ABOUT PHARMACOGENOMICS

Pharmacogenomics (PGx) examines how a person's genetic makeup influences their response to medication. Since everyone is genetically unique, prescriptions should reflect this individuality.

PGx testing helps identify which drugs are likely to be more effective and better tolerated based on an individual's genetic profile. It can be used preventively, to guide safer and more effective prescribing before treatment begins, or diagnostically, to optimize medications when patients experience side effects, poor efficacy, or treatment failure.

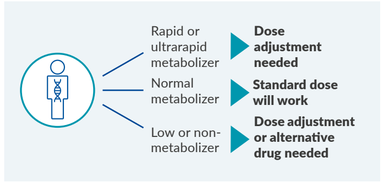

Figure 1: Genetic variation and its impact on drug response

PGx PREVENTIVE PANEL
A broad, preemptive screening test designed for proactive medication planning.

PGx DIAGNOSTIC TESTS
Targeted tests designed to support therapy decisions in patients already undergoing treatment.

WHY **RECOMMEND** TESTING?

Genetic differences account for up to 95% of the variability in how individuals respond to medications[2], impacting drug metabolism, transport, and clearance. Today, more than 100 FDA[5]-approved medications include PGx guidance in their labels[3], underscoring the growing role of genetics in prescribing.

PGx testing identifies genetic variants that influence drug response, enabling more precise, safer, and more effective treatment decisions, whether used proactively before treatment begins or in response to treatment failure or side effects.

Research shows[1, 2]:

- Up to 50% of adverse drug reactions (ADRs) may be linked to genetic factors
- Genetic variation explains up to 95% of differences in drug response, and most people carry at least one relevant variant

PGx testing can:

- Reduce ADRs and avoid ineffective prescriptions
- Improve drug efficacy and patient outcomes
- Personalize treatment with the right drug and dose
- Explain unexplained side effects or therapy resistance
- Support long-term medication planning and cost-efficiency

BENEFITS OF TESTING

- **ACTIONABLE** — Early risk identification
- **PRECISION** — Personalized drug and dose
- **SAFE** — Reduced preventable ADRs
- **EFFECTIVE** — Improved treatment success and adherence

[1]Chenchula et al. 2024, PMID: 38490995; [2]Principi et al. 2023, PMID: 38004461; [3]Clinical Pharmacogenetics Implementation Consortium (CPIC®); [4]Dutch Pharmacogenetics Working Group (DPWG); [5]Food and Drug Administration (FDA)

HOW TO **ORDER**?

1. Recommend pharmacogenetics analysis to your patient
2. Collect the sample(s)
3. Send the sample(s) to **Medicover Genetics**
4. The sample(s) will be analyzed at **Medicover Genetics** laboratories
5. Results will be sent to you

ABOUT MEDICOVER GENETICS

Medicover Genetics is a leading innovator in genetic diagnostics, laboratory enablement, and clinical testing, with over 25 years of experience supporting healthcare systems worldwide. The company offers a comprehensive portfolio of genetic testing services and clinical counselling, supported by certified diagnostic products and platforms.

At the core of its offering is the proprietary Technology Transfer Platform—an end-to-end genomics solution that enables partner laboratories worldwide to perform high-precision genetic tests in-house.

Medicover Genetics' CE-marked, IVDR-certified portfolio, developed through decades of clinical and medical expertise, includes VERACITY™, a non-invasive prenatal test (NIPT), and TarCET™, a suite of clinical assays addressing hereditary cancers, cardiovascular and metabolic disorders, infertility, neonatal conditions, and other critical health areas.

Driven by continuous research and development, Medicover Genetics is actively expanding into advanced areas such as liquid biopsy for therapy selection and minimal residual disease (MRD) testing. Its laboratories are CAP and ISO 15189 accredited, ISO 9001, and ISO 13485 certified, and comply with GMP and GCP, ensuring the highest quality standards.

With a presence across Europe, Asia, and Africa, Medicover Genetics collaborates closely with laboratories and clinicians to deliver scalable, high-impact genetic solutions that support personalized medicine and enable informed clinical decision-making. www.medicover-genetics.com

Medicover Genetics is part of Medicover, a leading international healthcare and diagnostic services company founded in 1995 and listed on Nasdaq Stockholm. www.medicover.com

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MEDICOVER GENETICS

PLACING **GENETICS** AT THE CORE OF **MEDICAL** DECISIONS

Pharmacogenomics Portfolio

www.medicover-genetics.com

OUR **TESTS**

PGx PREVENTIVE PANEL

The PGx Preventive Panel is a preemptive, patient-centered test that supports safer and more personalized prescribing from the outset. It analyzes 25 genes, including 16 core pharmacogenes with strong clinical evidence and high-level recommendations from CPIC[3], DPWG[4], and FDA[5].

