steady-state dose. Utilize therapeutic drug monitoring to guide dose adjustments. Titrate dose to observed clinical response with symptom improvement and minimal (if any) side effects.
Recommendations above only apply to higher initial doses of TCAs for treatment of conditions such as depression. Lower dosages are often used for neuropathic pain compared to depressive disorders. Because of the lower dosage, it is less likely that CYP2D6 intermediate metabolizers will experience adverse effects due to supratherapeutic plasma concentrations. Therefore, CPIC recommends no dose modifications for intermediate metabolizers when prescribed a lower dose for treatment of neuropathic pain, but these patients should be monitored closely for side effects. If larger doses are warranted, CPIC recommends following the gene-based guidelines presented above.

Oliceridine	Phenotype	Genetic Test	Results	Source/Evidence Level
Olinvyk ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Omeprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Losec Olex Prilosec TreatGx ReviewGx	Normal metabolizer	CYP2C19	*1/*1	CPIC A[29]; FDA 3[46]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require an increased dose, may reduce efficacy

2 CPIC – Implication: Normal PPI metabolism; may be at increased risk of therapeutic failure compared with CYP2C19 IMs and PMs.

2 CPIC – Moderate Recommendation: Initiate standard starting daily dose. Consider increasing dose by 50–100% for the treatment of Helicobacter pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.

Ondansetron	Phenotype	Genetic Test	Results	Source/Evidence Level
Zofran Zuplenz ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	CPIC A[7]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – Implication: Very limited data available for CYP2D6 intermediate metabolizers.

1 CPIC – No Recommendation: Insufficient evidence demonstrating clinical impact based on CYP2D6 genotype. Initiate therapy with recommended starting dose.
Drug-drug interactions and other patient characteristics (e.g., age, renal function, and liver function) should be considered when selecting alternative therapy.

Oral contraceptives	Phenotype	Genetic Test	Results	Source/Evidence Level
ReviewGx	Decreased risk for DVT	Factor II rs1799963	G/G	PharmGKB 2B[47,48]
	Decreased risk of thrombosis (normal Factor V)	Factor V rs6025	C/C	PharmGKB 2B[47,48]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 PharmGKB – Clinical Annotation (Level 2B Toxicity): Patients with the Factor II rs1799963 G/G genotype who are taking oral contraceptives may have a decreased risk for deep vein thrombosis (DVT), as compared to patients with the A/A or A/G genotypes or those who are not taking oral contraceptives. However, conflicting evidence has been reported. Other genetic and clinical factors may also influence risk for DVT in patients taking oral contraceptives.

1 PharmGKB – Clinical Annotation (Level 2B Toxicity): Patients with the rs6025 C/C genotype (normal Factor V) may have a decreased risk of experiencing thrombosis when receiving oral contraceptives as compared to patients with the C/T or T/T genotype (carriers of Factor V Leiden). However, conflicting evidence has been reported. Both Factor V Leiden and oral contraceptives have been found to independently increase the risk for thrombosis, but together they may have a cumulative effect on thrombosis risk. Other genetic and clinical factors may also influence risk of thrombosis.

Oxycodone	Phenotype	Genetic Test	Results	Source/Evidence Level
OxyContin Roxicodone Roxybond Xtampza ER TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	PharmGKB 2A[14,47,48]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – CYP2D6 Level C Implication, as adapted by PharmGKB (Level 2A Metabolism/PK Clinical Annotation): Decreased metabolism of oxycodone to active metabolite oxymorphone, but this does not appear to translate into decreased analgesia or side effects.
PharmGKB: This annotation only covers the pharmacokinetic relationship between CYP2D6 and oxycodone and does not include evidence about clinical outcomes. This drug-variant pair has been assigned a "no recommendation" by CPIC and DPWG, as it was determined to be not clinically actionable. Other genetic and clinical factors may also affect oxycodone metabolism.

1 CPIC: No recommendation for this CYP2D6 phenotype and oxycodone therapy because of weak evidence regarding adverse events or analgesia. CPIC defines "weak" evidence as insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information. Further research may change the magnitude and/or direction of the net effect.

Pantoprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Pantoloc Protonix Tecta TreatGx ReviewGx	Normal metabolizer	CYP2C19	*1/*1	CPIC A[29]; FDA 1[46]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require an increased dose, may reduce efficacy

2 CPIC – Implication: Normal PPI metabolism; may be at increased risk of therapeutic failure compared with CYP2C19 IMs and PMs.

2 CPIC – Moderate Recommendation: Initiate standard starting daily dose. Consider increasing dose by 50–100% for the treatment of Helicobacter pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.

Paroxetine	Phenotype	Genetic Test	Results	Source/Evidence Level
Brisdelle Paxil Pexeva	Intermediate metabolizer	CYP2D6	*4/*41	CPIC A[10]; FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 Reduced metabolism of paroxetine to less active compounds when compared with CYP2D6 normal metabolizers when starting treatment or at lower doses. Higher plasma concentrations may increase the probability of side effects. Paroxetine-associated phenoconversion of intermediate metabolizers to poor metabolizers due to CYP2D6 autoinhibition may occur and is dose-dependent and greater at steady-state concentrations.

