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# Pharmacogenomics – Cardiology Medication Fact Sheet

Pharmacogenomics (PGx) can be helpful in guiding the medication management of many cardiology related conditions. The PGx Multi panel shows how a patient metabolises certain cardiology specific medications including cholesterol-lowering medications, beta blockers and antiplatelet drugs. The patient's PGx results plus other clinical information can be used to personalise the selection of medication and dose to maximise clinical outcomes and minimise adverse side effects.

## Results backed by scientific evidence

The American Heart Association recently released a statement noting that: "The evidence to date supports CYP2C19 genetic testing before oral P2Y12 inhibitors are prescribed in patients with acute coronary syndromes or percutaneous coronary intervention."[1]
This highlights the importance of carrying out a relevant PGx test for individuals being prescribed clopidogrel for these conditions. Please scan the QR code to view the full article.

**AHA Article**

Our report recommendations are based on the guidelines of the Royal Dutch Pharmacists Association - Pharmacogenetics Working Group (DPWG) & the Clinical Pharmacogenetics Implementation Consortium (CPIC).

For a full list of the medications covered in the PGx Multi test, please see our website genomicdiagnostics.com.au/practitioners/pharmacogenomic-testing/.

## Case study

John is a 73 year old male who suffers from hypertension, elevated cholesterol and osteoarthritis. His current medications include perindopril 10mg and simvastatin 40mg.

Following an acute coronary syndrome, he was started on dual antiplatelet therapy with aspirin and clopidogrel, metoprolol, and his simvastatin dose was increased to 80mg.

He presented a few weeks later with a stent thrombosis.

PGx testing revealed that John is a CYP2C19 poor metaboliser, leading to reduced conversion of clopidogrel to its active form, decreased drug exposure, and diminished antiplatelet activity, which is the likely cause of the stent thrombosis.

Based on the PGx finding, the recommendation was to switch to an alternative antiplatelet such as prasugrel or ticagrelor that are not affected by this CYP2C19 result.

1. Pereira NL, Cresci S, Angiolillo DJ, et al. CYP2C19 Genetic Testing for Oral P2Y12 Inhibitor Therapy: A Scientific Statement From the American Heart Association. Circulation. Published online June 20, 2024.
Produced in collaboration with Dr Sam Mostafa, myDNA.

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## Medications covered by our PGx Multi report

| Drug Class | Drug(s) | Gene(s) | Benefits of PGx Testing |
|---|---|---|---|
| **Antiplatelet** | Clopidogrel | CYP2C19 | Clopidogrel is a prodrug which is metabolised by CYP2C19 to its active form producing antiplatelet activity. An individual's metaboliser type will determine the level of available active drug and therefore antiplatelet effect. In some cases, an alternative drug is recommended for better clinical outcomes. |
| **Cholesterol lowering** | Atorvastatin<br>Fluvastatin<br>Pravastatin<br>Rosuvastatin<br>Simvastatin | SLCO1B1<br>SLCO1B1/CYP2C9<br>SLCO1B1<br>SLCO1B1/ABCG2<br>SLCO1B1 | Statin use carries a risk of statin-induced myopathy. The SLCO1B1 gene encodes a transporter protein responsible for moving the active drug into liver cells for metabolism. Variations in this gene can alter statin exposure, potentially increasing the risk of developing statin-related myopathy. |
| **Beta Blocker** | Metoprolol | CYP2D6 | Metoprolol is metabolised by CYP2D6. PGx testing can predict an individual's CYP2D6 metaboliser status and therefore guide metoprolol dosing adjustments or selection of alternative therapies. |
| **Antiarrhythmic** | Flecainide | CYP2D6 | Flecainide is metabolised by CYP2D6. PGx testing can predict an individual's CYP2D6 metaboliser status and therefore guide flecainide dosing adjustments or selection of alternative therapies. |
| **Anticoagulant** | Warfarin | VKORC1/CYP2C9 | The VKORC1 and CYP2C9 genes play important roles in determining the optimal dosing of warfarin. Variations in the VKORC1 gene affect the sensitivity to warfarin, while variations in the CYP2C9 gene influence the metabolism of the drug. PGx testing for these variations can help tailor warfarin doses to individual patients, potentially lowering the incidence of adverse outcomes related to over-coagulation. |

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