The panel identifies genetic variants that influence how drugs are absorbed, metabolized, and eliminated, helping to reduce adverse effects and improve treatment outcomes. Details available below and at www.medicover-genetics.com.

Used in preventive care across multiple specialties, including:

- Cardiology
- Endocrinology
- Gastroenterology
- Internal Medicine
- Nephrology
- Neurology
- Oncology
- Pain Management
- Pediatrics
- Psychiatry
- Rheumatology
- Transplant Medicine

Recommended for:

- Individuals seeking personalized preventive care
- Patients managing multiple medications (polypharmacy)
- Those aiming to reduce future ADRs or treatment failures

PGx Preventive Panel for preemptive use

Preemptive multi-gene screening to support safer, more personalized prescribing before treatment begins

GUIDELINE-BASED GENES

Supported by CPIC, DPWG, or FDA recommendations

ABCG2, CYP2B6, CYP2C19, CYP2C9, CYP2D6, CYP3A4, CYP3A5, CYP4F2, DPYD, G6PD, IFNL3, NUDT15, SLCO1B1, TPMT, UGT1A1, VKORC1

EMERGING OR CONTEXT-SPECIFIC GENES

Based on emerging evidence or limited-use in clinical practice

ABCB1, ALDH2, BCHE, COMT, CYP1A1, CYP1A2, CYP2C8, F2, F5

About this test: The PGx Preventive Panel is a non-diagnostic, preemptive screening test intended for informational use only. It does not replace medical evaluation, must not be used to guide treatment without appropriate clinical consultation, and is compliant with GenDG, IVDR, and GDPR.

PGx DIAGNOSTIC TESTS

PGx diagnostic testing includes a range of clinically focused tests designed to support treatment decisions in patients with a medical indication for therapy. These tests help identify clinically actionable genetic variants that may explain ADRs, reduced efficacy, or dosing challenges by analyzing individual differences in drug metabolism, transport, and drug–target interactions.

Tests are structured by therapeutic area and focus on clinically relevant genes supported by CPIC[3], DPWG[4], and FDA[5] guidelines. The results provide actionable insights for drug selection, dose optimization, management of complex or long-term therapies, and integration with therapeutic drug monitoring (TDM), where applicable.

Recommended for:

- Patients with unexplained side effects or inadequate therapeutic response
- Individuals on high-risk medications (e.g., chemotherapy, psychotropics)
- Cases flagged during TDM or medication review

PGx Diagnostic Tests for clinical applications

PGx PANELS BY CLINICAL AREA

Multi-gene panels supporting therapy selection and dose optimization across complex treatment areas

PGx Anesthesia and Pain
- Assess risk of adverse drug reaction / therapy failure
- Genes: *BCHE, CYP2B6, CYP2C9, CYP2D6*

PGx Cardiovascular
- Assess risk of adverse drug reaction / therapy failure
- Genes: *CYP2C19, CYP2C9, CYP2D6, CYP4F2, SLCO1B1, VKORC1*

PGx CYP450 Drug Response
- Assess risk of adverse drug reaction / therapy failure
- Genes: *CYP1A2, CYP2A6, CYP2B6, CYP2C19, CYP2C8, CYP2C9, CYP2D6, CYP3A4, CYP3A5, CYP4F2*

PGx Malignant Hyperthermia
- Assess malignant hyperthermia predisposition
- Genes: *CACNA1S, RYR1*

PGx Metabolic Syndrome
- Assess risk of adverse drug reaction / therapy failure
- Genes: *CYP2C19, CYP2C9, CYP2D6, SLCO1B1*

PGx Neurology and Psychiatry
- Assess risk of adverse drug reaction / therapy failure
- Genes: *ABCB1, COMT, CYP2B6, CYP2C9, CYP2D6, CYP2C19, CYP3A5, CYP1A2, CYP3A4*

PGx Oncology
- Assess the risk of drug related toxicity
- Genes: *CYP2C8, CYP2D6, DPYD, NUDT15, TPMT, UGT1A1*

PGx ONCOLOGY TESTS

Drug–gene tests to personalize cancer therapy, reduce toxicity risk, and support safer treatment decisions

PGx Azathioprine
- Assess the risk of thiopurine-related toxicity
- Genes: *NUDT15, TPMT*

PGx 5-Fluorouracil
- Assess risk of fluoropyrimidine-related toxicity
- Gene: *DPYD*

PGx Irinotecan
- Assess the risk of irinotecan-related toxicity
- Gene: *UGT1A1*

PGx Paclitaxel
- Assess the risk of paclitaxel-related toxicity
- Gene: *CYP2C8*

PGx Tamoxifen
- Assess the risk of tamoxifen-related toxicity
- Gene: *CYP2D6*

PGx GUIDELINE-BASED TESTS

Drug–gene tests recommended by CPIC, EMA, or FDA to support safe and effective prescribing