2 Consider a lower starting dose and slower titration schedule as compared with normal metabolizers (per CPIC optional recommendation).

Perphenazine	Phenotype	Genetic Test	Results	Source/Evidence Level
	Intermediate metabolizer	CYP2D6	*4/*41	FDA 2[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Phenytoin	Phenotype	Genetic Test	Results	Source/Evidence Level
Dilantin Tremytoine Phenytek	Normal metabolizer	CYP2C9	*1/*1	CPIC A[27]; FDA 1[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – CYP2C9 Implication: Normal Phenytoin metabolism

1 CPIC – Strong Recommendation: No adjustments needed from typical dosing strategies. Subsequent doses should be adjusted according to therapeutic drug monitoring, response, and side effects. An HLA-B*15:02 negative test does not eliminate the risk of Phenytoin-induced Stevens-Johnson syndrome and toxic epidermal necrolysis (SJS/TEN), and patients should be carefully monitored according to standard practice.

Pimozide	Phenotype	Genetic Test	Results	Source/Evidence Level
Orap	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Piroxicam	Phenotype	Genetic Test	Results	Source/Evidence Level
Feldene	Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	CPIC A[45]; FDA 1[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C9 alleles do not indicate changes from recommended dose

Pitavastatin	Phenotype	Genetic Test	Results	Source/Evidence Level
Livalo Zypitamag	Normal function	SLCO1B1	*1/*1	CPIC A[13]

TreatG: ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – SLCO1B1 Implication: Typical myopathy risk and Pitavastatin exposure.

1 CPIC – SLCO1B1 Strong Recommendation: Prescribe desired starting dose and adjust doses based on disease-specific guidelines.
The potential for drug-drug interactions and dose limits based on renal and hepatic function and ancestry should be evaluated prior to initiating a statin.

Pitolisant	Phenotype	Genetic Test	Results	Source/Evidence Level
Wakix	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]; Product monograph (actionable)[23]

ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Pravastatin	Phenotype	Genetic Test	Results	Source/Evidence Level
Pravachol	Normal function	SLCO1B1	*1/*1	CPIC A[13]

TreatG: ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – SLCO1B1 Implication: Typical myopathy risk and Pravastatin exposure.

1 CPIC – SLCO1B1 Strong Recommendation: Prescribe desired starting dose and adjust doses based on disease-specific guidelines.
The potential for drug-drug interactions and dose limits based on renal and hepatic function and ancestry should be evaluated prior to initiating a statin.

Propafenone	Phenotype	Genetic Test	Results	Source/Evidence Level
Rythmol	Intermediate metabolizer	CYP2D6	*4/*41	DPWG[17]; FDA 1[46]

TreatG: ReviewG:

Drug-Gene Interactions:

Moderate drug-gene interaction: consider alternative medications, may require a reduced dose, may reduce efficacy, may increase adverse events

2 CYP2D6 intermediate metabolizer: reduced metabolism of Propafenone to less active compounds

2 Higher plasma concentrations of active drug may increase the risk of adverse drug reactions

2 Adjust dose in response to plasma concentration and record electrocardiogram or select an alternative drug

Propranolol	Phenotype	Genetic Test	Results	Source/Evidence Level
Inderal Innopran	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

TreatG: ReviewG:

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Protriptyline	Phenotype	Genetic Test	Results	Source/Evidence Level
Vivactil	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Quetiapine	Phenotype	Genetic Test	Results	Source/Evidence Level
Seroquel	Normal metabolizer	CYP3A4	*1/*1	DPWG[17]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 DPWG: no recommendation for this CYP3A4 phenotype.

Rabeprazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Aciphex Pariet	Normal metabolizer	CYP2C19	*1/*1	FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Risperidone	Phenotype	Genetic Test	Results	Source/Evidence Level
Perseris Risperdal	Intermediate metabolizer	CYP2D6	*4/*41	DPWG[17]; FDA 3[46]
	Decreased prolactin compared to A/A	ANKK1/DRD2 rs1800497	G/G	PharmGKB 3[47,48]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

1 DPWG – CYP2D6 Description: There is little evidence to support an increase in side effects caused by the gene variation. The gene variation may lead to a decrease in the required maintenance dose. However, as the effect on the dose is smaller than that of the normal biological variation, action is not useful.
DPWG – CYP2D6 Recommendation: NO action is needed for this gene-drug interaction.

1 PharmGKB – Clinical Annotation (Level 3 Toxicity): Patients with the ANKK1/DRD2 rs1800497 G/G genotype and schizophrenia may have decreased prolactin when treated with risperidone as compared to patients with the A/A genotype. Other genetic and clinical factors may also influence risperidone related hyperprolactinemia.

Rosuvastatin	Phenotype	Genetic Test	Results	Source/Evidence Level
Crestor	Normal function	SLCO1B1	*1/*1	CPIC A[13]; FDA 3[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – SLCO1B1 Implication: Typical myopathy risk and Rosuvastatin exposure.

