**Research of genes and genotypes currently recommend for PGx testing in hospitals**

1. **Mayo Clinic:**

The Mayo Clinic article on pharmacogenomics testing details specific genes and their associated drugs for personalized therapy recommendations. It includes genetic variants influencing responses to various drugs, focusing on clinical actionability for tailored medication plans.

**Focused Pharmacogenomics Panel -** This panel comprehensively analyzes multiple genes with strong drug phenotype associations.

|  |  |
| --- | --- |
| **Genes** | **Genotype(s)** |
| CYP1A2 | \*1F, \*1K, \*6, and \*7 |
| CYP2C9 | \*2, \*3, \*4, \*5, \*6, \*8, \*9, \*11, \*12, \*13, \*14, \*15, \*16, \*17, \*18, \*25, \*26, \*28, \*30, \*33, and \*35 |
| CYP2C19 | \*2, \*3, \*4, \*5, \*6, \*7, \*8, \*9, \*10, \*17, and \*35 |
| CYP2D6 | \*2, \*3, \*4, \*4N, \*5, \*6, \*7, \*8, \*9, \*10, \*11, \*12, \*13, \*14A (now known as \*114), \*14B (now known as \*14), \*15, \*17, \*29, \*35, \*36, \*41, \*59, \*68, and CYP2D6 gene duplication; additional CYP2D6 variants may be detected through the reflex testing process |
| CYP3A4 | \*8, \*11, \*12, \*13, \*16, \*17, \*18, \*22, and \*26 |
| CYP3A5 | \*3, \*6, \*7, \*8, and \*9  \*3 |
| SLCO1B1 | rs4149056 (\*5) |
| VKORC1 | c. -1639G>A, c.85G>T, c.106G>T, c.121G>T, c.134T>C, c.172A>G, c.196G>A, c.358C>T, and c.383T>G |
| CYP4F2 | \*3 |

**Psychotropic Pharmacogenomics Gene Panel -** This panel comprehensively analyzes multiple genes with strong pharmacogenomic associations with medications used to treat psychiatric disorders, including depression.

|  |  |
| --- | --- |
| **Genes** | **Genotype(s)** |
| ADRA2A | rs1800544 |
| ANKK1 (DRD2 associated) | rs1800497 |
| CHRNA3 | rs1051730 |
| COMT | rs4680 |
| CYP1A2 | \*1F, \*1K, \*6, and \*7 |
| CYP2B6 | \*4, \*5, \*6, \*7, \*8, \*9, \*11, \*12, \*13, \*14, \*15, \*16 (also known as \*18.002), \*18, \*19, \*20, \*22, \*26, \*27, \*35, \*36, and \*38 |
| CYP2C9 | \*2, \*3, \*4, \*5, \*6, \*8, \*9, \*11, \*12, \*13, \*14, \*15, \*16, \*17, \*18, \*25, \*26, \*28, \*30, \*33, and \*35 |
| CYP2C19 | \*2, \*3, \*4, \*5, \*6, \*7, \*8, \*9, \*10, \*17, and \*35 |
| CYP2D6 | \*2, \*3, \*4, \*4N, \*5, \*6, \*7, \*8, \*9, \*10, \*11, \*12, \*13, \*14A (now known as \*114), \*14B (now known as \*14),\*15, \*17, \*29, \*35, \*36, \*41, \*59, \*68, and CYP2D6 gene duplication; additional CYP2D6 variants may be detected through the reflex testing process |
| CYP3A4 | \*8, \*11, \*12, \*13, \*16, \*17, \*18, \*22, and \*26 |
| CYP3A5 | \*3, \*6, \*7, \*8, and \*9 |
| DRD2 | rs1799978 |
| EPHX1 | rs2234922 |
| GRIK4 | rs1954787 |
| HLA-A | \*31:01 |
| HLA-B | \*15:02 |
| HTR2A | rs7997012 |
| HTR2C | rs3813929 and rs1414334 |
| MTHFR | rs1801131 and rs1801133 |
| OPRM1 | rs1799971 |
| SCN1A | rs3812718 |
| SLC6A4 | linked polymorphic region (LPR), a 44-base pair promoter insertion/deletion polymorphism |
| UGT2B15 | rs1902023 |

Links:

<https://www.mayocliniclabs.com/test-catalog/Overview/610057>

<https://news.mayocliniclabs.com/genetics/pharmacogenomics/comprehensive-panels/>

1. **St. Clair Hospital:**

St. Clair Collaborates with Mayo Clinic on Pharmacogenomics (PGx).

