

## Gene test information

**CLOPIDOGREL-RESISTANCE  
(CYP2C19 GENE TEST)**

- **Background**

Clopidogrel (Plavix) inhibits platelet aggregation and is used in the management of patients with coronary artery disease, with acute coronary syndromes, and/or after percutaneous coronary interventions. Clopidogrel is an inactive pro-drug that requires hepatic activation cytochrome P450 2C19 (CYP2C19).

A number of different alleles of CYP2C19 have been identified; depending on the allele present, laboratory demonstrations of the enzymatic activity of CYP2C19 can be normal, reduced, or increased. Patients with reduced CYP2C19 activity have less formation of clopidogrel's active metabolite and demonstrate reduced clopidogrel-induced platelet inhibition.

- **CYP2C19 genotypes**

Genotype	Type	Frequency	Commentary
*1**1	Extensive metabolizer	71%	No sign of reduced CYP2C19 activity.
*1*2, *1*3	Intermediate metabolizer	26%	Reduced CYP2C19 activity. Reduced effectiveness of clopidogrel.
*2*2, *3*3, *2*3	Poor metabolizer	3%	Strongly reduced CYP2C19 activity. Reduced effectiveness of clopidogrel.

- **Indications for testing**

Individuals starting or clopidogrel therapy

**References:**

Shuldiner AR, O'Connell JR, Bliden KP, et al. Association of cytochrome P450 2C19 genotype with the antiplatelet effect and clinical efficacy of clopidogrel therapy. JAMA. 2009;302:849-57.