1 CPIC – Strong Recommendation: Prescribe desired starting dose and adjust doses of rosuvastatin based on disease-specific and population-specific guidelines.
The potential for drug-drug interactions and dose limits based on renal and hepatic function and ancestry should be evaluated prior to initiating a statin.

Sertraline

Zoloft

TreatGx
ReviewGx

Phenotype	Genetic Test	Results	Source/Evidence Level
Intermediate metabolizer	CYP2B6	*1/*9	CPIC B[10]
Normal metabolizer	CYP2C19	*1/*1	CPIC A[10]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose

2 Reduced metabolism of sertraline to less active compounds when compared with CYP2B6 normal metabolizers.

2 Normal CYP2C19 metabolism

2 Initiate therapy with recommended starting dose. Consider a slower titration schedule and lower maintenance dose (per CPIC moderate recommendation).

Simvastatin

Zocor
Flolipid

TreatGx
ReviewGx

Phenotype	Genetic Test	Results	Source/Evidence Level
Normal function	SLCO1B1	*1/*1	CPIC A[13]; FDA 2[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – SLCO1B1 Implication: Typical myopathy risk and Simvastatin exposure.

1 CPIC – SLCO1B1 Strong Recommendation: Prescribe desired starting dose and adjust doses based on disease-specific guidelines.
The potential for drug-drug interactions and dose limits based on renal and hepatic function and ancestry should be evaluated prior to initiating a statin.

Siponimod

Mayzent

ReviewGx

Phenotype	Genetic Test	Results	Source/Evidence Level
Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C9 alleles do not indicate changes from recommended dose

Tacrolimus

Advagraf
Astagraf XL
Envarsus XR
Prograf
Protopic

ReviewGx

Phenotype	Genetic Test	Results	Source/Evidence Level
Poor metabolizer	CYP3A5	*3/*3	CPIC A[9]; FDA 1[46]
Normal metabolizer	CYP3A4	*1/*1	PharmGKB 2A[47,48]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require an increased dose

1 CPIC – CYP3A5 Implication: Higher ("normal") dose-adjusted trough concentrations of tacrolimus and increased chance of achieving target tacrolimus concentrations.
CPIC – CYP3A5 Strong Recommendation: Initiate therapy with standard recommended dose. Use therapeutic drug monitoring to guide dose adjustments. This recommendation includes the use of tacrolimus in kidney, heart, lung, and hematopoietic stem cell transplant patients, and liver transplant patients in which the donor and recipient genotypes are identical.

2 PharmGKB – CYP3A4 Clinical Annotation (Level 2A Dosage): Patients who are recipients of an organ transplant and carry two copies of the CYP3A4*1 allele may require an increased dose of tacrolimus as compared to patients with two copies of the *3 or *22 alleles or one copy of the 1* allele in combination with one copy of the *3 or *22 alleles. Other genetic and clinical factors may also influence tacrolimus dose.

Tamoxifen	Phenotype	Genetic Test	Results	Source/Evidence Level
Nolvadex Soltamox ReviewGx	Intermediate metabolizer (AS 0.25-0.75)	CYP2D6 (Activity Score)	*4/*41	CPIC A[21]; FDA 3[46]

Drug-Gene Interactions:

Moderate drug-gene interaction: consider alternative medications, may require an increased dose, may reduce efficacy

2 CPIC – Implication: Lower endoxifen concentrations compared to normal metabolizers; higher risk of breast cancer recurrence, event-free and recurrence-free survival compared to normal metabolizers.

2 CPIC – Moderate Recommendation: Consider hormonal therapy such as an aromatase inhibitor for postmenopausal women or aromatase inhibitor along with ovarian function suppression in premenopausal women, given that these approaches are superior to tamoxifen regardless of CYP2D6 genotype (PMID 26211827). If aromatase inhibitor use is contraindicated, consideration should be given to use a higher but FDA approved tamoxifen dose (40 mg/day) (PMID 27226358). Avoid CYP2D6 strong to weak inhibitors.

1 FDA PGx Table Section 3 – Potential Impact on Pharmacokinetic Properties Only: Results in lower systemic active metabolite concentrations. The impact of CYP2D6 intermediate or poor metabolism on efficacy is not well established.

Tamsulosin	Phenotype	Genetic Test	Results	Source/Evidence Level
Flomax ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Tenoxicam	Phenotype	Genetic Test	Results	Source/Evidence Level
Mobiflex ReviewGx	Normal metabolizer	CYP2C9 (Star Alleles)	*1/*1	CPIC A[45]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2C9 alleles do not indicate changes from recommended dose

Tetrabenazine	Phenotype	Genetic Test	Results	Source/Evidence Level
Austedo Nitoman Xenazine ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Thioridazine	Phenotype	Genetic Test	Results	Source/Evidence Level
TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this CYP2D6 phenotype in the FDA PGx Table

Tolterodine	Phenotype	Genetic Test	Results	Source/Evidence Level
Detrol TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	FDA 2[46]

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Tramadol	Phenotype	Genetic Test	Results	Source/Evidence Level
Conzip Durela Ralivia Ultram Zytram XL	Intermediate metabolizer	CYP2D6	*4/*41	CPIC A[14]; FDA 1[46]; FDA 2[46]

TreatG
ReviewG

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – Implication: Reduced O-desmethyltramadol (active metabolite) formation.

