myome | atlas™ PLUS MEDICATION RESPONSE™

Technical Overview: Atlas Medication Response

Identify variants associated with medication response using whole-genome sequencing. This test produces a genomic dataset that MyOme can re-query as healthcare needs change and new information about the genome is discovered.

Clinical Use

This test is intended to facilitate the use of pharmacogenomic (PGx) guidance in a general care setting. MyOme reports variants and star alleles in 15 key pharmacogenes that are known to impact an individual's response to 70+ commonly prescribed medications. Reports include a summary of PGx findings and a Clinical Guidelines Supplement that contextualizes results according to gene-drug interactions outlined in the Clinical Pharmacogenetics Implementation Consortium (CPIC) guidelines[1] and FDA Table of Pharmacogenomic Associations[2]. The results of this test should be interpreted by a trained healthcare provider based on the full context of a patient's medical situation.

Sample Types

- Blood (2 EDTA tubes)
- Buccal (2 swabs)

Turnaround Times

- Most results are delivered **5–6 weeks** from the day all samples are received.*
- Follow-up testing and re-requisitions are typically completed within **1 week**.

*Turnaround times are provided as estimates and begin once sample(s) are processed at MyOme. Turnaround times may be extended in cases outside of MyOme's control, including delays related to confirmation testing or other unforeseen circumstances.

Method

Genomic DNA obtained from submitted samples is sequenced using Illumina technology and reads are aligned to the human genome reference assembly GRCh38.p14. MyOme's Medication Response variant calling pipeline is used to call variants, star alleles, copy number variants, and assign pharmacogenomic diplotypes. A high-coverage (mean 30X) PCR-free whole-genome library is constructed and sequenced with 2x150 bp paired-end reads.

Genes Analyzed

PLUS (PR3009)

Test Performance[3]

- >98.5% per gene accuracy for diplotypes and phenotypes
- >99% sensitivity for *CYP2D6*[6] gene duplications and deletions
- >99% sensitivity for PGx SNVs and indels
- >99.5% PGx variants at ≥10x depth
- 30X average genome-wide coverage

Variant Coverage

- **Tier 1**: All variant alleles recommended by the AMP PGx Working Group for *CYP2C19*[4], *CYP2C9*[5], *CYP2D6*[6], *TPMT* and *NUDT15*[7]
- **Tier 2**: All variants recomended by the AMP PGx Working Group for *CYP2C19*[4], *CYP2C9*[5], and *CYP2D6*[6] (excluding hybridizations)

15 Genes Analyzed

CYP2B6: *4; *6; *9; *18; *22

CYP2C9: *2; *3; *4; *5; *6; *8; *11; *12; *13; *15; *16; *26; *28; *29; *30; *31; *42; *55

CYP2C19: *2; *3; *4; *5; *6; *7; *8; *9; *10; *17; *35

CYP2D6: *2; *3; *4; *5; *6; *7; *8; *9; *10; *11; *12; *14; *15; *17; *21; *29; *31; *40; *41; *42; *49; *56; *59; *100; *114; gene duplications + deletions

CYP3A4: *22

CYP3A5: *3; *6; *7

CYP4F2: *3

DPYD: rs3918290; rs55886062; rs59086055; rs67376798; rs75017182+rs56038477; rs112766203; rs115232898; rs146356975; rs183385770

F5: rs6025

IFNL3: rs12979860

NUDT15: *3; *4; *9

SLCO1B1: *5; *9; *14; *20

TPMT: *2; *3A; *3B; *3C; *4; *11; *29

UGT1A1: *6; *27

VKORC1: rs9923231

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Drug-Gene Impact

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The list of drugs below can lead to a major or moderate drug-gene interaction based on the guidelines described in the technical overview.[1,2]

BEHAVIORAL HEALTH

DRUG NAME	GENE(S)
amitriptyline	*CYP2D6, CYP2C19*
amoxapine	*CYP2D6*
amphetamine	*CYP2D6*
aripiprazole	*CYP2D6*
aripiprazole lauroxil	*CYP2D6*
atomoxetine	*CYP2D6*
brexpiprazole	*CYP2D6*
citalopram	*CYP2C19, CYP2D6*
clobazam	*CYP2C19*
clomipramine	*CYP2D6*
clozapine	*CYP2D6*
desipramine	*CYP2D6*
diazepam	*CYP2C19*
doxepin	*CYP2D6, CYP2C19*
duloxetine	*CYP2D6*
escitalopram	*CYP2C19*
fluoxetine	*CYP2D6*
fluvoxamine	*CYP2D6*
iloperidone	*CYP2D6*
imipramine	*CYP2D6*
lofexidine	*CYP2D6*
nortriptyline	*CYP2D6*
paroxetine	*CYP2D6*
perphenazine	*CYP2D6*
protriptyline	*CYP2D6*
sertraline	*CYP2C19*
thioridazine	*CYP2D6*
trimipramine	*CYP2D6, CYP2C19*
valbenazine	*CYP2D6*
venlafaxine	*CYP2D6*
vortioxetine	*CYP2D6*