Cardiology

PGx Mavacamten
- Treatment guidance for hypertrophic obstructive cardiomyopathy (HOCM)
- Gene: *CYP2C19*

Infectious Diseases

PGx Abacavir
- Asses the risk of abacavir hypersensitivity reactions
- Gene: *HLA-B*5701*

Metabolic Disease

PGx Eliglustat
- Treatment guidance for Gaucher disease
- Gene: *CYP2D6*

Neurology and Psychiatry

PGx Carbamazepine
- Assess risk of severe cutaneous adverse reactions (SCAR)
- Gene: *HLA-B*15:02*

PGx Siponimod
- Treatment guidance for multiple sclerosis
- Gene: *CYP2C9*

Oncology

PGx 5-Fluorouracil
- Assess risk of fluoropyrimidine-related toxicity
- Gene: *DPYD*

PGx Irinotecan
- Assess the risk of irinotecan-related toxicity
- Gene: *UGT1A1*

HOW TO **CHOOSE** THE RIGHT TEST?

Our PGx solutions support safe prescribing across the full patient journey from screening through to personalized care.

Early risk identification before prescribing	Detect gene-drug risks during patient assessment	Guide drug and dose selection or adjust therapy based on PGx data	Reuse PGx insights for ongoing or future care
Preventive/ proactive care	**Diagnosis**	**Personalized treatment**	**Follow-up**

	PGx Preventive Panel	PGx Diagnostic Tests
Purpose	Preemptive screening for proactive prescribing (non-diagnostic)	Targeted testing to guide active treatment decisions
Use case	Before treatment, in healthy or asymptomatic individuals; for preventive use only	During treatment, typically after side effects or therapy failure
Scope	Broad NGS panel covering >15 therapeutic areas	Specialty-focused tests based on clinical indication
Genes covered	25 clinically relevant genes incl. 16 core pharmacogenes	23 clinically relevant genes grouped by specialty
Clinical applications	Risk reduction, personalized prescribing, polypharmacy	ADR analysis, therapy resistance, dose optimization
Available specialties	Primary care, geriatrics, internal medicine, polypharmacy management, preventive cardiology	Psychiatry, oncology, cardiology, pain management, endocrinology, infectious and metabolic diseases
Report content	Actionable screening report with gene–drug summaries and dosing guidance	Medical report with therapeutic recommendations, validated by a physician
Sample types accepted	EDTA blood, buccal swab, and ready-to-use DNA	EDTA blood, buccal swab, and ready-to-use DNA
Turnaround time	10-15 working days	Varies by test: 3–5 days (most), 1–2 weeks (long-read/ HLA-B), up to 6 weeks (e.g. Malignant Hyperthermia)

CASE **STUDIES**

The following case studies illustrate how pharmacogenomic testing supports personalized treatment decisions across both preventive and diagnostic use cases.

Preventive PGx: Cardiovascular Risk Management

Test used: PGx Preventive Panel

Patient: 62-year-old with hypertension and type 2 diabetes undergoing medication planning after cardiovascular risk screening

Drugs assessed: Simvastatin, clopidogrel, omeprazole

Findings and actions:
- *SLCO1B1 *5/*5:* Increased statin-associated myopathy risk → Switch to lower risk alternatives (e.g., rosuvastatin or pravastatin)
- *CYP2C19 *2/*2:* Poor metabolizer status (decreased activation of clopidogrel) → Replace clopidogrel with, e.g., prasugrel or ticagrelor
- *CYP2C9 *2/*3:* Reduced metabolism of NSAIDs and some PPIs → Adjust PPI dose or switch to, e.g., rabeprazole

Clinical value: Enables informed treatment planning before adverse effects occur, improving safety and long-term efficacy

From Lee et al., 2022, PMID: 35034351; Lima et al., 2020, PMID: 32770672; Ramsey et al., 2014, PMID: 24918167

Diagnostic PGx: Opioid Inefficacy in Cancer Pain

Test used: PGx Anesthesia and Pain

Patient: Adult with cancer-related pain and reduced response to codeine

Drug assessed: Codeine

Findings and actions:
- *CYP2D6* → Poor metabolizer
- Decreased conversion of codeine to morphine → Avoid codeine
- Use alternatives not dependent on *CYP2D6* (e.g., morphine, hydromorphone)
- Tailor opioid choice and dose based on clinical status

Clinical value: Enabled targeted pain therapy by identifying a genetic cause for treatment failure and guiding effective opioid selection

From Smith et al. 2023, PMID: 36718020