



Pharmacogenetics (PGx)

For Oncologists

Recommended by Guidelines, pharmacotherapeutic genotyping is one of multiple pieces of information that oncologists should consider when making their therapeutic choice for each patient. Preemptive use of testing could significantly optimise drug outcomes and be particularly useful for patients undergoing multiple treatments or experiencing poor drug responses. See below a selection of pharmacogenetic (PGx) tests that may be useful for your practice. *To view our full pharmacogenetics offering, scan the QR code below.*

Clinical Labs' Comprehensive PGx Gene Panel

Clinical Labs' Comprehensive PGx Gene Panel includes a family of enzymes that catalyse the metabolism of many drugs and xenobiotics, particularly in areas such as oncology, mental health, cardiology and pain management. With our Comprehensive PGx Gene Panel, you will receive a comprehensive report that will indicate the genotype and the predicted phenotypes, such as the metaboliser status, along with potential drug-gene interactions and Guidelines' recommendations. Please specify any medications of interest if you want them to be included in the report. The genes can be ordered separately or together - for individual genes, only genotyping/phenotyping will be reported. *See reverse for a list of genes tested and examples of drugs metabolised.*

Genes included in our Comprehensive PGx Panel

CYP2D6

CYP2C19

CYP2C9

CYP3A4

CYP3A5

CYP1A2

VKORC1

SLCO1B1

Single Gene Tests for Oncology

- **CYP2D6 (Tamoxifen PGx):** is the primary enzyme responsible for the metabolism of many commonly used medications, especially oncology (tamoxifen and 5-HT3 receptor antagonists) (Goetz et al., 2018). CYP2D6 is highly polymorphic, with over 130 identified allelic variants and sub-variants identified (www.PharmVar.org; CYP2D6 Allele Definition). CYP2D6 alleles have been extensively studied in multiple geographically, racially, and ethnically diverse groups, and significant differences in allele frequencies have been observed.
- **TPMT:** Thiopurine methyltransferase (TPMT) is the primary enzyme responsible for the metabolism of thiopurine drugs (azathioprine, 6-mercaptopurine, and 6-thioguanine). It is recommended that physicians order TPMT genotyping before prescribing thiopurines to avoid bone marrow toxicity and subsequent neutropenia. *Medicare rebate available.*
- **DYPD:** Mutations in the dihydropyrimidine dehydrogenase gene (DYPD) interfere with the breakdown of chemotherapeutic cancer drugs with structures similar to pyrimidines, such as 5-fluorouracil and capecitabine. As a result, these drugs can accumulate in the body, leading to severe reactions and neurological manifestations due to DYPD deficiency.
- **UGT1A1:** UGT1A1 gene polymorphism is associated with toxicity and clinical efficacy of irinotecan-based chemotherapy, which is used in patients with advanced solid tumours, including colorectal and lung cancers.

Ordering Pharmacogenetic Testing at Clinical Labs

- **When to order:** At the time of drug prescribing and dispensing for patients with genotypes that require action, such as dose reductions.
- **What to put on the request form:** Fill out our routine Clinical Labs request form, list the gene required or group of genes and prescribed medications if available.
- **Turnaround time:** Results within 7-10 business days from the sample receipt date.
- **Specimen details:** 2x EDTA blood samples.
- **Test cost:** Apart from the TPMT gene, an out-of-pocket fee applies.

Scan QR or visit cliniicallabs.com.au/pharmacogenetictesting for current pricing.



Pharmacogenetic (PGx) Testing Examples of drugs metabolised and genes tested

Medication	Gene(s)	Medication	Gene(s)	Medication	Gene(s)
Cardiology		Mental Health		Oncology	
Carvedilol	CYP2D6	Anti-Depressants (TCAs)		Atazanavir	UGT1A1*
Clopidogrel	CYP2C19	Amitriptyline	CYP2D6, CYP2C19	Azathioprine	TPMT*
Flecainide	CYP2D6	Clomipramine	CYP2D6, CYP2C19	Belinostat	UGT1A1*
Metoprolol	CYP2D6	Desipramine	CYP2D6, CYP2C19	Binimetinib	UGT1A1*
Warfarin	VKORC1, CYP2C9	Doxepin	CYP2D6, CYP2C19	Capecitabine	DPYD*
Lipid Lowering Medication		Imipramine	CYP2D6, CYP2C19	Cisplatin	TPMT*
Atorvastatin	SLCO1B1, CYP3A4	Nortriptyline	CYP2D6	Gefitinib	CYP2D6
Fluvastatin	SLCO1B1, CYP2C9	Trimipramine	CYP2D6, CYP2C19	Irinotecan	UGT1A1*
Lovastatin	SLCO1B1	Anti-Depressants (Other)		Mercaptopurine	TPMT*
Pitavastatin	SLCO1B1	Vortioxetine	CYP2D6	Nilotinib	UGT1A1
Pravastatin	SLCO1B1	Anti-Psychotics		Pazopanib	UGT1A1*
Rosuvastatin	SLCO1B1	Aripiprazole	CYP2D6	Tamoxifen	CYP2D6
Simvastatin	SLCO1B1	Brexpiprazole	CYP2D6	Tegafur	DPYD*
Gastroenterology		Haloperidol	CYP2D6	Thioguanine	TPMT*
Anti-Emetic		Quetiapine	CYP3A4	5-Fluorouracil	DPYD*
Metoclopramide	CYP2D6	Risperidone	CYP2D6	Organ Transplant	
Ondansetron	CYP2D6	Zuclopentixol	CYP2D6	Tacrolimus	CYP3A5
Tropisetron	CYP2D6	Benzodiazepines (Anxiolytics)		Pain Management	
Proton Pump Inhibitors		Clobazam	CYP2C19	NSAIDs	
Esomeprazole	CYP2C19	Diazepam (Valium)	CYP2C19	Celecoxib	CYP2C9
Lansoprazole	CYP2C19	Neurology		Flurbiprofen	CYP2C9
Omeprazole (Losec)	CYP2C19	Anti-Dementia		Ibuprofen	CYP2C9
Pantoprazole	CYP2C19	Donepezil	CYP2D6	Piroxicam	CYP2C9
Rabeprazole	CYP2C19	Galantamine	CYP2D6	Meloxicam	CYP2C9
Mental Health		Anti-Epileptics		Opioids	
Anti-ADHD		Phenytoin/ Fosphenytoin	CYP2C9	Codeine (prodrug)	CYP2D6
Atomoxetine	CYP2D6	Multiple Sclerosis		Dihydrocodeine	CYP2D6
Anti-Depressants (MOAs)		Siponimod	CYP2C9	Tramadol	CYP2D6
Moclobemide	CYP2C19	Urology		Urology	
Anti-Depressants (SNRIs)				Darifenacin	CYP2D6
Venlafaxine	CYP2D6			Mirabegron	CYP2D6
Anti-Depressants (SSRIs)				Tamsulosin	CYP2D6
Citalopram	CYP2C19			Tolterodine	CYP2D6
Escitalopram	CYP2C19	Anti-Fungal		Anti-Fungal	
Fluvoxamine	CYP2D6			Voriconazol	CYP2C19
Paroxetine	CYP2D6				
Sertraline (Zoloft)	CYP2C19				

Please note that this is a guide for gene selection. The test is not intended to cover possible allergies to certain drugs. Due to a lack of evidence, some specific medications may not be reported even if they are part of the same drug class that is metabolised by the relevant gene.

*The following genes are not included in our Comprehensive PGx Gene Panel and need to be ordered individually: UGT1A1, TPMT and DPYD.

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