1 CPIC – Optional Recommendation: Use tramadol label recommended age specific or weight-specific dosing. If no response and opioid use is warranted, consider non-codeine opioid.

Trimipramine	Phenotype	Genetic Test	Results	Source/Evidence Level
Surmontil	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[24]; FDA 3[46]
	Normal metabolizer	CYP2C19	*1/*1	CPIC B[24]

ReviewG

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 CPIC – CYP2D6 Implication: Reduced metabolism of TCAs to less active compounds compared to normal metabolizers. Higher plasma concentrations of active drug will increase the probability of side effects.

2 CPIC – CYP2C19 Implication: Normal metabolism of tertiary amines.

2 CPIC – Optional Recommendation: Consider a 25% reduction of recommended starting dose. Patients may receive an initial low dose of TCAs, which is then increased over several days to the recommended steady-state dose. The starting dose in this guideline refers to the recommended steady-state dose. Recommendations above only apply to higher initial doses of TCAs for treatment of conditions such as depression. Lower dosages are often used for neuropathic pain compared to depressive disorders. Because of the lower dosage, it is less likely that CYP2D6 intermediate metabolizers will experience adverse effects due to supratherapeutic plasma concentrations. Therefore, CPIC recommends no dose modifications for intermediate metabolizers when prescribed a lower dose for treatment of neuropathic pain, but these patients should be monitored closely for side effects. If larger doses are warranted, CPIC recommends following the gene-based guidelines presented above.

Valbenazine	Phenotype	Genetic Test	Results	Source/Evidence Level
Ingrezza	Intermediate metabolizer	CYP2D6	*4/*41	FDA 1[46]

ReviewG

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CYP2D6 alleles do not indicate changes from recommended dose

Venlafaxine	Phenotype	Genetic Test	Results	Source/Evidence Level
Effexor XR	Intermediate metabolizer	CYP2D6	*4/*41	CPIC B[10]; FDA 1[46]

TreatG
ReviewG

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 Decreased metabolism of venlafaxine to active metabolite O-desmethylvenlafaxine (desvenlafaxine) and decreased O-desmethylvenlafaxine: venlafaxine ratio as compared with CYP2D6 normal metabolizers. There is insufficient evidence supporting the clinical impact of the decreased O-desmethylvenlafaxine: venlafaxine ratio in CYP2D6 intermediate metabolizers.

1 CPIC: No action recommended based on genotype for venlafaxine because of minimal evidence regarding the impact on efficacy or side effects.

Viloxazine	Phenotype	Genetic Test	Results	Source/Evidence Level
Qelbree	Intermediate metabolizer	CYP2D6	*4/*41	FDA 3[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 FDA PGx Table: No recommended changes or information for this phenotype in the FDA PGx Table

Voriconazole	Phenotype	Genetic Test	Results	Source/Evidence Level
Vfend	Normal metabolizer	CYP2C19	*1/*1	CPIC A[33]; FDA 2[46]

ReviewGx

Drug-Gene Interactions:

Mild or no drug-gene interaction: no PGx-based action; standard precautions apply

1 CPIC – Implication: Normal voriconazole metabolism.

1 CPIC – Strong Recommendation: Initiate therapy with recommended standard of care dosing
Notes (Adult & Pediatrics): Further dose adjustments or selection of alternative therapy may be necessary due to other clinical factors, such as drug interactions, hepatic function, renal function, species, site of infection, therapeutic drug monitoring, and comorbidities.

Vortioxetine	Phenotype	Genetic Test	Results	Source/Evidence Level
Trintellix	Intermediate metabolizer	CYP2D6	*4/*41	CPIC A[10]; FDA 1[46]

TreatGx
ReviewGx

Drug-Gene Interactions:

Moderate drug-gene interaction: may increase adverse events

2 Reduced metabolism of vortioxetine to less active compounds when compared with CYP2D6 normal metabolizers. Higher plasma concentrations may increase the probability of side effects.

2 Initiate therapy with recommended starting dose (per CPIC moderate recommendation).

Warfarin	Phenotype	Genetic Test	Results	Source/Evidence Level
Coumadin Jantoven TreatGx ReviewGx	Normal metabolizer	CYP2C9	*1/*1	CPIC A[26]; FDA 1[46]
	Increased response	VKORC1 rs9923231	G/A	CPIC A[26]; FDA 1[46]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may require an increased dose, may reduce efficacy, may increase adverse events

2 CPIC – Strong Recommendation for Non-African ancestry/Moderate Recommendation for African ancestry: Calculate initial dose based on validated published pharmacogenetic algorithms, using results for VKORC1-1639G>A and CYP2C9 *2 and *3.
It is important to note that these algorithms do not include CYP4F2, CYP2C9*5, *6, *8 or *11, or rs12777823, and incorporation of these should be added when results are available.

