



**INFINITI™ Warfarin Assay**  
(2C9 & VKORC1 Multiplex Assay)

**Directional Package Insert**

**For *In Vitro* Diagnostic Use**



### **INTENDED USE**

The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin is an *in vitro* diagnostic test for the detection and genotyping of the \*2 and \*3 CYP2C9 genetic variants and the VKORC1 3673 (-1639) intronic variant in genomic deoxyribonucleic acid (DNA) obtained from EDTA-anticoagulated whole blood samples. The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin is a qualitative assay for use in clinical laboratories upon prescription by the attending physician.

The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin is indicated for use to identify individuals at risk for sensitivity to Warfarin.

### **BACKGROUND INFORMATION**

Warfarin is a widely used anticoagulant prescribed for patients with venous thrombosis and pulmonary embolism, chronic atrial fibrillation and prosthetic heart valves. FDA estimates that two million persons start taking Warfarin in the United States every year to prevent blood clot<sup>2</sup>.

Individual differences such as the intake of vitamin K, illness, age, gender, concurrent medication and body surface area, and genetic differences may affect a patient's response to warfarin.

Warfarin acts by interfering with the recycling of vitamin K, which leads to reduced activation of several clotting factors. Two genes affecting the pharmacokinetic and pharmacodynamic parameters of Warfarin are CYP2C9 (cytochrome  $P_{450}$  2C9) and *VKORC1* (vitamin K epoxide reductase complex subunit 1). These two genes, together with other factors such as age, body surface area, and gender, partly explain the inter-individual variation in warfarin response<sup>1</sup>. Research suggests that some of the inter-patient variability in response to warfarin may depend on a patient's variants of the genes CYP2C9 and *VKORC1*<sup>2</sup>.

#### **CYP2C9**

Warfarin is supplied as a racemic mixture of *R*- and *S*-isomers; the *S*-isomer has 3-5 times the potency of the *R*-form. After oral administration, free Warfarin is taken up by the liver where it is metabolized by cytochrome  $P_{450}$ . The *S*-isomer is metabolized by cytochrome  $P_{450}$ , subfamily IIc, polypeptide 9 protein (CYP2C9) and eventually excreted in the bile<sup>3</sup>.

CYP2C9\*2 and CYP2C9\*3 are among the CYP2C9 variants that have been shown to exhibit decreased enzymatic activity<sup>5,9</sup>. The \*2/\*2 homozygous variant leads to a reduction to approximately 12% of wild-type CYP2C9 activity and the \*3/\*3 homozygous variant has a <5% of wild type CYP2C9 activity<sup>4</sup>. In a retrospective association study, individuals with one or both genetic variants were reported to require a lower maintenance dose of Warfarin compared with patients without these variations<sup>5,7,8</sup>.

**VKORC1**

Warfarin’s anticoagulant activity results from inhibition of vitamin K epoxide reductase important for the activation of various coagulation factors. Studies suggest that single nucleotide polymorphisms (SNPs) in the C1 subunit of the vitamin K 2,3 epoxide reductase complex (VKORC1) may influence Warfarin sensitivity.

Polymorphisms of the VKORC1 gene tend to occur in haplotype blocks with particular combinations of polymorphisms that exhibit strong linkage disequilibrium. The identification of one member of a haplotype block is often predictive for the overall haplotype.<sup>7</sup> The identification of the VKORC1 3673 (-1639) polymorphism, which is common to the H1 and H2 haplotypes, could be predictive of an individual’s response to Warfarin.

The following table provides the allele frequency across ethnic groups for the CYP2C9 and VKORC1 variants which are measured by this test:

Allele	Ethnic Group		
	Caucasian	African	Asian
CYP2C9*2	0.9 - 20% <sup>b</sup>	0.8 - 7% <sup>b</sup>	0% <sup>b</sup>
CYP2C9*3	0 - 14.5% <sup>b</sup>	0.4 - 3% <sup>b</sup>	0 - 8.2% <sup>b</sup>
VKORC1 3673 (-1639)	37% <sup>f</sup>	14% <sup>f</sup>	89% <sup>f</sup>

