Sonic Genetics
Quality is in our DNA

SonicPGx
Making medicines personal

# Pharmacogenetics Test List

Pharmacogenetic (PGx) tests detect genetic variations that influence how individuals metabolise, distribute and respond to different medications. Internationally, a significant proportion of drug prescriber information labels are required to provide precautionary advice about clinically significant PGx effects.

Sonic Genetics brings together the national and international expertise of Sonic Healthcare to provide doctors, patients and families across Australia with a comprehensive range of accredited genetic tests.

As one of Australia's largest private genetic testing facilities, Sonic Genetics understands that genetic testing is a complex and emerging field of medicine. We provide detailed explanations and resources to allow people to make informed choices about medical decisions.

Headed by Professor Graeme Suthers, Sonic Genetics is at the forefront of genetic pathology, with an experienced team of specialist genetic pathologists committed to providing a comprehensive genetic testing service to support optimal pharmacogenetic management of your patients.

This information leaflet provides a quick reference to the Sonic Genetics pharmacogenetics test menu with relevance to your clinical practice.

**For more information, please visit www.sonicgenetics.com.au or contact us on 1800 010 447 or info@sonicgenetics.com.au.**

| SonicPGx PANEL | |
|---|---|
| Medicare rebates do not apply | |
| **CYP2D6** | Variants in the CYP2D6 gene modify the rate at which certain drugs are activated or broken down. The drugs affected include:<br>▪ Tamoxifen<br>▪ Codeine<br>▪ Tramadol<br>▪ Tricyclic antidepressants<br>▪ Metoprolol<br>▪ Flecanide<br>A patient with such a variant may be at risk of toxicity or derive limited benefit from the medication. |
| **CYP2C19** | Variants in the CYP2C19 gene modify the rate at which certain drugs are activated or broken down. The drugs affected include:<br>▪ Clopidogrel<br>▪ Tricyclic antidepressants<br>▪ Proton pump inhibitors<br>A patient with such a variant may be at risk of toxicity or derive limited benefit from the medication. When considering antidepressant therapy, this test is often combined with analysis of the CYP2C9 and CYP2D6 genes. |
| **CYP2C9** | Variants in the CYP2C9 genes modify the rate at which some medications are broken down.<br>The drugs affected include:<br>▪ Tricyclic antidepressants<br>A patient with such variants may be at risk of toxicity from the medication. When considering antidepressant therapy, this test is often combined with analysis of the CYP2C19 and CYP2D6 genes. When considering warfarin therapy, this test is often combined with analysis of VKORC1. |
| **CYP2C9, VKORC1** | Variants in the CYP2C9 and VKORC1 genes modify the rate at warfarin, an anti-coagulant medication, is broken down in the body. A patient with such variants may be at risk of toxicity from the medication.<br>This test is useful to guide dosage prior to and within the first month of warfarin therapy. |

| SonicPGx PANEL | |
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| **CYP2D6, CYP3A4, CYP3A5** | Variants in the CYP2D6, CYP3A4 and CYP3A5 genes may slow the rate at which certain drugs are broken down. The drugs involved are:<br>▪ Fentanyl ▪ Some analgesics<br>▪ Methadone ▪ Some anti-psychotics<br>A patient with such a variant may be at risk of toxicity from the medication. |
| **ABCB1** | ABCB1 encodes a transporter protein known as p-glycoprotein. Variations are important in many drug interactions. Faster transporters may get limited benefit from ondansetron. |
| **CYP1A2** | CYP1A2 is especially important in the metabolism of olanzapine, clozapine and duloxetine. Fast metabolisers (*1F/ *1F) are especially vulnerable to loss of drug efficacy. |
| **CYP3A4** | CYP3A4 is responsible for the metabolism of approximately 50-60% of clinical drugs used today including paracetamol, codeine, cyclosporine A, diazepam and erythromycin. It is also important in the metabolism of steroid hormones. Function is essentially replicated by CYP3A5 when expressed at low levels. |
| **CYP3A5** | Intermediate and normal metabolisers may have difficulty in achieving tacrolimus levels. Function is essentially replicated by CYP3A4 when expressed at low levels. |
| **OPRM1** | OPRM1 encodes endorphin μ-1-opioid receptor. Presence of a G-allele is associated with increased pain sensitivity and need for narcotics such as morphine or fentanyl. |
| **SLCO1B1** | SLCO1B1 encodes a transporter protein that is clinically important in clearance of statins, especially simvastatin. Poor transporters (521T>C) should avoid simvastatin due to high myopathy risk but may tolerate lower doses of atorvastatin, pravastatin and rosuvastatin. |

| SINGLE-GENE PANELS AVAILABLE | |
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| Medicare rebates apply as specified below | |
| **UGT1A1** | The UGT1A1 gene encodes an enzyme responsible for conjugation of bilirubin in the liver. Variants in UGT1A1 can impair this process, resulting in mild unconjugated hyperbilirubinaemia in the absence of liver disease or overt haemolysis, referred to as Gilbert syndrome.<br>Conjugation is also an important step in elimination of drugs, and therefore individuals with Gilbert syndrome may have increased susceptibility to adverse effects of some drugs metabolised by UGT1A1, such as indinavir, atazanavir and irinotecan. |
| **DPYD** | The protein, dihydropyrimidine dehydrogenase, is involved in the breakdown of various drugs. Variants in the protein's gene, DPYD, can slow the rate at which certain drugs are broken down. The drugs involved are:<br>▪ 5-fluoro-uracil (5FU)<br>▪ Capecitabine<br>▪ Tegafur<br>A patient with such a variant may be at risk of bone marrow toxicity from the medication. |
| **TPMT**<br>Medicare rebatable for eligible patients | The protein, thiopurine methyltransferase, breaks down the thiopurine-based immunosuppressive drugs. Variants in the protein's gene, TPMT, can reduce the activity of the protein, resulting in toxic levels of the drug and bone marrow suppression. The drugs involved are:<br>▪ Azathioprine<br>▪ 6-mercaptopurine (6MP)<br>This test identifies almost all patients at risk of neutropenia from these medications.<br>Other side effects, such as GIT upset (with or without pancreatitis), are not identified by this test. |
| **HLA-B*15:02** | A specific variant of the human leucocyte antigen B15, HLA-B*15:02, is associated with severe cutaneous adverse reactions (SCAR) to carbamazepine. This variant occurs more commonly in people of Han Chinese ancestry than in other ethnic groups. The pharmaceutical manufacturer recommends that this test be performed before prescribing carbamazepine.<br>HLA-A*31:01 has similar but less strong predictive value in Caucasians. If a person has this genotype and has been on carbamazepine for more than three months, they are unlikely to develop SCAR. |
| **HLA-B*57:01**<br>Medicare rebatable for eligible patients | A specific variant of the human leucocyte antigen B57, HLA-B*57:01, is associated with severe cutaneous adverse reactions (SCAR) to abacavir.<br>Abacavir must never be prescribed to a patient with HLA-B*57:01. Patients must be screened for this variant before being commenced on abacavir. |
| **HLA-B*58:01** | A specific variant of the human leucocyte antigen B58, HLA-B*58:01, is associated with severe cutaneous adverse reactions to allopurinol. |

**For further information, including scientific and peer-reviewed publications, please refer to our website, www.sonicgenetics.com.au or call us on 1800 010 447**

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