Patient	**XXX**	Requesting physician	
Date of birth	01/06/1956 | Sex F		

Sample type	DNA	Report generated	29/08/2022
Collection date	10/06/2022	Laboratory director	Dr C. Lapucci
Received date	28/06/2022	Contact email	cristina.lapucci@synlab.it
Sample number	xxx		

MyPGx ® - Pharmacogenetic short screening panel (method: PCR, MassArray and MLPA)

Provided clinical information:

Clinical information	
Known problematic medication	NKDA
Relevant medical history	None

Summary of key pharmacogenetic results (predicted Poor or Ultrarapid activity):

Gene	Prediction
CYP2C19	Rapid metabolizer
VKORC1	Warfarin resistance
SLC22A1	Low function
SLCO1B3	Low function
SULT1A1	Poor metabolizer
NAT2	Poor acetylator

The detailed pharmacogenetic results are presented on the following pages.

Technical comments and limitations:

Coverage 100%. Haplotypes not determined (failed SNPs): None

PGx is a rapidly-evolving field primarily providing evidence-based predictions of how the tested individual's genetic profile may affect reaction to certain drugs. Factors such as drug-drug interaction and also age, diet, ethnicity, family and personal health history, can also impact the likelihood of exhibiting certain drug reactions, independently of genotype-based predictions.

This report is intended for use by a healthcare professional. Based on PGx results, **patients should make no changes to medical care without the prior advice of and consultation with a healthcare professional** [including, but not limited to, changes in dosage or frequency of medication, diet and/or exercise regimens, or pregnancy planning].

ELECTRONIC SIGNATURE	**Dott.ssa Cristina Lapucci** SPECIALISTA IN GENETICA MEDICA SYNLAB ITALIA

GENOTYPE/HAPLOTYPE/PHENOTYPE DETAIL

Gene	Genotype-Haplotype	Allele Tested	Predicted Phenotype
CYP1A1	*1/*1	*1, *2, *3, *4, *5, *6, *7, *8	Normal metabolizer
CYP1A2	*1A/*1F	*1A, *1F, *1K, *7	Normal metabolizer
CYP2A6	*1A/*9	*1A, *1B, *2, *4, *5, *6, *7, *8, *9, *11, *17, *20	Intermediate metabolizer
CYP2B6	*6/*6	*1, *6, *8, *10, *18, *28	Intermediate metabolizer
CYP2C8	*1/*1	*1, *2, *3, *4, *5, *7, *8	Normal metabolizer
CYP2C9	*1/*3	*1, *2, *3, *4, *5, *6, *8, *9, *10, *11, *12, *13, *15, *25, *27	Intermediate metabolizer
CYP2C19	***1A/*17**	***1A, *1B, *2A, *3, *4, *5A, *5B, *6, *7, *8, *12, *17**	**Rapid metabolizer**
CYP2D6	*2A/*41	*1, *2A, *3, *4A, *4M, *5, *6A, *7, *8, *9, *10, *11, *12, *14A, *14B, *17, *18, *19, *20, *21, *36, *38, *40, *41, *42, *44, *56A, *56B, and CNVs	Normal metabolizer
CYP2E1	*1/*7	*1, *2, *7	Normal metabolizer
CYP3A4	*1/*1	*1, *2, *6, *20, *22	Normal metabolizer
CYP3A5	*1A/*1A	*1A, *3A, *3K, *5, *6, *7	Normal metabolizer
VKORC1	**H7/H7**	**H1, H3, H7, H9**	**Warfarin resistance**
SLC15A2	*1/*1	*1, *509K, *284A, *350F, *409S	Normal function
SLC22A1	***420Del/*420Del**	***1, *2, *3, *4, *5, *6, *220V, *283L, *287G, *341L, *408V, *420Del**	**Low function**
SLC22A2	*1/*270A	*1, *54S, *165V, *270A, *400C, *432N	Normal function
SLC22A6	*1/*1	*1, *50H	Normal function
SLCO1B1	*1A/*1A	*1A, *1B, *2, *3, *5, *6, *9, *10, *11, *12, *13, *15	Normal function
SLCO1B3	***233I/*233I**	***1, *112A, *233I**	**Low function**
SLCO2B1	*1/*1	*1, *3	Normal function
ABCB1	*1/*2	*1, *2	Intermediate function
ABCC2	*1/*1324I	*1, *417I, *789F, *768W, *1324I, *1450S	Intermediate function
ABCG2	*1/*1	*1, *141K, *126Ter	Normal function
SULT1A1	***3/*3**	***1, *2, *3, *4**	**Poor metabolizer**
NAT1	*4/*11	*1, *5, *11, *14, *15, *17, *19, *22	Normal acetylator
NAT2	***5B/*6A or *5A/*6C or *6B/*5G or *12C/*5J**	***4, *5A, *5B, *5C, *5D, *5E, *5G, *5J, *6A, *6B, *6C, *6E, *7A, *7B, *11A, *12A, *12B, *12C, *13, *14A, *14B, *14C, *14D, *14E, *14F, *14G, *19**	**Poor acetylator**
TPMT	*1/*1	*1, *2, *3A, *3B, *3C, *4, *8	Normal metabolizer
GSTM1	*1/*1	*1, *173Asn	Normal metabolizer
GSTP1	*1A/*1A	*1A, *1B, *1D, *1C	Normal metabolizer
UGT1A1	*28(*60)/*28(*60)	*1, *6, *7, *27, *29, *60	Intermediate metabolizer
UGT2B7	*1a/*1a	*1a, 2b	Normal metabolizer
UGT2B15	*2/*2	*1, *2	Intermediate metabolizer
DPYD	*1/*2A	*1, *2A, *7, *8, *9A, *9B, *10	Intermediate metabolizer

