

CYTOCHROME P450 1A2 GENOTYPE #89401

USEFUL FOR:

- Identifying patients who are poor, intermediate, extensive, or ultrarapid metabolizers of drugs metabolized by CYP1A2.
- Adjusting dosages for drugs that are metabolized by CYP1A2.

ADDITIONAL TESTS:

Unit Code	Reporting Name	Available Separately	Always Performed
81769	Rapid DNA Extraction	Yes	Yes

TESTING ALGORITHM: When this test is ordered, DNA extraction will always be performed at an additional charge. However, for multiple drug metabolism genotype test orders, only a single specimen is needed and the DNA extraction will only be charged once.

METHODOLOGY: Polymerase Chain Reaction (PCR), Allele Specific Primer Extension (ASPE)/Bead Hybridization with Fluorescence Detection

REFERENCE VALUES: An interpretive report will be provided

SPECIMEN REQUIREMENTS:

NOTE: Multiple drug metabolism genotype tests can be performed on a single specimen after a single extraction. See "Multiple Drug Metabolism Genotype Tests" in Special Instructions in the on-line test catalog for a list of tests that can be ordered together.

Draw blood in a lavender-top (EDTA) tube(s), and send 3 mL of EDTA whole blood refrigerated in original VACUTAINER(S).

NOTE: 1. Bone marrow and liver transplants will interfere with testing.

- For bone marrow transplant patients, buccal cells should be provided from the **recipient** to obtain an accurate genotype.
 - For liver transplant patients, **donor** blood or buccal cells should be provided to obtain an accurate genotype for the recipient patient.
2. Transfusions will interfere with testing for up to 4 to 6 weeks. DNA obtained from white cells may not provide useful information for patients who received a recent transfusion of blood that was not leukocyte-reduced. Wait 4 to 6 weeks until transfused cells have left the patient's circulation before drawing the patient's blood specimen for genotype testing.
 3. An "Informed Consent for DNA Testing" (Supply T576) is available. See Special Instructions in the on-line catalog for a copy of the form.
 4. Cytochrome P450 Patient Education Brochure (Supply T526) is available upon request.

TEST DEFINITION

7/14/2009

CODE NAME

89401 CYP1A2 GENOTYPE

ORDER CODE	EFF DATE	TC	TITLE	CHECKING NORMALS	PRINT NORMALS (# CODED)	PERFORM SITE *
89401	6/17/2009		CYP1A2 GENOTYPE			MCR
			TRANSPORT TEMP : REFRIG\AMBIENT OK\FROZEN OK			
		45499	1A2 PHENOTYPE INTERPRETATION			
		45501	1A2 -3860G>A			
		45502	1A2 -2467TDEL			
		45504	1A2 -729C>T			
		45505	1A2 -163C>A			
		45506	1A2 125C>G			
		45507	1A2 558C>A			
		45508	1A2 2385G>A			
		45509	1A2 2473G>A			
		45510	1A2 2499A>T			
		45511	1A2 3497G>A			
		45512	1A2 3533G>A			
		45513	1A2 5090C>T			
		45514	1A2 5166G>A			
		45517	1A2 REVIEWED BY			

TEST CODE ALWAYS MESSAGE - [Z45517]

Z45517 DIRECT POLYMORPHISM ANALYSIS FOR -3860G>A, -2467T>DEL T, -729C>T, -163C>A, 125C>G, 558C>A, 2385G>A, 2473G>A, 2499A>T, 3497G>A, 3533G>A, 5090C>T, AND 5166G>A IS PERFORMED FOLLOWING PCR AMPLIFICATION. DIRECT DNA TESTING WILL NOT DETECT ALL THE KNOWN MUTATIONS THAT RESULT IN DECREASED OR INACTIVE CYP1A2 ALLELES. THIS ASSAY DOES NOT TEST FOR SOME KNOWN POLYMORPHISMS BECAUSE THOSE POLYMORPHISMS HAVE NOT BEEN ASSOCIATED WITH ALTERATIONS IN ENZYMATIC ACTIVITY. SEE [HTTP://WWW.CYPALLELES.KI.SE/CYP1A2.HTM](http://www.cypalleles.ki.se/cyp1a2.htm) FOR A FULL DESCRIPTION OF CYP1A2 ALLELES. ABSENCE OF A DETECTABLE GENE MUTATION OR POLYMORPHISM DOES NOT RULE OUT THE POSSIBILITY THAT A PATIENT HAS A METABOLIZER STATUS OTHER THAN PREDICTED ABOVE. THE FREQUENCY OF POLYMORPHISMS CAUSING POOR METABOLISM HAS NOT BEEN FULLY CHARACTERIZED IN VARIOUS ETHNIC GROUPS. PATIENTS WITH AN ULTRARAPID, EXTENSIVE (NORMAL), OR INTERMEDIATE GENOTYPE MAY HAVE CYP1A2 ENZYME ACTIVITY INHIBITED OR INDUCED BY A VARIETY OF SUBSTANCES, MEDICATIONS, OR THEIR METABOLITES. THE FOLLOWING IS A LISTING OF SUBSTANCES KNOWN TO AFFECT CYP1A2 ACTIVITY AS OF THE DATE OF THIS REPORT.