The International Warfarin Pharmacogenetics Consortium (IWPC) dosing algorithm is available online at: https://files.cpicpgx.org/data/guideline/publication/warfarin/2011/IWPC_dose_calculator.xls

Another option http://warfarindosing.org/ contains Gage as the primary algorithm and IWPC as the secondary algorithm, and can adjust for CYP4F2, CYP2C9*5, and *6.

The two algorithms provide very similar dose recommendations. Most algorithms are developed for target INR 2-3.

The IWPC algorithm is available within the TreatGx software (see Atrial Fibrillation – Anticoagulation), accounting for all factors from the IWPC calculation (height, weight, age, VKORC1, CYP2C9*2 and *3, ethnicity/race, drug-drug interactions) along with additional optional adjustments for CYP2C9 *5, *6, *8, *11, CYP4F2 rs2108622, CYP2C rs12777823, smoking, and target INR other than 2-3.

An alternative is to use the FDA-approved Product Monograph, which provides expected maintenance dose ranges based on VKORC1 and CYP2C9 results.

CPIC – Optional Recommendation: For loading dose, a pharmacogenetics-based warfarin initiation dose algorithm could be considered. See the EU-PACT trial for pharmacogenetics-based warfarin initiation (loading) dose algorithm. https://www.nejm.org/doi/full/10.1056/NEJMoa1311386

Zuclopenthixol	Phenotype	Genetic Test	Results	Source/Evidence Level
Clopixol TreatGx ReviewGx	Intermediate metabolizer	CYP2D6	*4/*41	DPWG[17]

Drug-Gene Interactions:

Moderate drug-gene interaction: may require a reduced dose, may increase adverse events

2 DPWG – CYP2D6 Description: The risk of side effects may be elevated. The genetic variation leads to decreased conversion of zuclopenthixol, which causes the plasma concentration to be approximately 1.35-fold higher.
DPWG – CYP2D6 Recommendation: Use 75% of the normal dose.

Table of Available References

Drug	Genetic Test	Sources
Abrocitinib	CYP2C19	FDA[36,46]
Alfentanil	OPRM1 rs1799971	PharmGKB[47,48]
Amitriptyline	CYP2D6	CPIC[24]; FDA[46]
Amitriptyline	CYP2C19	CPIC[24]
Amoxapine	CYP2D6	FDA[46]
Amphetamine	CYP2D6	FDA[46]
Aripiprazole	CYP2D6	FDA[46]; Product monograph (actionable)[42]
Aripiprazole lauroxil	CYP2D6	FDA[46]; Product monograph (actionable)[2]
Atomoxetine	CYP2D6 (Activity Score)	CPIC[11]; FDA[46]
Atorvastatin	SLCO1B1	CPIC[13]; FDA[46]
Atorvastatin	ApoE rs7412	PharmGKB[47,48]
Avatrombopag	CYP2C9	FDA[46]
Avatrombopag	Factor II rs1799963	Product monograph (actionable)[1]
Avatrombopag	Factor V rs6025	Product monograph (actionable)[1]
Brexpiprazole	CYP2D6	FDA[46]; Product monograph (actionable)[3]
Brivaracetam	CYP2C19	FDA[46]
Bupropion	ANKK1/DRD2 rs1800497	PharmGKB[47,48]
Carisoprodol	CYP2C19	FDA[46]
Carvedilol	CYP2D6	FDA[46]
Celecoxib	CYP2C9 (Star Alleles)	CPIC[45]; FDA[46]
Cevimeline	CYP2D6	FDA[46]
Citalopram	CYP2C19	CPIC[10]; FDA[46]
Clobazam	CYP2C19	FDA[46]; Product monograph (actionable)[30]
Clomipramine	CYP2D6	CPIC[24]; FDA[46]
Clomipramine	CYP2C19	CPIC[24]
Clopidogrel	CYP2C19	CPIC[28]; FDA[46]
Clozapine	CYP2D6	FDA[46]
Codeine	CYP2D6	CPIC[14]; FDA[46]
Cyclosporine	CYP3A5	PharmGKB[47,48]
Darifenacin	CYP2D6	FDA[46]
Desipramine	CYP2D6	CPIC[24]; FDA[46]
Deutetrabenazine	CYP2D6	FDA[46]
Dexlansoprazole	CYP2C19	CPIC[29]; FDA[46]
Dextromethorphan/ Bupropion	CYP2D6	FDA[6]
Dextromethorphan/ Quinidine	CYP2D6	FDA[5]
Diazepam	CYP2C19	FDA[46]
Donepezil	CYP2D6	FDA[46]
Doxepin	CYP2D6	CPIC[24]; FDA[46]
Doxepin	CYP2C19	CPIC[24]; FDA[46]
Dronabinol	CYP2C9	FDA[46]
Efavirenz	CYP2B6	CPIC[15]; FDA[46]