Disclaimer: Laboratory-developed screening test and interpretation protocols, employing research-use only (RUO) materials. The result of the "Phenotype" shown in the table is to be considered as a generic parameter and not specific to a single drug. For a reference to a specific drug check the tables below in the report. Additional Disclaimer: MyPGx® is a registered trade mark of SYNLAB International GmbH. **Patients should not initiate or modify any treatment or otherwise use the information in this report without the prior advice, consultation and supervision of a licensed healthcare professional such as a pharmacist or medical doctor.**

Methodology: PCR-based RUO assays detect listed alleles, including all common and most rare variants with known clinical significance at analytical sensitivity and specificity >99%. Phenotypic predictions based on the current state of the scientific literature and PharmGKB. MLPA assay to identify CYP2D6 CNVs (deletions, duplications).

Limitations: Testing cannot detect all genetic variants, inactive or altered genes. The absence of a finding of a detectable gene or variant does not necessarily indicate patient possesses intermediate- or high-sensitivity phenotypes or that patient has an undetected variant. Drug-drug interactions may significantly modify phenotypes, especially in polymedicated patients. The lack of data in the literature and the absence of clinical reports do not allow any ambiguous variants and related phenotypic consequences to be adequately characterised. For these reasons, in the absence of this information, the result is given on the basis of haplotype frequencies.

PHARMACOGENOMICS

Genetic Markers Tested for Pharmacogenomics:

Results are arranged by drug response. Each individual report contains six sections, including: Patient's current medication (if any), Medication history, genotype/haplotype/phenotype detail, PGx report, Genomic Test Results, and Patient Information Card. Inclusion of the PGx Report indicates that the tested individual: displays decreased efficacy to the drug (yellow dots), should use the drug as directed (green dots), or exhibits increased toxicity to the drug (orange dots). Inclusion of Genomic Test Results indicates genotype, haplotype, phenotype, or presence of mutation.

Organization of Table:

1. Gene/Locus refers to gene or intergenic region of genetic marker location.

2. Marker refers to the tested marker's unique identifier.

3. Genotype/Haplotype refers to the particular marker's combination of nucleotides. The letter(s) on either side of the slash refer(s) to the two (2) copies of the patient DNA. Del and dashes denotes nucleotide indels in patient DNA. Empty cells indicate an absence of genotyping results.

4. Phenotype refers to the CYP specific drug metabolizing capabilities of an individual.

See RISKS AND LIMITATIONS on the last pages of this Report.

