Client: Example Client ABC123
123 Test Drive
Salt Lake City, UT 84108
UNITED STATES

Physician: Doctor, Example

Patient: Patient, Example

DOB	11/17/1993
Gender:	Female
Patient Identifiers:	01234567890ABCD, 012345
Visit Number (FIN):	01234567890ABCD
Collection Date:	00/00/0000 00:00

Cytochrome P450 Genotyping Panel, with GeneDose Access

ARUP test code 3004255

CYP PANEL Specimen	Whole Blood	
CYP2C19 Genotype	*1/*2	
CYP2C19 Phenotype	**Intermediate**	*
CYP2C8 Genotype	*1/*2	
CYP2C8 Phenotype	**See Note**	*
CYP2C9 Genotype	*1/*5	
CYP2C9 Phenotype	**Intermediate**	*
CYP2C Cluster Geno	**Heterozygous**	*
CYP2C Cluster Pheno	**See Note**	*
CYP2D6 Genotype	*1/*4	
CYP2D6 Phenotype	**Intermediate**	*
CYP3A4 Genotype	*1/*22	

H=High, L=Low, *=Abnormal, C=Critical

CYP3A4 Phenotype	**Intermediate**	*
CYP3A5 Genotype	*1/*3	
CYP3A5 Phenotype	**Intermediate**	*
CYP2B6 Genotype	*1/*6	
CYP2B6 Phenotype	**Intermediate**	*
CYP PANEL Interpretation	See Note	

H=High, L=Low, *=Abnormal, C=Critical

The following CYP2C19 allele(s) were detected: *1/*2. This result predicts the intermediate metabolizer phenotype.

Recommendation: Guidelines for genotype-based dosing are published by the Clinical Pharmacogenetics Implementation Consortium (CPIC) and can be found at: https://cpicpgx.org/ and https://www.pharmgkb.org/.

The following CYP2C8 alleles were detected: *1/*2. The metabolizer phenotype is drug-dependent.

The following CYP2C9 allele(s) were detected: *1/*5. This result predicts the intermediate metabolizer phenotype, with an activity score of 1.5 of 2.

Recommendation: Guidelines for genotype-based dosing are published by the Clinical Pharmacogenetics Implementation Consortium (CPIC) and can be found at: https://cpicpgx.org/ and https://www.pharmgkb.org/.

One copy of the 2C cluster rs12777823 was detected. This variant is associated with reduced warfarin dose requirement in some individuals of African ancestry.

The following CYP2D6 allele(s) were detected: *1/*4. This result predicts the intermediate metabolizer phenotype with an activity score estimated at 1 of 2.

Recommendation: Guidelines for genotype-based dosing are published by the Clinical Pharmacogenetics Implementation Consortium (CPIC) and can be found at: https://cpicpgx.org/ and https://www.pharmgkb.org/.

The following CYP3A4 allele(s) were detected: *1/*22. This result predicts the intermediate metabolizer phenotype.

The following CYP3A5 allele(s) were detected: *1/*3. This result predicts the intermediate metabolizer phenotype.

Recommendation: Guidelines for genotype-based dosing are published by the Clinical Pharmacogenetics Implementation Consortium (CPIC) and can be found at: https://cpicpgx.org/ and https://www.pharmgkb.org/.

The following CYP2B6 alleles were detected: *1/*6. This result predicts the intermediate metabolizer phenotype.

Recommendation: Guidelines for genotype-based dosing are published by the Clinical Pharmacogenetics Implementation Consortium (CPIC) and can be found at: https://cpicpgx.org/ and https://www.pharmgkb.org/.

This result has been reviewed and approved by [redacted]

BACKGROUND INFORMATION: Cytochrome P450 Genotyping Panel

Characteristics: The cytochrome P450 (CYP) isozymes 2B6, 2C19, 2C8, 2C9, 2D6 and the CYP3A subfamily are involved in the metabolism of many drugs. Variants in the genes that code for CYP2B6, CYP2C19, CYP2C8, CYP2C9, CYP2D6, CYP3A4, and CYP3A5, and CYP2C cluster (rs12777823) loci, influence pharmacokinetics of respective substrates, and may predict or explain nonstandard dose requirements, therapeutic failure, or adverse reactions.
Inheritance: Autosomal codominant.
Cause: Gene variants affect enzyme function.
Variants Tested:
(Variants are numbered according to the following transcripts: CYP2C19 NM_000769, CYP2C8 NM_000770, CYP2C9 NM_000771, 2C cluster rs12777823,
CYP2D6 M33388 sequence, CYP3A4 NM_017460 and CYP3A5 NM_000777, CYP2B6 NM_000767).