Drug	Genetic Test	Sources
Elagolix	SLCO1B1	FDA[46]
Eliglustat	CYP2D6	DPWG[17]; FDA[46]
Eltrombopag	Factor V rs6025	Product monograph (actionable)[35]
Erdafitinib	CYP2C9 (Star Alleles)	FDA[46]
Escitalopram	CYP2C19	CPIC[10]; FDA[46]
Esomeprazole	CYP2C19	FDA[46]
Fentanyl	OPRM1 rs1799971	PharmGKB[47,48]
Fesoterodine	CYP2D6	FDA[46]
Flecainide	CYP2D6	DPWG[17]
Flibanserin	CYP2C19	FDA[46]
Fluoxetine	CYP2D6	Product monograph (actionable)[12]
Flurbiprofen	CYP2C9 (Star Alleles)	CPIC[45]; FDA[46]
Fluvastatin	CYP2C9	CPIC[13]
Fluvastatin	SLCO1B1	CPIC[13]
Fluvoxamine	CYP2D6	CPIC[10]; FDA[46]
Fosphenytoin	CYP2C9	CPIC[27]; FDA[46]
Galantamine	CYP2D6	FDA[46]
Gefitinib	CYP2D6	FDA[46]
Haloperidol	CYP2D6	DPWG[17]
Hydrocodone	CYP2D6	CPIC[14]
Ibuprofen	CYP2C9 (Star Alleles)	CPIC[45]; FDA[46]
Iloperidone	CYP2D6	FDA[46]
Imipramine	CYP2D6	CPIC[24]; FDA[46]
Imipramine	CYP2C19	CPIC[24]
Lansoprazole	CYP2C19	CPIC[29]; FDA[46]
Lofexidine	CYP2D6	FDA[46]
Lovastatin	SLCO1B1	CPIC[13]
Lusutrombopag	Factor II rs1799963	Product monograph (actionable)[43]
Lusutrombopag	Factor V rs6025	Product monograph (actionable)[43]
Mavacamten	CYP2C19	FDA[46]
Meclizine	CYP2D6	FDA[46]
Meloxicam	CYP2C9 (Star Alleles)	CPIC[45]; FDA[46]
Methadone	CYP2B6	CPIC[40]; PharmGKB[47,48]
Methotrexate	MTHFR rs1801133	PharmGKB[47,48]
Methylphenidate	COMT rs4680	PharmGKB[47,48]
Metoclopramide	CYP2D6	FDA[46]
Metoprolol	CYP2D6	CPIC[16]
Mirabegron	CYP2D6	FDA[46]
Mirtazapine	CYP2D6	DPWG[17]; PharmGKB 2A[47,48]
Morphine	OPRM1 rs1799971	PharmGKB[47,48]
Nateglinide	CYP2C9	FDA[46]
Nebivolol	CYP2D6	FDA[46]
Nevirapine	CYP2B6 rs28399499	PharmGKB[47,48]
Nevirapine	CYP2B6 rs3745274	PharmGKB[47,48]

Drug	Genetic Test	Sources
Nicotine replacement therapy	ANKK1/DRD2 rs1800497	PharmGKB[47,48]
Nortriptyline	CYP2D6	CPIC[24]; FDA[46]
Oliceridine	CYP2D6	FDA[46]
Omeprazole	CYP2C19	CPIC[29]; FDA[46]
Ondansetron	CYP2D6	CPIC[7]
Oral contraceptives	Factor II rs1799963	PharmGKB[47,48]
Oral contraceptives	Factor V rs6025	PharmGKB[47,48]
Oxycodone	CYP2D6	CPIC[14]; PharmGKB[47,48]
Pantoprazole	CYP2C19	CPIC[29]; FDA[46]
Paroxetine	CYP2D6	CPIC[10]; FDA[46]
Perphenazine	CYP2D6	FDA[46]
Phenytoin	CYP2C9	CPIC[27]; FDA[46]
Pimozide	CYP2D6	FDA[46]
Piroxicam	CYP2C9 (Star Alleles)	CPIC[45]; FDA[46]
Pitavastatin	SLCO1B1	CPIC[13]
Pitolisant	CYP2D6	FDA[46]; Product monograph (actionable)[23]
Pravastatin	SLCO1B1	CPIC[13]
Propafenone	CYP2D6	DPWG[17]; FDA[46]
Propranolol	CYP2D6	FDA[46]
Protriptyline	CYP2D6	FDA[46]
Quetiapine	CYP3A4	DPWG[17]
Rabeprazole	CYP2C19	FDA[46]
Risperidone	CYP2D6	DPWG[17]; FDA[46]
Risperidone	ANKK1/DRD2 rs1800497	PharmGKB[47,48]
Rosuvastatin	SLCO1B1	CPIC[13]; FDA[46]
Sertraline	CYP2B6	CPIC[10]
Sertraline	CYP2C19	CPIC[10]
Simvastatin	SLCO1B1	CPIC[13]; FDA[46]
Siponimod	CYP2C9 (Star Alleles)	FDA[46]
Tacrolimus	CYP3A5	CPIC[9]; FDA[46]
Tacrolimus	CYP3A4	PharmGKB[47,48]
Tamoxifen	CYP2D6 (Activity Score)	CPIC[21]; FDA[46]
Tamsulosin	CYP2D6	FDA[46]
Tenoxicam	CYP2C9 (Star Alleles)	CPIC[45]
Tetrabenazine	CYP2D6	FDA[46]
Thioridazine	CYP2D6	FDA[46]
Tolterodine	CYP2D6	FDA[46]
Tramadol	CYP2D6	CPIC[14]; FDA[46]
Trimipramine	CYP2D6	CPIC[24]; FDA[46]
Trimipramine	CYP2C19	CPIC[24]
Valbenazine	CYP2D6	FDA[46]
Venlafaxine	CYP2D6	CPIC[10]; FDA[46]
Viloxazine	CYP2D6	FDA[46]
Voriconazole	CYP2C19	CPIC[33]; FDA[46]
Vortioxetine	CYP2D6	CPIC[10]; FDA[46]
Warfarin	CYP2C9	CPIC[26]; FDA[46]