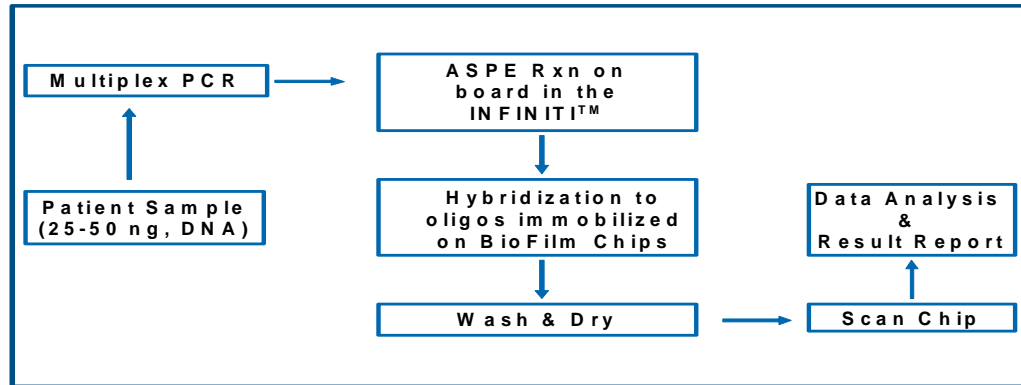
**TEST PRINCIPLE / ASSAY OVERVIEW**

The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin is designed to simultaneously detect the \*2 and \*3 CYP4502C9 genetic variants and the VKORC1 3673 (-1639) intronic variant. The assay protocol is based on the following major processes:

- (a) DNA extraction
- (b) PCR amplification of purified DNA from human genomic DNA
- (c) Labeling of the amplified product (allele specific primer extension)
- (d) Hybridization of the labeled amplified product to a microarray by signature Tag/Capture probe hybridization under isothermal conditions.
- (e) Scanning of the microarray
- (f) Signal detection and analysis [determination of the 2C9\*2, 2C9\*3 and VKORC1 3673 (-1639) genotypes]

Steps (c) through (f) are automated by the INFINITI Analyzer.

A schematic overview of the assay is shown below.



#### DEVICE DESCRIPTION

The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin, an *in vitro* diagnostic device, utilizes AutoGenomics' proprietary film-based microarray technology combined with process automation, reagent management and software technology for the detection and genotyping of the 2C9\*2, 2C9\*3, and VKORC1 3673 (-1639) mutations from human whole peripheral blood samples.

The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin is comprised of the BioFilmChip™ Microarray, and the Intellipac™ Reagent Module.

The **BioFilmChip Microarray** consists of a polyester film coated with proprietary multi-layer components designed for DNA analysis. The layers have been designed to provide a versatile surface to enhance test performance. The microarrays are designed to be assay specific. The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin uses a microarray chip (R-Chip) which contains unused Capture Probes which could potentially be used for certain specific assays. Therefore, multiple assays can be developed using the same microarray.

The **Intellipac Reagent Module** which acts as a communication link contains up to eight reservoirs that house the test reagents and has an integrated memory chip. Information on the reagent such as lot number, expiration date and volume usage is archived in the memory chip.

The INFINITI 2C9 & VKORC1 Multiplex Assay should be run using the AutoGenomics **INFINITI Analyzer**. The INFINITI Analyzer is an instrument used for clinical multiplex systems intended to measure and sort multiple signals from a clinical sample. The INFINITI Analyzer is designed to measure fluorescence signals of labeled DNA target hybridized to BioFilmChip microarrays. The INFINITI Analyzer automates the 2C9 and VKORC1 assays and integrates all the discrete processes of sample (PCR amplicon) handling, reagent management, hybridization, detection, and results analysis. The assays are processed automatically and the spots are read by the built-in confocal microscope. Results are analyzed and presented as genotype calls.

Instructions on how to use the INFINITI Analyzer are provided in the INFINITI Analyzer Operator's Manual.



## WARNINGS AND PRECAUTIONS

### Handling Requirements

- **For *in vitro* diagnostic use. To be used by qualified laboratory personnel.**
- This test is to be used only with whole blood collected in EDTA. Do not freeze / thaw blood samples. Specimens should be assayed as soon as possible.
- All patient specimens are potentially hazardous and care should be taken when handling materials of human origin. No test method can offer complete assurance that HCV, HIV or other infectious agents are absent.