DRUGS AND SUBSTANCES KNOWN TO INCREASE (INDUCE) CYP1A2 ACTIVITY INCLUDE: BROCCOLI, BRUSSEL SPROUTS, CHAR-GRILLED MEAT, INSULIN, METHYLCHOLANTHRENE, MODAFINIL, NAFCILLIN, BETA-NAPHTHOFLAVONE, OMEPRAZOLE, AND TOBACCO. COADMINISTRATION WILL INCREASE THE RATE OF METABOLISM OF CYP1A2 METABOLIZED DRUGS AND MAY CHANGE THE EFFECTIVENESS OF THE DRUG.

DRUGS AND SUBSTANCES KNOWN TO DECREASE CYP1A2 ACTIVITY INCLUDE: AMIODARONE, CIMETIDINE, CIPROFLOXACIN, FLUROQUINOLONES, FLUVOXAMINE, FURAFYLLINE, INTERFERON, METHOXSALEN, AND MIBEFRADIL. COADMINISTRATION WILL DECREASE THE RATE OF METABOLISM OF CYP1A2 METABOLIZED DRUGS, INCREASING THE POSSIBILITY OF TOXICITY.

DRUGS AND SUBSTANCES THAT UNDERGO METABOLISM BY CYP1A2 INCLUDE: ACETAMINOPHEN, AMITRIPTYLINE, CAFFEINE, CLOMIPRAMINE, CLOZAPINE, CYCLOBENZAPRINE, ESTRADIOL, FLUVOXAMINE, HALOPERIDOL, IMIPRAMINE, MEXILETINE, NAPROXEN, OLANZAPINE, ONDANSETRON, PHENACETIN, PROPRANOLOL, RILUZOLE, ROPIVACAINE, TACRINE, THEOPHYLLINE, TIZANIDINE, VERAPAMIL, (R)WARFARIN, ZILEUTON, AND ZOLMITRIPTAN. COADMINISTRATION MAY DECREASE THE RATE OF ELIMINATION OF OTHER DRUGS METABOLIZED BY CYP1A2.

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TEST DEFINITION

7/14/2009

CODE NAME

81769 RAPID DNA EXTRACTION

ORDER CODE	EFF DATE	TC	TITLE	CHECKING NORMALS	PRINT NORMALS (# CODED)	PERFORM SITE *
81769	5/23/2007		RAPID DNA EXTRACTION			MCR
			TRANSPORT TEMP : AMBIENT\FROZEN OK\REFRIG OK			
			28357 COMMENT			

*PERFORMING SITE LEGEND

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MCR MAYO CLINIC DPT OF LAB MED & PATHOLOGY LAB DIRECTOR: FRANKLIN R. COCKERILL, III, M.D.
200 FIRST STREET SW
ROCHESTER, MN 55905
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LABORATORY SERVICE REPORT

1-800-533-1710

PATIENT NAME TESTING, 1A2		PATIENT NUMBER		AGE 35	SEX M	ACCESSION # G9131545
ORDERING PHYSICIAN		CLIENT ORDER #				ACCOUNT # LIAISONS
COLLECTION 07/13/09 10:07 A	RECEIVED 07/13/09 10:07 A	REPORT PRINTED 07/15/09 10:00 A		SPECIMEN INFORMATION DATE OF BIRTH:		
DATE	TIME	DATE	TIME	DATE	TIME	
Test Client Attn: Mayo Liaisons 200 First Street SW Rochester, MN 55905 507-284-8202						

TEST REQUESTED	HI LO	REF RANGE	PERFORM SITE *
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Rapid DNA Extraction

Comment

Genomic DNA was
extracted.

MCR

CYP1A2 Genotype

1A2 Phenotype

Interpretation

This individual is expected to be an extensive (normal) metabolizer. This individual is expected to metabolize CYP1A2 substrates normally.