Drug	Genetic Test	Sources
Warfarin	VKORC1 rs9923231	CPIC[26]; FDA[46]
Zuclopenthixol	CYP2D6	DPWG[17]

References

https://www.genxys.com/lab-references

Methods

DNA was extracted from dried blood spot (DBS) card by Chemagic 360 system (Revvity) and processed in a SmartChip system (Takara Bio) with Thermo Fisher Scientific TaqMan Assays.

Limitations

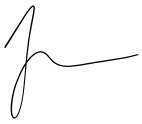
The annotations and interpretations provided in this report are based on scientific literature and do not take into account drug-drug interactions, medical conditions or other clinical factors that may affect medication response. Gene-drug interactions are ranked according to guidelines, level of evidence and clinical utility. GenXys reports and TreatGx Clinical Decision Support are regularly updated. Current predicted phenotype and allele functionality may change in the future depending on new evidence. Phenotype annotations for CYP2C9 are based on total activity scores as defined by CPIC[79]. Genetic test results and interpretation may be inaccurate for individuals who have undergone or are receiving non-autologous blood transfusion, tissue, or organ transplant therapies.

The report includes alleles of proteins involved in the metabolism of many medications. In rare cases, a variant that is not covered may be typed as *1 or other variants. In the case of pseudogenes and mutations in the untranslated regions of genes, incorrect allele typing may occur despite proper SNP detection. Preferential amplification of one allele over another present in the sample may also lead to incorrect genotyping.

Liability Disclaimer

This test was developed and its performance characteristics determined by GenXys Health Care Systems. It has not been cleared or approved by the US Food and Drug Administration. The report is not a diagnostic test, and TreatGx is not a prescribing system. You should discuss your pharmacogenetic information with a physician or other health care provider before you act upon the pharmacogenetic information resulting from this report. The medication brand names are not an exhaustive list and do not include combination therapies. Not all medications in this report are included in the TreatGx or ReviewGx software or other GenXys derivative works.

Laboratory Director



Dr Juha Matilainen, PhD, Laboratory Director

11/Nov/2025

Date of Signature

Laboratory Report

The **Laboratory Report** contains your genetic results.