#### **Follow the CLSI Guidelines (Molecular Diagnostics Methods for Infectious Diseases; Approved Guidelines; MM3-A).**

- Upon receipt of samples, visually inspect sample condition. Specifically, look for abnormal signs that indicate that sample integrity has been compromised (e.g., evaporation, decrease in volume, precipitation, spills, discoloration, sedimentation, separation, turbidity, etc.). If you observe or suspect any sample abnormality, do not perform any test.
- Samples should be handled with extreme caution to prevent contamination, spillage, sample mix-up. Sample containers should be labeled clearly to prevent mix-up.
- Store samples at the specified conditions.
- To minimize the risk of cross contamination, sample preparation, PCR reaction set up and PCR product analysis should be performed according to approved guidelines such as CLSI (Molecular Diagnostic Methods for Genetic Diseases: Approved Guideline).
- Do not pool / mix reagents from different lots.
- Do not use a kit or reagent past its expiration date.
- Store kits and reagents according to the product label.

### Laboratory Procedures

- Follow normal precautions for handling laboratory reagents.
- Follow safe laboratory procedures: do not pipette by mouth; wear protective clothing (e.g., disposable gloves laboratory coats) and eye protection; do not eat, drink or smoke in the laboratory work areas; wash hands thoroughly after handling samples and reagents.

### Waste Handling

- Dispose of unused reagents, specimens and waste according to applicable country, federal, state and local regulations
- Material Safety data Sheets (MSDS) are available upon request from AutoGenomics Customer Service

### Sample Preparation

- Refer to the safety instructions in the package insert provided with the DNA extraction kit used.
- The PCR product can not be stored prior to loading it onto the microarray. Use immediately.

### INFINTI Analyzer

- **Read the INFINTI Analyzer Operator's Manual before operating the instrument.** Pay particular attention to "Notes".
- Follow the Caution and Safety Warning in the Operator's Manual.
- Refer to the Installation Requirements Section when installing the instrument.
- Refer to the Errors Section when errors are encountered while operating the instrument.
- Refer to the Help Section when problems are encountered.



### **STORAGE / STABILITY**

BioFilmChip Microarray: 12 months at RT (15-30°C)  
Intellipac Reagent: 12 months Refrigerated (2-8°C)  
Amplification Mix: 12 months Frozen ( $\leq$ -10°C)

### **SPECIMEN COLLECTION AND STABILITY**

- Peripheral blood drawn in an EDTA (purple-top) tube.
- Do not freeze / thaw blood samples. Specimens should be assayed as soon as possible.

### **MATERIALS PROVIDED (SUFFICIENT FOR 24 TESTS)**

- Product Number 03-114 INFINITI Warfarin Assay BioFilmChip™ Microarray Magazine
- Product Number 03-214 INFINITI Warfarin Assay Intellipac™ Reagent Module  
24 tests per module which contains
  - 1.0ml ASPE master mix:
    - d[AGT]TP Mix
    - Cy5 -dCTP
    - ASPE Primer Mix
    - PCR Buffer
  - 2.6ml Hybridization Buffer
    - SSC
    - Sodium Azide
    - Hybridization Positive Control (Pos C-PTAG10, Cy5)
- Product Number 03-314 INFINITI Warfarin Assay Amplification Mix  
4 x 250µL vials of PCR reaction master mix containing
  - d[AGT]TP Mix
  - dCTP
  - PCR Primer Mix
  - MgCl<sub>2</sub>
  - PCR Buffer
- Product Number 12-001: Wash buffer
- Product Number 12-002: Taq DNA Polymerase



### REAGENTS REQUIRED BUT NOT PROVIDED BY AUTOGENOMICS

- DNA Extraction Kits - The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin can detect 2C9\*2, 2C9\*3, and VKORC1 3673 (-1639) genetic variations using genomic DNA isolated from blood with sufficient purity, i.e., with the ratio of absorbance at 260nm to absorbance at 280nm of 1.7 to 2.0. Any DNA extraction method that meets this specification may be used. The INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin has been tested with several commercially available kits. The user can contact AutoGenomics for further information.
- Distilled Water (DNase and RNase free)

### EQUIPMENT

The following equipment is required but not provided with the assay reagents

- AutoGenomics Product Number 10-001: INFINITI Analyzer.
- AutoGenomics Product Number 11-001: INFINITI PipetteTips
- AutoGenomics Product Number 11-003: INFINITI 24 well plate / lids
- Pipettors
- Mini Centrifuge
- Pipette Tips
- Microfuge Tube Racks
- Thermocycler
- Vortex
- 0.2 ml Thin wall Tubes for PCR
- 0.5 ml Microcentrifuge Tubes
- 24-Well Plate (24 WP)

### ASSAY PROCEDURE

#### DNA Extraction

Follow the instructions provided with the DNA extraction kit used.