1A2 -3860g>a	G/G	MCR
1A2 -2467tdel	WT	MCR
1A2 -729c>t	C/C	MCR
1A2 -163c>a	C/C	MCR
1A2 125c>g	C/C	MCR
1A2 558c>a	C/C	MCR
1A2 2385g>a	G/G	MCR
1A2 2473g>a	G/G	MCR
1A2 2499a>t	A/A	MCR
1A2 3497g>a	G/G	MCR
1A2 3533g>a	G/G	MCR
1A2 5090c>t	C/C	MCR
1A2 5166g>a	G/G	MCR
1A2 Reviewed by	Linnea M. Baudhuin, Ph.D.	MCR

Direct polymorphism analysis for -3860G>A, -2467T>del T, -729C>T, -163C>A, 125C>G, 558C>A, 2385G>A, 2473G>A, 2499A>T, 3497G>A, 3533G>A, 5090C>T, and 5166G>A is performed following PCR amplification. Direct DNA testing will not detect all the known mutations that result in decreased or inactive CYP1A2 alleles. This assay does not test for some known polymorphisms because

* Perform Site Legend on last page of report

PATIENT NAME TESTING, 1A2	ORDER STATUS Final	COLLECTION DATE AND TIME 07/13/09 10:07 A
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Specimen receipt and report times are in CST/CDT

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07/15/2009 10:02AM



LABORATORY SERVICE REPORT

1-800-533-1710

PATIENT NAME TESTING, 1A2		PATIENT NUMBER		AGE 35	SEX M	ACCESSION # G9131545
ORDERING PHYSICIAN			CLIENT ORDER #			ACCOUNT # LIAISONS
COLLECTION 07/13/09 10:07 A	RECEIVED 07/13/09 10:07 A	REPORT PRINTED 07/15/09 10:00 A		SPECIMEN INFORMATION DATE OF BIRTH:		
DATE	TIME	DATE	TIME			
Test Client Attn: Mayo Liaisons 200 First Street SW Rochester, MN 55905 507-284-8202						

TEST REQUESTED	HI LO	REF RANGE	PERFORM SITE *
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those polymorphisms have not been associated with alterations in enzymatic activity. See <http://www.cypalleles.ki.se/cyp1a2.htm> for a full description of CYP1A2 alleles. Absence of a detectable gene mutation or polymorphism does not rule out the possibility that a patient has a metabolizer status other than predicted above. The frequency of polymorphisms causing poor metabolism has not been fully characterized in various ethnic groups. Patients with an ultrarapid, extensive (normal), or intermediate genotype may have CYP1A2 enzyme activity inhibited or induced by a variety of substances, medications, or their metabolites. The following is a listing of substances known to affect CYP1A2 activity as of the date of this report.

Drugs and substances known to increase (induce) CYP1A2 activity include: Broccoli, brussel sprouts, char-grilled meat, insulin, methylcholanthrene, modafinil, nafcillin, beta-naphthoflavone, omeprazole, and tobacco. Coadministration will increase the rate of metabolism of CYP1A2 metabolized drugs and may change the effectiveness of the drug.

Drugs and substances known to decrease CYP1A2 activity include: Amiodarone, cimetidine, ciprofloxacin, fluoroquinolones, fluvoxamine, furafylline, interferon, methoxsalen, and mibefradil. Coadministration will decrease the rate of metabolism of CYP1A2 metabolized drugs, increasing the possibility of toxicity.

Drugs and substances that undergo metabolism by CYP1A2 include: Acetaminophen, amitriptyline, caffeine, clomipramine, clozapine, cyclobenzaprine, estradiol, fluvoxamine, haloperidol, imipramine, mexiletine,

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PATIENT NAME TESTING, 1A2	ORDER STATUS Final	COLLECTION DATE AND TIME 07/13/09 10:07 A
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LABORATORY SERVICE REPORT

1-800-533-1710

PATIENT NAME TESTING, 1A2		PATIENT NUMBER		AGE 35	SEX M	ACCESSION # G9131545
ORDERING PHYSICIAN		CLIENT ORDER #				ACCOUNT # LIAISONS
COLLECTION 07/13/09 10:07 A	RECEIVED 07/13/09 10:07 A	REPORT PRINTED 07/15/09 10:00 A		SPECIMEN INFORMATION DATE OF BIRTH:		
DATE	TIME	DATE	TIME			
Test Client Attn: Mayo Liaisons 200 First Street SW Rochester, MN 55905 507-284-8202						

TEST REQUESTED	HI LO	REF RANGE	PERFORM SITE *
naproxen, olanzapine, ondansetron, phenacetin, propranolol, riluzole, ropivacaine, tacrine, theophylline, tizanidine, verapamil, (R)warfarin, zileuton, and zolmitriptan. Coadministration may decrease the rate of elimination of other drugs metabolized by CYP1A2.			

* PERFORMING SITE

MCR 200 First Street SW Rochester, MN 55905	Lab Director: Franklin R. Cockerill, III, M.D.
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PATIENT NAME TESTING, 1A2	ORDER STATUS Final	COLLECTION DATE AND TIME 07/13/09 10:07 A
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