Human Immunodeficiency Virus Type 1 (HIV-1) PhenoSense GT Plus Integrase

Patient: [redacted]
DOB: [redacted] Age: 47 Sex: F
Patient Identifiers: [redacted]

Visit Number (FIN): [redacted]

Client: [redacted]

Physician: [redacted]

ARUP Test Code: 3001186

Collection Date: 05/24/2023
Received in lab: 05/27/2023
Completion Date: 07/04/2023

TEST INFORMATION

Test performed at Labcorp Monogram Biosciences, 345 Oyster Point Blvd., South San Francisco, CA 94080

PATIENT REPORT

Patient's results continue on following page(s).

ARUP LABORATORIES | 800-522-2787 | aruplab.com
500 Chipeta Way, Salt Lake City, UT 84108-1221
Jonathan R. Genzen, MD, PhD, Laboratory Director

Chart continues on following page(s)

PhenoSense GT® Plus Integrase

Combination HIV-1 Drug Resistance Assay

ARUP Interface Acct
500 Chipeta Way Attn: Referrals MC 233
Salt Lake City, UT 84108
USA

Client: [redacted] Project: [redacted]
Phone: (800) 242-2787 Fax: (801) 584-5132

Weidong Huang, MD, Medical Director
345 Oyster Point Blvd
South San Francisco, CA 94080 - Tel: (800) 777-0177

Patient Name:	DOB	Patient ID/Medical Record #	Gender	Monogram Accession #
[redacted]	[redacted]		F	[redacted]
Date Collected	**Date Received**	**Date Reported**	**Mode**	**Report Status**
24-MAY-2023 14:58	31-MAY-2023 11:09 PT	03-JUL-2023 15:59 PT	F,L,W	**FINAL**
Referring Physician [redacted]			Reference Lab ID/Order # 23-144-146274	
Comments			**HIV-1 Subtype: B**	

DRUG						PHENOSENSE® SUSCEPTIBILITY			Evidence of Susceptibility		
Drug Class	Generic Name	Brand Name	Net Assessment	Cutoffs (Lower-Upper)	Fold Change	Increasing ◄ .1 1 10 100 ► Decreasing Drug Susceptibility			Pheno Type	Gero Type	Comments
NRTI	**Abacavir**	Ziagen	**Sensitive**	*(4.5 - 6.5)*	**0.83**				**Y**	**Y**	
	Didanosine	Videx	**Sensitive**	*(1.3 - 2.2)*	**0.89**				**Y**	**Y**	
	Emtricitabine	Emtriva	**Sensitive**	*(3.5)*	**0.75**				**Y**	**Y**	
	Lamivudine	Epivir	**Sensitive**	*(3.5)*	**0.89**				**Y**	**Y**	
	Stavudine	Zerit	**Sensitive**	*(1.7)*	**0.75**				**Y**	**Y**	
	Zidovudine	Retrovir	**Sensitive**	*(1.9)*	**0.84**				**Y**	**Y**	
	Tenofovir	Viread	**Sensitive**	*(1.4 - 4)*	**0.86**				**Y**	**Y**	
	NRTI Mutations		**none**								
NNRTI	**Delavirdine**	Rescriptor	**Sensitive**	*(6.2)*	**2.00**				**Y**	**Y**	
	Doravirine	Pifeltro	**Resistant**	*(3)*	**1.81**				**Y**	**N**	1
	Efavirenz	Sustiva	**Sensitive**	*(3)*	**1.46**				**Y**	**Y**	
	Etravirine	Intelence	**Sensitive**	*(2.9 - 10)*	**1.62**				**Y**	**Y**	
	Nevirapine	Viramune	**Sensitive**	*(4.5)*	**2.34**				**Y**	**Y**	
	Rilpivirine	Edurant	**Resistant**	*(2)*	**1.91**				**Y**	**N**	1
	NNRTI Mutations		**V189I, F227F/C**								
INI	**Bictegravir**	Bictegravir	**Sensitive**	*(3.5 - 10)*	**1.00**				**Y**	**Y**	
	Dolutegravir	Tivicay	**Sensitive**	*(4 - 13)*	**1.22**				**Y**	**Y**	
	Elvitegravir	Vitekta	**Sensitive**	*(3.5)*	**2.34**				**Y**	**Y**	
	Raltegravir	Isentress	**Sensitive**	*(2.2)*	**1.20**				**Y**	**Y**	
	INI Mutations		**none**								