#### PCR Reaction

**Note:** The PCR product can not be stored prior to loading it onto the microarray. Use immediately.

1. Thaw and bring to room temperature the tube of PCR master mix and keep Taq DNA polymerase on ice.
2. Vortex the PCR master mix tube 2 to 5 sec to mix reagents and centrifuge briefly to bring the content to the bottom of the tubes. Include one negative control in every PCR reaction set up.

10X PCR Buffer	17.5µl
Taq DNA polymerase	0.5µl
Template DNA (25 ng/µl)	2.0µl
<hr/>	
Total	20.0µl

For the PCR negative control, add 1µl of DNase free water.

3. Vortex tubes for 2 to 5 seconds to mix and then centrifuge briefly.
4. Place tubes in the thermocycler and cycle using the following conditions

**Multiplex 2 Tm PCR Conditions**

Step No.	Temperature °C	Time	No. of Cycles
1	94	2 minutes	
2 (touch down)	94 60 (-0.5 °C/cycle) 72	20 seconds 30 seconds 30 seconds	12
3	94 54 72	20 seconds 30 seconds 30 seconds	30
4	4	Hold	

**Note:**

- Setting PCR reaction in 3 X 8 microwell is recommended to minimize sample handling in subsequent steps.
- To avoid potential contamination, a separate area is recommended for the PCR.
- Make sure there is no abnormal evaporation of the PCR product. After PCR is complete, visually inspect for any volume change. All PCR reaction volumes should be about 20µl. Otherwise, do not proceed with the assay.

**Sample Loading**

Follow instructions in the **INFINITI Analyzer Operator’s Manual (Part Number EM-34000)**.

1. Dispense 20µl of the PCR product into the 3 X 8 well plates and load onto the INFINITI Analyzer.
2. Load the appropriate magazines, Intellipac, tips and wash buffer.

**Operation of the INFINITI Analyzer**

Please refer to the **INFINITI Analyzer Operator’s Manual (Part Number EM-34000)**

**QUALITY CONTROL**

It is recommended that a positive (heterozygous and/or homozygous for the three genotypes) sample for each mutation, a negative control (a sample that does not contain the mutation of interest, i.e., a wild type sample); and a “Non Template Control” (Molecular Grade water 1XTE) be included with each test run.

All quality control requirements and testing should be performed in conformance with local, state and/or federal regulations or accreditation requirements.

**Note:** The thermal cycler used should be regularly maintained and calibrated with an external temperature standard, according to the laboratory’s regulatory and QC requirements.

**LIMITATIONS**

The results obtained from the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin should be used and interpreted only in the context of the overall clinical diagnosis. AutoGenomics is not responsible for any clinical decisions that are taken.

In the VKORC1 gene, additional polymorphisms other than 3673G>A have been observed. Similarly, 2C9 variants other than the \*2 and \*3 have been observed. This test does not report those variations.



## INTERPRETATION OF RESULTS

Results from the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin are reported to the user as a genotype “call”, indicating which genotype was detected in the sample, i.e., Wild Type, Homozygous, or Heterozygous for the 2C9\*2, 2C9\*3 and VKORC1 3673 (-1639) variants. An “Indeterminate” result means no genotype call was made.

**Important: All results with an “Indeterminate” or no call require a repeat assay.**

When an error message occurs, refer to the Trouble Shooting section of the INFINITI Analyzer Operator’s Manual.

## PERFORMANCE CHARACTERISTICS

### Analytical Specificity

Studies related to specificity were conducted during assay development. PCR primer specificity was determined by amplicon size on a gel and sequencing the amplicon. ASP primer specificity was determined by the correct calls made by the assay using known genomic samples. Capture probe specificity was determined by hybridizing different oligos and demonstrating that correct oligo hybridizes to the known spot.