H=High, L=Low, *=Abnormal, C=Critical

*1: Indicative of no detected targeted variants and an assumption of functional allele.

CYP2C19*2: rs4244285, c.681G>A; rs12769205, c.332-23A>G
CYP2C19*3: rs4986893, c.636G>A
CYP2C19*4A: rs28399504, c.1A>G
CYP2C19*4B: rs28399504, c.1A>G; rs12248560, c.-806C>T
CYP2C19*5: rs56337013, c.1297C>T
CYP2C19*6: rs72552267, c.395G>A
CYP2C19*7: rs72558186, c.819+2T>A
CYP2C19*8: rs41291556, c.358T>C
CYP2C19*9: rs17884712, c.431G>A
CYP2C19*17: rs12248560, c.-806C>T
CYP2C19*35: rs12769205, c.332-23A>G

CYP2C8*2: rs11572103, c.805A>T
CYP2C8*3: rs10509681, c.1196A>G
CYP2C8*4: rs1058930, c.792C>G

CYP2C rs12777823, g.96405502 G>A

CYP2C9*2: rs1799853, c.430C>T
CYP2C9*3: rs1057910, c.1075A>C
CYP2C9*4: rs56165452, c.1076T>C
CYP2C9*5: rs28371686, c.1080C>G
CYP2C9*6: rs9332131, c.818del
CYP2C9*8: rs7900194, c.449G>A
CYP2C9*11: rs28371685, c.1003C>T
CYP2C9*12: rs9332239, c.1465C>T

CYP2D6*2: rs16947, g.2850C>T; rs1135840, g.4180G>C
CYP2D6*2A: rs1080985, g.-1584C>G; rs16947, g.2850C>T; rs1135840, g.4180G>C
CYP2D6*3: rs35742686, g.2549del
CYP2D6*4: rs1065852, g.100C>T; rs3892097, g.1846G>A; rs1135840, g.4180G>C
CYP2D6*5: gene deletion
CYP2D6*6: rs5030655, g.1707del
CYP2D6*7: rs5030867, g.2935A>C
CYP2D6*8: rs5030865, g.1758G>T; rs16947, g.2850C>T; rs1135840, g.4180G>C
CYP2D6*9: rs5030656, g.2615_2617del
CYP2D6*10: rs1065852, g.100C>T; rs1135840, g.4180G>C
CYP2D6*11: rs1080985, g.-1584C>G; rs201377835, g.883G>C; rs16947, g.2850C>T;
rs1135840, g.4180G>C
CYP2D6*13: a CYP2D7-derived exon 1 conversion
CYP2D6*14: rs5030865, g.1758G>A; rs16947, g.2850C>T; rs1135840, g.4180G>C
CYP2D6*15: rs774671100, g.137_138insT
CYP2D6*17: rs28371706, g.1023C>T; rs16947, g.2850C>T; rs1135840, g.4180G>C
CYP2D6*29: rs16947, g.2850C>T; rs59421388, g.3183G>A; rs1135840, g.4180G>C
CYP2D6*35: rs769258, g.31G>A; rs16947, g.2850C>T; rs1135840, g.4180G>C; rs1080985, g.-1584C>G
CYP2D6*36: a CYP2D6*10 carrying a CYP2D7-derived exon 9 conversion
CYP2D6*36-*10: a CYP2D6*36 and a CYP2D6*10 in tandem
CYP2D6*40: rs28371706, g.1023C>T, rs16947, g.2850C>T; rs1135840, g.4180G>C; rs72549356, g.1863_1864ins TTTCGCCCCTTTCGCCCC
CYP2D6*41: rs16947, g.2850C>T; rs28371725, g.2988G>A; rs1135840, g.4180G>C
CYP2D6*42: rs16947, g.2850C>T; rs1135840, g.4180G>C; rs72549346, g.3260_3261insGT
CYP2D6*49: rs1065852, g.100C>T; rs1135822, g.1611T>A; rs1135840, g.4180G>C
CYP2D6*69: rs1065852, g.100C>T; rs16947, g.2850C>T; rs28371725, g.2988G>A; rs1135840, g.4180G>C
CYP2D6*114: rs1065852, g.100C>T; rs5030865, g.1758G>A; rs16947, g.2850C>T; rs1135840, g.4180G>C