PI Results for Protease Inhibitors are shown on page 2 of this report

Lower Clinical Cutoff (in bold)	Hypersusceptibility Cutoff	Sensitive	**Y** Evidence of Drug Sensitivity
Upper Clinical Cutoff (in bold)		Partially Sensitive	**P** Evidence of Partial Drug Sensitivity
Biological Cutoff		Resistant	**N** Evidence of Drug Resistance

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Patient Name:	Date Collected:	Monogram Acc#:	Status:
[redacted]	**24-MAY-2023 14:58**	[redacted]	**FINAL**

	DRUG		PHENOSENSE® SUSCEPTIBILITY				Evidence of Susceptibility		
Drug Class	Generic Name	Brand Name	Net Assessment	Cutoffs (Lower-Upper)	Fold Change	Increasing ◄ Drug Susceptibility ► Decreasing (1 / 10 / 100)	Pheno Type	Geno Type	Comments
PI	Atazanavir	Reyataz / r‡	Sensitive	*(5.2)*	1.53		Y	Y	
	Darunavir	Prezista / r‡	Sensitive	*(10 - 90)*	0.67		Y	Y	
	Fosamprenavir	Lexiva / r‡	Sensitive	*(4 - 11)*	1.33		Y	Y	
	Indinavir	Crixivan / r‡	Sensitive	*(10)*	1.97		Y	Y	
	Lopinavir	Kaletra‡	Sensitive	*(9 - 55)*	1.40		Y	Y	
	Nelfinavir	Viracept	Sensitive	*(3.6)*	3.43		Y	Y	
	Ritonavir	Norvir	Sensitive	*(2.5)*	1.78		Y	Y	
	Saquinavir	Invirase / r‡	Sensitive	*(2.3 - 12)*	1.11		Y	Y	
	Tipranavir	Aptivus / r‡	Sensitive	*(2 - 8)*	1.36		Y	Y	
	PI Mutations		**E35D, L63T, A71V**						

Phenotype / Genotype Comments (clinical significance may vary)

1 - **Mixture**: Mixtures detected at resistance-associated position(s); minor populations with decreased susceptibility may be present and may increase in the presence of drug pressure.

Combination Phenotype/Genotype Net Assessment

	SENSITIVE		PARTIALLY SENSITIVE	RESISTANT	
NRTI	Abacavir	Didanosine			
	Emtricitabine	Lamivudine			
	Stavudine	Tenofovir			
	Zidovudine				
NNRTI	Delavirdine	Efavirenz		Doravirine	Rilpivirine
	Etravirine	Nevirapine			
INI	Bictegravir	Dolutegravir			
	Elvitegravir	Raltegravir			
PI	Atazanavir / r	Darunavir / r			
	Fosamprenavir / r	Indinavir / r			
	Lopinavir / r	Nelfinavir			
	Ritonavir	Saquinavir / r			
	Tipranavir / r				

For more information on interpreting this report, please visit monogrambio.labcorp.com or call Customer Service at 800-777-0177 between the hours of 6:30am to 5:00pm PT Monday through Friday.

PhenoSense GT(R) plus Integrase is an assay that combines the proprietary technology of PhenoSense(R) with a genotypic assessment of resistance and expert interpretation for HIV-1 reverse transcriptase, protease and integrase inhibitors in a single report. PhenoSense(R) is a proprietary, recombinant virus, single replication cycle phenotypic assay. The genotypic DNA sequence assay is performed using primer extension and chain termination to analyze the protease (amino acids 1-99), reverse transcriptase (amino acids 1-400) and integrase (amino acids 1-288) coding regions in HIV-1 DNA sequences amplified from a patient blood sample to evaluate mutational changes associated with drug resistance. HIV-1 subtype is determined using the protease and reverse transcriptase sequence information. This test is validated for testing specimens with HIV-1 viral loads equal to or above 500 copies/mL and should be interpreted only on such specimens. This test was developed and its performance characteristics determined by Labcorp. It has not been cleared or approved by the Food and Drug Administration. Monogram Biosciences, Inc. is a subsidiary of Laboratory Corporation of America Holdings, using the brand Labcorp. The results should not be used as the sole criteria for patient management. This document contains private and confidential health information protected by state and federal law. If you have received this document in error, please call 800-777-0177.