### Limit of Detection (analytical sensitivity)

Serial dilutions (200, 100, 50, 25, 10, 1, 0.1ng DNA) were prepared from a known purified DNA sample. Each serial dilution was assayed three times using the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin. The study established the minimum DNA concentration for the INFINITI System Assay for 2C9-VKORC1 to be 1ng DNA. The recommended DNA concentration for the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin is 25ng/μl. The assay requires 2μl of DNA sample or the equivalent of 50ng per test.

In addition, the same study demonstrated that DNA concentrations of 100ng and 200ng, which were in excess of the recommended concentration (50ng), did not interfere with the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin. The following table provides a summary results of the study.

Limit of Detection

ng DNA	Sample			Run 1				Run 2				Run 3					
	Genotype			Genotype Calls				Result	Genotype Calls				Result	Genotype Calls			
	2C9		VKORC1 3673 (-1639)	2C9		VKORC1 3673 (-1639)	2C9		VKORC1 3673 (-1639)	2C9	VKORC1 3673 (-1639)	2C9		VKORC1 3673 (-1639)	Result		
	*2	*3		*2	*3											*2	*3
200	W	W	H	W	W	H	Pass	W	W	H	Pass	W	W	H	Pass		
100	W	W	H	W	W	H	Pass	W	W	H	Pass	W	W	H	Pass		
50	W	W	H	W	W	H	Pass	W	W	H	Pass	W	W	H	Pass		
25	W	W	H	W	W	H	Pass	W	W	H	Pass	W	W	H	Pass		
10	W	W	H	W	W	H	Pass	W	W	H	Pass	W	W	H	Pass		
1	W	W	H	W	W	H	Pass	W	W	H	Pass	W	W	H	Pass		
0.1	W	W	H	No call	W	H	Fail	W	W	H	Pass	No call	W	W	Fail		

### Percent Agreement vs. Bi-directional Sequencing

The results of the comparison studies conducted in three clinical sites comparing the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin to bi-directional sequencing demonstrated

98.0% agreement for 2C9*2 as compared with bi-directional sequencing on 1 <sup>st</sup> run
97.3% agreement for 2C9*3 as compared with bi-directional sequencing on 1 <sup>st</sup> run
98.0% agreement for VKORC1 3673 (-1639) as compared with bi-directional sequencing on 1 <sup>st</sup> run

The results of the comparison studies are summarized in Table 1a and Table 1b.

**Table 1a: Agreement between INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin and Bi-Directional DNA Sequencing**

Genotype <sup>a</sup>	Number Tested	Replicates per Sample	Number of Correct Genotype Calls <sup>b</sup>	Number of Incorrect Calls	No Calls	Agreement	95% One-Sided Confidence Lower Limit
2C9*2 *1/*2	35	1	34	0	1	97.1%	88.82%
2C9*2 *2/*2	2	1	2	0	0	100.0%	50% <sup>d</sup>
2C9*2 *1/*1	113	1	111	0	2	98.2%	94.91%
Total for 2C9*2	150	1	147	0	3	98.0%	95.09%
2C9*3 *1/*3	19	1	19	0	0	100.0%	80.45%
2C9*3 *3/*3	1	1	1	0	0	100.0%	0% <sup>d</sup>
2C9*3 *1/*1	130	1	126	1 <sup>c</sup>	3	96.9%	94.30%
Total for 2C9*3	150	1	146	1	3	97.3%	94.09%
VKORC1 3673 (-1639) GA	63	1	62	0	1	98.4%	93.74%
VKORC1 3673(-1639) AA	27	1	25	0	2	92.6%	79.01%
VKORC1 3673 (-1639) GG	60	1	60	0	0	100.0%	98.33%
Total for VKORC1 3673 (-1639)	150	1	147	0	3	98.0%	95.09%
<b>Total for Assay</b>	450	1	440	1	9	97.8%	96.86%

<sup>a</sup> Genotype determined through bi-directional DNA sequencing

<sup>b</sup> Calls produced on first run

<sup>c</sup> Initial INFINITI results (\*1/\*1 for 2C9\*2, \*1/\*3 for 2C9\*3 and GG for VKORC1 3673) did not match bi-directional sequence results (\*1/\*1 for 2C9\*2, \*1/\*1 for 2C9\*3 and GG for VKORC1 3673). The same INFINITI results were obtained on repeat run. Reason unknown.