PGx Report - Modulation of Cardiovascular Function

Type: Antiarrhythmic

Drug Class	Substance	Primary Mechanism Involved	Other Mechanisms Involved	May Have Decreased Efficacy	Used As Directed	May Have Increased Toxicity
Antiarrhythmic class Ia	Quinidine	CYP3A4, CYP2D6	CYP2E1, CYP3A5, CYP2C9, CYP2C8		⊘	
	Procainamide	CYP2D6	NAT2			⊘
	Sparteine	CYP2D6				⊘
	Disopyramide	CYP3A4	CYP3A5, CYP1A2, CYP2C19		⊘	
Antiarrhythmic class Ib	**Phenytoin**	**CYP2C19**	CYP2C9, CYP3A4, CYP3A5, CYP2D6, ABCB1, EPHX1, HLA-B*1502		⊘	
	Tocainide	UGTs			⊘	
	Lidocaine	CYP1A2	CYP3A4, CYP3A5		⊘	
	Mexiletine	CYP2D6	CYP1A2		⊘	
Antiarrhythmic class Ic	Propafenone	CYP2D6	CYP3A4, CYP1A2, CYP3A5		⊘	
	Flecainide	CYP2D6				⊘
	Encainide	CYP2D6				⊘
Antiarrhythmic class II	Carvedilol	CYP2D6	UGT1A1, CYP2C9			⊘
	Bisoprolol	CYP2D6	CYP3A4, CYP3A5		⊘	
	Metoprolol	CYP2D6	CYP3A4, CYP3A5		⊘	
	Propranolol	CYP2D6	CYP1A2, CYP2C19, CYP3A4, CYP3A5		⊘	
Antiarrhythmic class III	Amiodarone	CYP3A4	CYP2C8, CYP3A5		⊘	
	Dronedarone	CYP3A4	CYP3A5		⊘	
	Dofetilide	Renal Excretion	CYP3A4, CYP3A5		⊘	
Antiarrhythmic class IV	Diltiazem	CYP3A4	CYP2C19, CYP3A5		⊘	
	Verapamil	CYP3A4	CYP2C8, CYP3A5, ABCB1		⊘	

PGx Report - Modulation of Cardiovascular Function

Type: Antihypertensive I

Drug Class	Substance	Primary Mechanism Involved	Other Mechanisms Involved	May Have Decreased Efficacy	Used As Directed	May Have Increased Toxicity
Antihypertensives						
Angiotensin II receptor antagonist	Losartan	CYP2C9	CYP3A4, CYP3A5, UGT1A1	⊘		
	Azilsartan	CYP2C9				⊘
	Irbesartan	CYP2C9				⊘
	Telmisartan	Biliary Excretion	UGT1A1		⊘	
	Olmesartan	Hydrolysis	Renal Excretion, SLCO1B1		⊘	
	Valsartan	CYP2C9				⊘
Angiotensin-Converting Enzyme Inhibitors	Captopril	Renal Excretion	CYP2D6		⊘	
	Enalapril	CES1, Renal Excretion	CYP3A4, CYP3A5		⊘	
	Trandolapril	CES1	CYP2D6, CYP2C9, Renal Excretion		⊘	
Renin inhibitors	Aliskiren	CYP3A4	CYP3A5, ABCB1		⊘	
Aldosterone Antagonists	Eplerenone	CYP3A4	CYP3A5		⊘	
Loop diuretic	Torasemide	CYP2C9	CYP2C8, Renal Excretion			⊘
Thiazide-like diuretic	Indapamide	CYP3A4	CYP3A5		⊘	
Potassium-sparing diuretic	Triamterene	CYP1A2			⊘	
Vasopressin receptor antagonists	Tolvaptan	CYP3A4	CYP3A5		⊘	
Adrenergic release inhibitors	Debrisoquine	CYP2D6				⊘
Peripheral Adrenergic Inhibitors	Reserpine	CYP2D6				⊘
Beta-1 cardioselective beta-blockers	Metoprolol	CYP2D6	CYP3A4, CYP3A5		⊘	
	Bisoprolol	CYP2D6	CYP3A4, CYP3A5		⊘	
	Nebivolol	CYP2D6				⊘