TRANSPLANT

DRUG NAME	GENE(S)
azathioprine	*TPMT, NUDT15*
tacrolimus	*CYP3A5*

CARDIOLOGY

DRUG NAME	GENE(S)
atorvastatin	*SLCO1B1*
carvedilol	*CYP2D6*
clopidogrel	*CYP2C19*
fluvastatin	*CYP2C9, SLCO1B1*
lovastatin	*SLCO1B1*
mavacamten	*CYP2C19*
pitavastatin	*SLCO1B1*
pravastatin	*SLCO1B1*
rosuvastatin	*SLCO1B1*
simvastatin	*SLCO1B1*
warfarin	*CYP2C9, CYP4F2, VKORC1*

NEUROLOGY

DRUG NAME	GENE(S)
brivaracetam	*CYP2C19*
deutetrabenazine	*CYP2D6*
donepezil	*CYP2D6*
fosphenytoin	*CYP2C9*
modafinil	*CYP2D6*
phenytoin	*CYP2C9*
pimozide	*CYP2D6*
pitolisant	*CYP2D6*
siponimod	*CYP2C9*
tetrabenazine	*CYP2D6*
valbenazine	*CYP2D6*

PAIN MANAGEMENT

DRUG NAME	GENE(S)
carisoprodol	*CYP2C19*
celecoxib	*CYP2C9*
codeine	*CYP2D6*
elagolix	*SLCO1B1*
flurbiprofen	*CYP2C9*
ibuprofen	*CYP2C9*
lornoxicam	*CYP2C9*
meloxicam	*CYP2C9*
oliceridine	*CYP2D6*
piroxicam	*CYP2C9*
tenoxicam	*CYP2C9*
tramadol	*CYP2D6*

UROLOGY

DRUG NAME	GENE(S)
darifenacin	*CYP2D6*
fesoterodine	*CYP2D6*
mirabegron	*CYP2D6*
tamsulosin	*CYP2D6*
tolterodine	*CYP2D6*

GASTROENTEROLOGY

DRUG NAME	GENE(S)
dexlansoprazole	*CYP2C19*
dronabinol	*CYP2C9*
esomeprazole	*CYP2C19*
lansoprazole	*CYP2C19*
metoclopramide	*CYP2D6*
nateglinide	*CYP2C9*
omeprazole	*CYP2C19*
ondansetron	*CYP2D6*
pantoprazole	*CYP2C19*
rabeprazole	*CYP2C19*

HEMATOLOGY/ONCOLOGY

DRUG NAME	GENE(S)
capecitabine	*DPYD*
erdafitinib	*CYP2C9*
eltrombopag	*F5*
fluorouracil	*DPYD*
gefitinib	*CYP2D6*
mercaptopurine	*TPMT, NUDT15*
tamoxifen	*CYP2D6*
thioguanine	*TPMT, NUDT15*

INFECTIOUS DISEASE

DRUG NAME	GENE(S)
atazanavir	*UGT1A1*
dolutegravir	*UGT1A1*
efavirenz	*CYP2B6*
peginterferon alfa-2a	*IFNL3*
peginterferon alfa-2b	*IFNL3*
quinine	*CYP2D6*
voriconazole	*CYP2C19*

MISCELLANEOUS

DRUG NAME	GENE(S)
abrocitinib	*CYP2C19*
cevimeline	*CYP2D6*
eliglustat	*CYP2D6*
lesinurad	*CYP2C9*
meclizine	*CYP2D6*
tropisetron	*CYP2D6*

REPRODUCTIVE AND SEXUAL HEALTH

DRUG NAME	GENE(S)
flibanserin	*CYP2C19, CYP2C9, CYP2D6*

1. Clinical Pharmacogenetics Implementation Consortium (CPIC). Genes-drugs. https://cpicpgx.org/genes-drugs. 2. US Food and Drug Administration. Table of pharmacogenetic associations. 2022. 3. MyOme Inc. Data on file. 4. Pratt VM, et al. Recommendations for clinical CYP2C19 genotyping allele selection. *J Mol Diagn.* 2018;20(3):269-276. doi:10.1016/j.jmoldx.2018.01.011. 5. Pratt VM, et al. Recommendations for clinical CYP2C9 genotyping allele selection. *J Mol Diagn.* 2019;21(5):746-755. doi:10.1016/j.jmoldx.2019.04.003. 6. Pratt VM, et al. Recommendations for clinical CYP2D6 genotyping allele selection. *J Mol Diagn.* 2021;23(9):1047-1064. doi:10.1016/j.jmoldx.2021.05.013. 7. Pratt VM, et al. TPMT and NUDT15 genotyping recommendations. *J Mol Diagn.* 2022;24(10):1051-1063. doi:10.1016/j.jmoldx.2022.06.007.

These tests were developed, and their performance characteristics were determined, by MyOme, Inc., a clinical laboratory certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA) and College of American Pathologist (CAP) accredited to perform high complexity clinical laboratory testing. These tests have not been cleared or approved by the U.S. Food and Drug Administration (FDA). Test results should always be interpreted by a clinician in the context of clinical and familial data with the availability of genetic counseling when appropriate. MyOme is not responsible for the content or accuracy of third-party websites.