<sup>d</sup> For sample sizes 1 and 2, and 100% agreement, SE(p2-p1)=0. Pure sample size correction for sample size 2 is 50% and for sample size 1 is 100%, therefore, the 95% One –Sided Confidence Limits are 50% (n=2) and 0% (n=1).



**Table 1b: Agreement between INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin and Bi-Directional DNA Sequencing (by Sample Type)**

Sample Description Genotype <sup>a</sup>			# Samples Tested	First Time Run					Final Result <sup>d</sup>				
2C9		VKORC1 3673 (-1639)		Samples with Genotype Calls made by INFINITI <sup>b</sup>	Samples with Correct Calls <sup>c</sup>	Samples with No Calls	Samples with Incorrect Calls	Correct Call Rate <sup>e</sup> (%)	Samples with Genotype Calls made by INFINITI <sup>b</sup>	Samples with Correct Calls <sup>c</sup>	Samples with No Calls	Samples with Incorrect Calls	Correct Call Rate <sup>e</sup> (%)
*2	*3												
*1/*1	*1/*1	AA	20	18	18	2	0	90.0	20	20	0	0	100
*1/*1	*1/*1	GA	34	34	34	0	0	100	34	34	0	0	100
*1/*1	*1/*1	GG	43	43	42	0	1 <sup>f</sup>	97.7	43	42	0	1	97.7 (42/43)
*1/*2	*1/*1	AA	4	4	4	0	0	100	4	4	0	0	100
*1/*2	*1/*1	GA	15	14	14	1	0	93.3	15	15	0	0	100
*1/*2	*1/*1	GG	12	12	12	0	0	100	12	12	0	0	100
*1/*1	*1/*3	AA	2	2	2	0	0	100	2	2	0	0	100
*1/*1	*1/*3	GA	10	10	10	0	0	100	10	10	0	0	100
*1/*1	*1/*3	GG	3	3	3	0	0	100	3	3	0	0	100
*2/*2	*1/*1	GA	1	1	1	0	0	100	1	1	0	0	100
*2/*2	*1/*1	GG	1	1	1	0	0	100	1	1	0	0	100
*1/*2	*1/*3	AA	1	1	1	0	0	100	1	1	0	0	100
*1/*2	*1/*3	GA	2	2	2	0	0	100	2	2	0	0	100
*1/*2	*1/*3	GG	1	1	1	0	0	100	1	1	0	0	100
*1/*1	*3/*3	GA	1	1	1	0	0	100	1	1	0	0	100
Total			150	147	146	3	1	97.3	150	149	0	1	99.3 (149/150)

a Genotype determined through bi-directional DNA sequencing

b Excludes samples with indeterminate/no calls

c A sample with correct call indicates a correct call at all three loci. One incorrect or no call at one out of the three loci for the sample is considered an incorrect call for the whole sample

d Final results reflect one time repeat of samples with indeterminate (no) calls

e Correct call rate = # samples with correct calls/# samples tested

f Initial INFINITI results (\*1/\*1 for 2C9\*2, \*1/\*3 for 2C9\*3 and GG for VKORC1 3673) did not match bi-directional sequence results (\*1/\*1 for 2C9\*2, \*1/\*1 for 2C9\*3 and

GG for VKORC1 3673). The same INFINITI results were obtained on repeat run. Reason unknown.



### **Assay Inter-Laboratory Reproducibility**

A three-site study was conducted to demonstrate the reproducibility of the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin. The study involved three lots of the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin. The sites ran identical samples comprised of seven genomic DNA samples and five whole blood samples. The sites were blinded to sample identity. Each site used a different DNA extraction method. At each site, each sample was run in duplicate per day / operator for six days. Three operators were required for each site. Results of the inter-laboratory reproducibility study are summarized in Table 2a and Table 2b.