PGx Report - Modulation of Cardiovascular Function

Type: Antihypertensive II

Drug Class	Substance	Primary Mechanism Involved	Other Mechanisms Involved	May Have Decreased Efficacy	Used As Directed	May Have Increased Toxicity
Antihypertensives						
Nonselective beta-blockers	Timolol	CYP2D6				⊘
	Propranolol	CYP2D6	CYP1A2, CYP2C19, CYP3A4, CYP3A5		✓	
Beta-blockers with alpha activity	Carvedilol	CYP2D6	UGT1A1, UGT2B4, CYP2C9			⊘
	Labetalol	CYP2D6	CYP2C19, ABCB1, UGT1A1, UGT2B7		✓	
Alpha blockers	Terazosin	CYP3A4	CYP3A5		✓	
	Doxazosin	CYP2D6	CYP2C19, CYP3A4, CYP3A5		✓	
α-2 adrenergic agonist	Clonidine	CYP2D6	CYP1A2, CYP3A4, CYP3A5		✓	
	Tizanidine	CYP1A2			✓	
Antihypertensives Calcium channel blockers						
Dihydropyridine	Amlodipine	CYP3A4	CYP3A5		✓	
	Nifedipine	CYP3A4	CYP1A2, CYP2A6, CYP3A5		✓	
	Nimodipine	CYP3A4	CYP3A5		✓	
	Nicardipine	CYP2C8	CYP2D6, CYP3A4, CYP3A5		✓	
Benzothiazepine	Diltiazem	CYP3A4	CYP2C19, CYP3A5		✓	
Phenylalkylamine	Verapamil	CYP3A4	CYP2C8, CYP3A5, ABCB1		✓	
Nonselective	Bepridil	CYP3A4	CYP3A5		✓	
Anti-pulmonary arterial hypertension						
ERA-Dual antagonists	Bosentan	CYP2C9	CYP3A4, CYP3A5, SLCO1B3			⊘
	Macitentan	CYP3A4	CYP2C19, CYP3A5		✓	
Phosphodiesterase inhibitors	Sildenafil	CYP3A4	CYP2C9, CYP3A5		✓	
	Tadalafil	CYP3A4	CYP3A5		✓	
Abbreviations: ERA, endothelin receptor antagonist.						

PGx Report - Modulation of Cardiovascular Function

Type: Cardiac stimulant, Vasodilator, Drugs Prescribed for the Treatment of Angina

Drug Class	Substance	Primary Mechanism Involved	Other Mechanisms Involved	May Have Decreased Efficacy	Used As Directed	May Have Increased Toxicity
Cardiac stimulants						
Digitalis glycosides	Digoxin	Renal Excretion	ABCB1, SLCO1B3, ABCB4		✓	
Adrenergic and dopaminergic agents	Epinephrine	MAO	COMT		✓	
	Phenylephrine	MAO	SULTs, UGTs		✓	
	Dopamine	ALDH1A1, ALDH2	DBH, MAOA, MAOB, SULT1A3, SULT1A4, COMT		✓	
	Synephrine	MAO			✓	
Vasodilators used in cardiac diseases						
Organic nitrates	**Isosorbide dinitrate**	**NAT2**	NAT1			⊘
Other Vasodilators	**Hydralazine**	**NAT2**	NAT1, CYP1A2, CYP3A4, CYP3A5			⊘
Other Drugs Used in Angina						
Other cardiac preparations	Ranolazine	CYP3A4	CYP2D6, CYP3A5		✓	
	Ivabradine	CYP3A4	CYP3A5		✓	

PGx Report - Modulation of Cardiovascular Function

Type: Dyslipidemia

Drug Class	Substance	Primary Mechanism Involved	Other Mechanisms Involved	May Have Decreased Efficacy	Used As Directed	May Have Increased Toxicity
Drug Therapy for Hypercholesterolemia and Dyslipidemia (Liver)						
HMG CoA reductase inhibitors Statins	Atorvastatin	CYP3A4, SLCO1B1	ABCG2, CYP3A5, ABCB1, ABCG8, UGT1A1, UGT2B7, KIF6		✓	
	Fluvastatin	CYP2C9, SLCO1B1	ABCG2, CYP3A4, CYP2C8, UGT1A1, UGT2B7			⊘
	Lovastatin	CYP3A4, SLCO1B1	CYP3A5, UGT1A1		✓	
	Cerivastatin	CYP3A4, SLCO1B1	CYP2C8, CYP3A5		✓	
	Pitavastatin	UGT2B7	CYP2C9, CYP2C8, ABCB1		✓	
	Simvastatin	CYP3A4, SLCO1B1	ABCG2, CYP3A5, ABCB1, SLCO2B1, UGT1A1, UGT2B7, KIF6		✓	
	Rosuvastatin	UGT1A1	ABCG2		✓	
MTTP inhibitors	Lomitapide	CYP3A4	CYP3A5, LDLR		✓	
Drug Therapy for Hypercholesterolemia and Dyslipidemia (GI)						
Cholesterol absorption inhibitors	Ezetimibe	UGT1A1	UGT2B15			⊘
Drug Therapy for Hypercholesterolemia and Dyslipidemia (Blood vessels)						
Fibrates	Gemfibrozil	CYP3A4	CYP3A5, UGT2B7, UGT1A1, UGT2B15		✓	
	Clofibrate	UGT2B7			✓	
Drug Therapy for familial hypercholesterolemia						
Cholesterol-reducing drug (antisense oligonucleotide)	Mipomersen	Nuclease, Renal Excretion	LDLR		✓	
rosuvastatin						