Gene	rsID	HGVS	HGVS Reference	Result
ABCB1	rs1045642	c.3645T>C	NM_001348945.2	A/A
ANKK1/DRD2	rs1800497	c.2137G>A	NM_178510.1	G/G
APOE	rs429358	c.388T>C	NM_000041.3	C/T
APOE	rs7412	c.526C>T	NM_000041.3	C/T
COMT	rs4680	c.472G>A	NM_000754.3	A/G
CYP1A2	rs12720461	c.-10+113C>T	NM_000761.4	C/C
CYP1A2	rs2069514	g.74745879G>A	NC_000015.10	G/G
CYP1A2	rs56107638	g.9427G>A	NG_061543.1	G/G
CYP1A2	rs72547513	c.558C>T	NM_000761.4	C/C
CYP1A2	rs762551	c.-9-154A>C	NM_000761.3	A/A
CYP2B6	rs28399499	c.983T>C	NM_000767.4	T/T
CYP2B6	rs3745274	c.516G>T	NM_000767.5	G/T
CYP2C19	rs12248560	g.94761900C>T	NC_000010.11	C/C
CYP2C19	rs12769205	c.332-23A>G	NM_000769.2	A/A
CYP2C19	rs17884712	c.431G>A	NM_000769.4	G/G
CYP2C19	rs28399504	c.1A>G	NM_000769.4	A/A
CYP2C19	rs4244285	c.681G>A	NM_000769.4	G/G
CYP2C19	rs4986893	c.636G>A	NM_000769.4	G/G
CYP2C19	rs56337013	c.1297C>T	NM_000769.4	C/C
CYP2C19	rs6413438	c.680C>T	NM_000769.4	C/C
CYP2C19	rs72552267	c.395G>A	NM_000769.4	G/G
CYP2C19	rs72558186	g.94781999T>A	NC_000010.11	T/T
CYP2C9	rs1057910	c.1075A>C	NM_000771.4	A/A
CYP2C9	rs1799853	c.430C>T	NM_000771.4	C/C
CYP2C9	rs28371685	c.1003C>T	NM_000771.4	C/C
CYP2C9	rs28371686	c.1080C>G	NM_000771.4	C/C
CYP2C9	rs56165452	c.1076T>C	NM_000771.4	T/T
CYP2C9	rs72558187	c.269T>C	NM_000771.4	T/T
CYP2C9	rs72558190	c.485C>A/T	NM_000771.4	C/C
CYP2C9	rs7900194	c.449G>A/C/T	NM_000771.4	G/G
CYP2C9	rs9332131	c.818del	NM_000771.4	A/A
CYP2C9	rs9332239	c.1465C>T	NM_000771.4	C/C
CYP2D6	rs1065852	c.100C>T	NM_000106.6	A/G
CYP2D6	rs1135822	c.358T>A	NM_000106.6	A/A
CYP2D6	rs1135840	c.1457G>C	NM_000106.6	G/G
CYP2D6	rs16947	c.886C>T	NM_000106.6	A/G
CYP2D6	rs201377835	g.42129910C>G	NC_000022.11	C/C
CYP2D6	rs267608319	c.1319G>A	NM_000106.6	C/C
CYP2D6	rs28371706	c.320C>T	NM_000106.6	G/G
CYP2D6	rs28371725	c.985+39G>A	NM_000106.5	C/T
CYP2D6	rs35742686	c.775del	NM_000106.6	T/T
CYP2D6	rs3892097	g.42128945C>T	NC_000022.11	C/T
CYP2D6	rs5030655	c.454del	NM_000106.6	A/A
CYP2D6	rs5030656	c.841_843del	NM_000106.6	CTT/CTT
CYP2D6	rs5030862	c.124G>A	NM_000106.6	C/C
CYP2D6	rs5030865	c.505G>T/C/A	NM_000106.6:	C/C
CYP2D6	rs5030867	c.971A>C	NM_000106.6	T/T
CYP2D6	rs59421388	c.971A>C	NM_000106.6	C/C
CYP2D6	rs72549356	c.514_522dup	NM_000106.6	-/-

Gene	rsID	HGVS	HGVS Reference	Result
CYP2D6	rs72549346	c.1088_1089dup	NM_000106.6	-/-
CYP2D6	rs72549347	c.1030C>T	NM_000106.6	G/G
CYP2D6	rs72549353	c.765_768del	NM_000106.6	AGTT/AGTT
CYP2D6	rs72549354	c.635dup	NM_000106.6	-/-
CYP2D6	rs79292917	c.975G>A	NM_000106.6	C/C
CYP3A4	rs35599367	c.522-191C>T	NM_017460.6	G/G
CYP3A4	rs4987161	c.566T>C	NM_017460.6	A/A
CYP3A4	rs55785340	c.664T>C	NM_017460.6	A/A
CYP3A5	rs10264272	c.624G>A	NM_000777.5	C/C
CYP3A5	rs28365083	c.1193C>A	NM_000777.5	G/G
CYP3A5	rs41303343	c.1035dup	NM_000777.5	-/-
CYP3A5	rs776746	c.219-237A>G	NM_000777.5	C/C
Factor II	rs1799963	c.*97G>A	NM_000506.5	G/G
Factor V	rs6025	c.1601G>A	NM_000130.4	C/C
MTHFR	rs1801131	c.1286A>C	NM_005957.5	T/T
MTHFR	rs1801133	c.665C>T	NM_005957.5	A/A
OPRM1	rs1799971	c.118A>G	NM_000914.5	A/A
SLCO1B1	rs4149056	c.521T>C	NM_006446.5	T/T
VKORC1	rs9923231	g.31096368C>T	NC_000016.10	G/A (C/T)[1]

1: Pharmacogenetic testing may occasionally lead to unusual genotypes. In these situations, pharmacogenetic laboratories will sometimes report on alternative genotypes. If this is done, then both genotypes appear in the result table; a genotype in () is the alternative genotype chosen by the lab.

Summary of Genetic and Phenotype Data

Copy Number Variation

Gene	Reference	Result (Copy/Copies)
CYP2D6	NG_008376.3 exon 9	2
CYP2D6_5pFlank	NG_008376.3 CYP2D6_5pFlank	2

Phenotype Table

Gene	Genotype Result	Phenotype Result OR Genotype Explanation
CYP3A4	*1/*1	Normal Metabolizer
CYP2D6	*4/*41	Intermediate Metabolizer
CYP2C9	*1/*1	Normal Metabolizer
CYP2C19	*1/*1	Normal Metabolizer
SLCO1B1	*1/*1	Normal Function
CYP2B6	*1/*9	Intermediate Metabolizer
CYP3A5	*3/*3	Poor Metabolizer