Gene - ABCG2, CYP2B6, CYP2C19, CYP2C9, CYP2D6, CYP3A5, CYP4F2, DPYD, SLCO1B1, and TPMT, COMT, OPRM1, POR, VKORC1, CYP3A4, and rs12777823.

Links:

<https://pmc.ncbi.nlm.nih.gov/articles/PMC8347064/#:~:text=In%20an%20observational%20cohort%20study,expert%20consultations%20with%20interdisciplinary%20collaborations>.

[**https://www.stclair.org/st-clair-info/mayo/pharmacogenomics/ - :~:text=Fortunately, St., to improve your medication experience.**](https://www.stclair.org/st-clair-info/mayo/pharmacogenomics/#:~:text=Fortunately%2C%20St.,to%20improve%20your%20medication%20experience.)

1. **Brigham and Women's Hospital**

Gene - CYP2C9, CYP2C19, CYP2D6, CYP3A4, CYP3A5, VKORC1, CYP1A2, HTR2A, HTR2C, and SLC6A4

1. **Cincinnati Children's Hospital Medical Center**

Gene - CYP2C19, CYP2C9, CYP2D6, CYP3A5, TPMT, NUDT15, and VKORC1

1. **St Jude Children's Hospital**

| **Drug** | **Gene** | **Phenotype** | **Dosing Recommendation** |
| --- | --- | --- | --- |
| Codeine | CYP2D6 | Ultra-rapid metabolizer | Change drug |
| Extensive metabolizer | No change |
| Intermediate metabolizer | No change |
| Poor metabolizer | Change drug |
| Tramadol | CYP2D6 | Ultra-rapid metabolizer | Change drug |
| Extensive metabolizer | No change |
| Intermediate metabolizer | No change |
| Poor metabolizer | Change drug |
| Oxycodone | CYP2D6 | Ultra-rapid metabolizer | Change drug |
| Extensive metabolizer | No change |
| Intermediate metabolizer | No change |
| Poor metabolizer | Change drug |
| Amitriptyline | CYP2D6 | Ultra-rapid metabolizer | Change drug |
| Extensive metabolizer | No change |
| Intermediate metabolizer | Reduce dose |
| Poor metabolizer | Reduce dose/Change drug |
| Ondansetron | CYP2D6 | Ultra-rapid metabolizer | Change drug |
| Extensive metabolizer | No change |
| Intermediate metabolizer | No change |
| Poor metabolizer | No change |
| Fluoxetine | CYP2D6 | Ultra-rapid metabolizer | Change drug |
| Extensive metabolizer | No change |
| Intermediate metabolizer | No change |
| Poor metabolizer | Reduce dose |
| Paroxetine | CYP2D6 | Ultra-rapid metabolizer | Change drug |
| Extensive metabolizer | No change |
| Intermediate metabolizer | No change |
| Poor metabolizer | Reduce dose |
| Simvastatin | SLCO1B1 | High function | No change |
| Intermediate function | Reduce dose/change drug |
| Low function | Change drug |
| Clopidogrel | CYP2C19 | Ultra-rapid metabolizer | No change |
| Extensive metabolizer | No change |
| Intermediate metabolizer | Change drug |
| Poor metabolizer | Change drug |
| Mercaptopurine Thioguanine Azathioprine | TPMT | High (normal) function | No change |
| Intermediate function | Reduce dose |
| Low or absent function | Reduce dose/change drug |

Links:

<https://pmc.ncbi.nlm.nih.gov/articles/PMC4056586/#:~:text=Clinical%20pharmacogenetics%20services%20at%20St,of%20array%2Dbased%20pharmacogenetic%20testing>.

**Additional References:**

National Library of Medicine

<https://pmc.ncbi.nlm.nih.gov/articles/PMC10622662/>