H=High, L=Low, *=Abnormal, C=Critical

DUP: complete gene duplications

CYP2B6*4: rs2279343, c.785A>G
CYP2B6*6: rs3745274, c.516G>T; rs2279343, c.785A>G
CYP2B6*7: rs3745274, c.516G>T; rs2279343, c.785A>G; rs3211371, c.1459C>T
CYP2B6*9: rs3745274, c.516G>T
CYP2B6*18: rs28399499, c.983T>C
CYP2B6*22: rs34223104, c.-82T>C
CYP2B6*36: rs34223104, c.-82T>C; rs3745274, c.516G>T; rs2279343, c.785A>G

CYP3A4*1A: rs2740574, c.-392G>A
CYP3A4*22: rs35599367, c.522-191C>T

CYP3A5*3: rs776746, c.219-237A>G
CYP3A5*6: rs10264272, c.624G>A
CYP3A5*7: rs41303343, c.1035dup

Methodology: Polymerase chain reaction (PCR) and fluorescence monitoring. Sequencing is only performed if needed to characterize a duplicated CYP2D6 gene.

Analytic Sensitivity and Specificity: Greater than 99 percent.

Limitations: Only the targeted variants will be detected by this panel, and assumptions about phase and content are made to assign alleles. Publicly available sources such as the www.pharmvar.org or www.pharmgkb.org provide guidance on phenotype predictions and allele frequencies. A combination of the CYP2D6*5 (gene deletion) and a CYP2D6 gene duplication cannot be specifically identified; however, this combination is not expected to adversely affect the phenotype prediction. The assay used to detect *40 allele, cannot distinguish between insertions of 1 or 2 copies; it also cannot distinguish between heterozygous and homozygous mutant samples due to unavoidable cross reactivity with the wild type sequence. Additional assays will be used to help differentiate the *40 allele from other CYP2D6 star alleles. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with gene substrates may be affected by genetic and nongenetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring.

Please note the information contained in this report does not contain medication recommendations, and should not be interpreted as recommending any specific medications. Any dosage adjustments or other changes to medications should be evaluated in consultation with a medical provider.

This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the U.S. Food and Drug Administration. This test was performed in a CLIA-certified laboratory and is intended for clinical purposes.

Counseling and informed consent are recommended for genetic testing. Consent forms are available online.

CYP PANEL, GeneDose Link	See Note

To access GeneDose LIVE, visit the URL below and enter the ARUP Accession number to continue:

H=High, L=Low, *=Abnormal, C=Critical

	INTERPRETIVE INFORMATION: CYP PANEL, GeneDose Link GeneDose LIVE content is provided by Coriell Life Sciences and not by ARUP Laboratories. Any dosage adjustments or other changes to medications should be evaluated in consultation with a medical provider.
EER Cytochrome P450 Panel, GeneDose	See Note Authorized individuals can access the ARUP Enhanced Report using the following link: [redacted]

H=High, L=Low, *=Abnormal, C=Critical

VERIFIED/REPORTED DATES

Procedure	Accession	Collected	Received	Verified/Reported
CYP PANEL Specimen	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C19 Genotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C19 Phenotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C8 Genotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C8 Phenotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C9 Genotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C9 Phenotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C Cluster Geno	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2C Cluster Pheno	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2D6 Genotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2D6 Phenotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP3A4 Genotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP3A4 Phenotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP3A5 Genotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP3A5 Phenotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2B6 Genotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP2B6 Phenotype	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP PANEL Interpretation	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CYP PANEL, GeneDose Link	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
EER Cytochrome P450 Panel, GeneDose	24-323-113907	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00

END OF CHART

H=High, L=Low, *=Abnormal, C=Critical