PGx Report - Modulation of Cardiovascular Function

Type: Anticoagulant, Antiplatelet

Drug Class	Substance	Primary Mechanism Involved	Other Mechanisms Involved	May Have Decreased Efficacy	Used As Directed	May Have Increased Toxicity
Blood Coagulation and Anticoagulant, and Antiplatelet Drugs						
Vitamin K antagonist	Warfarin	CYP2C9, VKORC1	CYP2C19, CYP1A2, CYP3A4, EPHX1, PROC, PROS1		✓	
	Acenocoumarol	CYP2C9, VKORC1	CYP2C19, CYP1A2		✓	
	Phenprocoumon	CYP2C9, VKORC1	CYP3A4, CYP2C8		✓	
Direct factor Xa inhibitors	Rivaroxaban	CYP3A4	CYP3A5		✓	
	Apixaban	CYP3A4	CYP3A5		✓	
Antiplatelet Drugs						
ADP receptor (P2Y12) inhibitors Nucleotide/nucleoside analogs	Ticagrelor	CYP3A4	CYP3A5		✓	
ADP receptor (P2Y12) inhibitors Thienopyridines	**Clopidogrel**	**CYP2C19**	ABCB1, ABCC3			⊘
	Prasugrel	BCHE, CYP3A4	CYP2B6, CYP2C9, CYP2C19, CYP3A5, CYP2D6		✓	
Irreversible cyclooxygenase inhibitors	Aspirin	GLYAT, UGTs, Renal Excretion	CYP2C9, CYP3A4, CYP3A5		✓	
Phosphodiesterase inhibitors	Cilostazol	CYP3A4	CYP2C19, CYP3A5		✓	
Protease-activated receptor-1 (PAR-1) antagonists	Vorapaxar	CYP3A4	CYP3A5		✓	
Abbreviations: P2Y12, purinergic receptor P2Y12.						

Patient Information Card

An easily portable summary of the report patients can share with their medical professionals. (Please cut along dotted line.)

Pharmacogenomic Test Summary

CYP1A1	*1/*1	Normal metabolizer
CYP1A2	*1A/*1F	Normal metabolizer
CYP2A6	*1A/*9	Intermediate metabolizer
CYP2B6	*6/*6	Intermediate metabolizer
CYP2C8	*1/*1	Normal metabolizer
CYP2C9	*1/*3	Intermediate metabolizer
CYP2C19	***1A/*17**	**Rapid metabolizer**
CYP2D6	*2A/*41	Normal metabolizer
CYP2E1	*1/*7	Normal metabolizer
CYP3A4	*1/*1	Normal metabolizer
CYP3A5	*1A/*1A	Normal metabolizer
VKORC1	**H7/H7**	**Warfarin resistance**
SLC15A2	*1/*1	Normal function
SLC22A1	***420Del/*420Del**	**Low function**
SLC22A2	*1/*270A	Normal function
SLC22A6	*1/*1	Normal function
SLCO1B1	*1A/*1A	Normal function
SLCO1B3	***233I/*233I**	**Low function**
SLCO2B1	*1/*1	Normal function
ABCB1	*1/*2	Intermediate function
ABCC2	*1/*1324I	Intermediate function
ABCG2	*1/*1	Normal function
SULT1A1	***3/*3**	**Poor metabolizer**
NAT1	*4/*11	Normal acetylator
NAT2	***5B/*6A or *5A/*6C or *6B/*5G or *12C/*5J**	**Poor acetylator**
TPMT	*1/*1	Normal metabolizer
GSTM1	*1/*1	Normal metabolizer
GSTP1	*1A/*1A	Normal metabolizer
UGT1A1	*28(*60)/*28(*60)	Intermediate metabolizer
UGT2B7	*1a/*1a	Normal metabolizer
UGT2B15	*2/*2	Intermediate metabolizer
DPYD	*1/*2A	Intermediate metabolizer

For a complete report contact Synlab.com