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DNA DRUG SENSITIVITY TEST (DST) RESULTS
Cytochrome P450 Tests

Patient Name: John Doe	Date of Birth: 05/02/1940	Genelex Laboratory # 12345
Referrer: Dr. James Watson	Client Account: Bellevue Cardiology	Sample Type: Buccal
Date Collected: December 29, 2010	Date Received: December 29, 2010	Date Reported: December 29, 2010

Cytochrome P450 Test Result(s):
Cytochrome Genotype
Phenotype Interpretation:

DST-CYP2D6*1/*1 Normal Metabolizer
DST-CYP2C19 *2/*3 Poor Metabolizer
DST-CYP2C9 *1/*1 Normal Metabolizer
DST-VKORC1 A/A High sensitivity to warfarin

Laboratory Director: Teresa H. Aulinskas, Ph.D.

Laboratory Test Interpretive Comments:

✔ CYP2D6 Normal Metabolizers are the common phenotype for CYP2D6 enzyme activity. In general they can be administered CYP2D6 metabolized drugs following standard dosing practices.
NM genotypes consist of two active or one active and one partially active CYP2D6 allele(s). Increased caution is advised for individuals having one partially active allele such as *9, *10, *17, *41.

✘ CYP2C19 Poor Metabolizers have greatly decreased enzyme activity and may require alternative treatments or less than standard dosage to prevent overdose toxicity, drug interactions and for optimal therapeutic response to CYP2C19 inactivated drugs. For prodrugs, such as clopidogrel requiring activation by CYP2C19, consider alternative treatment or increased dosage.
PM genotypes consist of two inactive CYP2C19 alleles.
Clopidogrel (Plavix): Consult label for dosing guidance.

✔ CYP2C9 Normal Metabolizers are the common phenotype for CYP2C9 enzyme activity. In general they can be administered CYP2C9 metabolized drugs following standard dosing practices.
NM genotypes consist of two active CYP2C9 alleles.
Warfarin (Coumadin): Consult label or www.warfarindosing.org for dosing advice.

✘ VKORC1 (-1639 AA) high sensitivity to warfarin. The VKORC1 enzyme is the site of action of warfarin. Consult label or www.warfarindosing.org for dosing advice.

Co-administration of other drugs. Genotype results should be interpreted in context of the individual clinical situation including co-administration of other drugs, hepatic and renal function. In all cases monitor for co-administration of inhibitors which may convert patients to poor metabolizer status. Potential adverse outcomes included overdose toxicity or treatment failure particularly for prodrugs. For more information see GeneMedRx drug-drug and drug-gene interaction software and Cytochrome P450 Metabolism Inhibitor/Inducer Tables. Access GeneMedRx using the patient's Genelex lab number and date of birth at www.GeneMedRx.com/DNAlogin.

Clinical Indication for Testing: Patients taking medicines metabolized by the cytochrome P450s with a personal or family history of adverse reactions including treatment failure, to confirm the presence or absence of relevant genotypes and as an aid to dosing and co-medication administration. DNA testing does not replace the need for clinical and therapeutic drug monitoring.

Methodologies: PCR based assays detect listed alleles, including all common and most rare variants with known clinical significance at analytical sensitivity and specificity >99%. **CYP2C19:** 8 variants (active *1; inactive *2, *3, *4, *5, *6, *7, *8; rapid *17). **CYP2D6:** 17 variants (active *1, *2; inactive *3,*4, *5, *6, *7, *11, *12, *14, *15; partially active *9, *10, *17, *41; gene duplications *1, *2, *4, *10, *41). **CYP2C9:** 5 variants (active *1, Inactive *2, *3, *4, *5, *6). **VKORC1:** 1 variant (-1639G>A). Rare variants of CYP2D6 (*7, *8, *11, *12, *14, *15) and CYP2C9 (*4) may not have been observed at Genelex. Assays developed and performance characteristics determined by Genelex. Rare false negative or false positive results may occur. Genelex Corporation, Washington State Medical Test Site No. MTS-3919 **(CLIA No. 50D0980559),** is qualified to perform high complexity clinical testing.

References: Available at www.HealthandDNA.com/healthcare-professional/pharmacogenetics.html or by request.

Illustrative Guide to Cytochrome P450 Genes: Prevalence and Substrates

	CYP2C19	CYP2D6	CYP2C9
Medicines Affected	10% of drugs including clopidogrel (Plavix), amitriptyline, citalopram, clomipramine, diazepam, escitalopram, imipramine, sertraline, phenytoin, lansoprazole, omeprazole, carisoprodol, propanolol, and voriconazole.	25% of drugs, including most SSRIs, TCAs, beta blockers, opiates, antihistamines, cough medicines, neuroleptics, antiarrhythmics, tamoxifen, carveodilol, metoprolol, propranolol, timolol, codeine, and hydrocodone.	16% of drugs including most angiotensin II blockers, NSAIDs, hypoglycemics, warfarin (Coumadin), sulfonylureas, ibuprofen, some antidepressants, Amaryl, isoniazid, Hyzaar, amitriptyline, Dilantin, naproxen, and Viagra.
Patients w/Variants	~30% typical U.S., higher in Asians and Africans	~50%, increased prevalence in Africans	~35%

For more complete information see GeneMedRx software at www.GeneMedRx.com. Drug-gene tables with dosing considerations for commonly prescribed medicines can be requested at 800-523-6487.

Genelex Corporation • 3000 First Avenue, Suite 1, Seattle, Washington 98121, 1-800 523-6487 www.HEALTHandDNA.com,

FOR THE PATIENT

Your physician has ordered DNA Drug Sensitivity (pharmacogenetic) Testing on your behalf. This testing determines your genetic ability to process most commonly prescribed medicines and will not change in your lifetime.

It is important that you share the cards below with all of your healthcare providers going forward. This information needs to be reviewed anytime medication changes are considered to help select the safest and most effective drug and dose for you.

Some drugs will not work for some people. Drug doses need to be high enough to fight a specific disease but low enough to avoid causing serious side effects. Large changes in the amount of the drug in your bloodstream can be caused by genetics, prescription and non-prescription (over-the-counter) drugs, recreational drugs, herbal products, or food. This is called a "drug interaction." The software link on the cards below allows your healthcare providers to determine which medication changes are least likely to cause drug interactions.

Drug-gene tables have also been provided which contain an abridged list of medications which you may have problems with at standard doses.

Please visit www.GeneMedRx.com/explainreport.ppt for more information or watch a 3-minute movie at www.HealthandDNA.com/movie.

Patient Name: **John Doe**
Date of Birth: 05/02/1940 **Laboratory #:**12345

Go to www.GeneMedRx.com/dnalogin to determine interaction risk before prescribing medication to this patient. The patient's genetic information listed below impacts response to the majority of medications.

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