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Patient Name:	Date Collected:	Monogram Acc#:	Status:
[redacted]	**24-MAY-2023 14:58**	[redacted]	**FINAL**

Complete List of Mutations Detected

RT:K20R, V35I, S68S/R, Q102K, D123N, C162S, V189I, T200A, R211Q, F214F/L, F227F/C, V245K, R277K, T286A, V293I, M357T, K358R, A376S, A400I

PR: E35D, R41K, L63T, A71V, I72T, V77I, I93L

IN: E10D, E11D, M22M/R, S24N, V31V/I, E35E/K, D41D/N, M50M/I, L63M, V72I, L101I, V113I, T122I, R187K, K188R, V201I, T206S, I208L, I220L, V234L, Q285Q/P

Patient-Specific Results

Drugs	ABC	ddI	FTC	3TC	d4T	ZDV	TFV	DLV	DOR	EFV	ETR	NVP	RPV
IC50(µM)	1.28	2.82	0.45	1.33	0.32	0.009	0.529	0.1237	0.00808	0.0117	0.005167	0.201	0.002287
Drugs	**BIC**	**DTG**	**EVG**	**RAL**	**ATV**	**DRV**	**AMP**	**IDV**	**LPV**	**NFV**	**RTV**	**SQV**	**TPV**
IC50(µM)	0.00441	0.003961	0.01008	0.01694	0.00617	0.000341	0.0056	0.0084	0.005	0.0395	0.0202	0.0044	0.0874

Important Definitions

IC50: Concentration of drug required to inhibit viral replication by 50%. **Fold Change** = $\frac{\text{IC50 patient}}{\text{IC50 reference}}$

Clinical Cutoffs: *Lower clinical cutoff* denotes the fold change which was the best discriminator of reduced clinical response using drug- specific clinical outcome data. Reduced response was defined by the clinical endpoint for the specific clinical cohort analyzed for each cutoff value. *Upper clinical cutoff* denotes the fold change above which a clinical response is unlikely (<0.5 log reduction in HIV RNA). Biological cutoffs are used for specific antiretrovirals (ZDV, the NNRTIs, RAL, EVG and specific protease inhibitors when not pharmacokinetically enhanced with ritonavir). These values are defined as the fold change value below which reside 99% of tested wild-type isolates, i.e., those without known drug resistance mutations. Fold Change <0.4 indicates enhanced susceptibility. The cut-off for FTC was established by bridging in vitro susceptibility data, biological cut-off determinations and data derived from other NRTI clinical trials performed in NRTI-experienced patients. Upper and lower cutoffs for bictegravir were established by bridging in vitro susceptibility data, biological cut-off determinations and data derived from other integrase inhibitor clinical trials performed in INI-experienced patients. Clinical outcome data in INI-experienced patients for bictegravir are not available.

Mixtures are indicated by amino acids separated by a slash. Deletions in the amino acid sequence are indicated by a ^ symbol.
‡ **Boosted PIs:** Clinical cutoff and genotypic interpretation algorithms for ritonavir-boosted protease inhibitors derived from individual studies using the following dosages: AMP/r 600mg/100mg BID; ATV/r 300mg/100mg QD; DRV/r 600mg/100mg BID; IDV/r 800mg/200mg BID; LPV/r 400mg/100mg BID; SQV/r 1000mg/100mg BID; and TPV/r 500mg/200mg BID.
Assessment of drug susceptibility is based upon detected mutations and interpreted using an advanced proprietary algorithm (version 18)

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