**Table 2a: Inter-Laboratory Reproducibility of the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin by Genotype calls**

Genotype	Samples Tested	Tests Per Site	Site	Genotype Calls	First Time Run					Final Result*				
					Correct Calls	Incorrect Calls	No Calls	% Correct Calls	95% One-Sided Confidence Lower Limit	Correct Calls	Incorrect Calls	No Calls	% Correct Calls	95% One-Sided Confidence Lower Limit
2C9*2 *1/*2	3	36	1	36	36	0	0	100		36	0	0	100	
			2	36	34	0	2 <sup>b</sup>	94.4		36	0	0	100	
			3	36	36	0	0	100		36	0	0	100	
			total	108	106	0	2	98.15	95.14%	108	0	0	100	99.53%
2C9*2 *2/*2	1	12	1	12	12	0	0	100		12	0	0	100	
			2	12	11	0	1 <sup>b</sup>	91.7		12	0	0	100	
			3	12	12	0	0	100		12	0	0	100	
			total	36	35	0	1	97.22	90.47%	36	0	0	100	98.61%
2C9*2 *1/*1	8	96	1	96	95	0	1 <sup>a</sup>	99.0		96	0	0	100	
			2	96	96	0	0	100		96	0	0	100	
			3	96	96	0	0	100		96	0	0	100	
			total	288	287	0	1	99.65	99.13	288	0	0	100	99.83
Total for 2C9*2				432	428	0	4	99.07	98.06%	432	0	0	100	99.88
2C9*3 *1/*3	2	24	1	24	24	0	0	100		24	0	0	100	
			2	24	22	0	2 <sup>b</sup>	91.7		24	0	0	100	
			3	24	24	0	0	100		24	0	0	100	
			total	72	70	0	2	97.22	92.73%	72	0	0	100	99.30%
2C9*3 *3/*3	2	24	1	24	24	0	0	100		24	0	0	100	
			2	24	24	0	0	100		24	0	0	100	
			3	24	23	0	1 <sup>c</sup>	95.8		24	0	0	100	
			total	72	71	0	1	98.61	95.21%	72	0	0	100	99.30%
2C9*3 *1/*1	8	96	1	96	95	0	1 <sup>a</sup>	99.0		96	0	0	100	
			2	96	95	0	1 <sup>b</sup>	99.0		96	0	0	100	
			3	96	96	0	0	100		96	0	0	100	
			total	288	286	0	2	99.31	98.17%	288	0	0	100	99.83%
Total for 2C9*2				432	427	0	5	98.84	97.72%	432	0	0	100	99.88%
VKORC1 3673 (-1639) GA	5	60	1	60	60	0	0	100		60	0	0	100	
			2	60	59	0	1 <sup>b</sup>	98.3		60	0	0	100	
			3	60	60	0	0	100		60	0	0	100	
			total	180	179	0	1	99.44	98.08%	180	0	0	100	99.72%
VKORC1 3673 (-1639) AA	2	24	1	24	24	0	0	100		24	0	0	100	
			2	24	22	0	2 <sup>b</sup>	91.7		24	0	0	100	
			3	24	24	0	0	100		24	0	0	100	
			total	72	70	0	2	97.22	92.73	72	0	0	100	99.30%
VKORC1 3673 (-1639) GG	5	60	1	60	59	0	1 <sup>a</sup>	98.3		60	0	0	100	
			2	60	60	0	0	100		60	0	0	100	
			3	60	60	0	0	100		60	0	0	100	
			total	180	179	0	1	99.44	98.08%	180	0	0	100	99.72%
Total for VKORC1 3673 (-1639)				432	428	0	4	99.07	98.06%	432	0	0	100	99.88%



Genotype	Samples Tested	Tests Per Site	Site	Genotype Calls	First Time Run					Final Result*				
					Correct Calls	Incorrect Calls	No Calls	% Correct Calls	95% One-Sided Confidence Lower Limit	Correct Calls	Incorrect Calls	No Calls	% Correct Calls	95% One-Sided Confidence Lower Limit
Total per Site			1	432	429	0	3	99.3	98.41%	432	0	0	100	99.88%
			2	432	423	0	9	97.9	96.45%	432	0	0	100	99.88%
			3	432	431	0	1	99.8	99.31%	432	0	0	100	99.88%
Total for Assay				1296	1283	0	13	98.99	98.42%	1296	0	0	100	99.96%

\* Results after one repeat of samples

a Site 1: no results - no tips for one sample; repeat OK

b Site 2: no results - tip sensor did not sense liquid due low volume of wash buffer on one sample; correct test result achieved on second test.  
no calls on two samples - reason unknown; correct test result achieved on second test

c Site 3: one sample had no call; correct test result achieved on second test



**Table 2b: Reproducibility Study Results by Sample Type**

Sample ID	Genotype		# Samples Tested	First Time Run					Final Result <sup>c</sup>					
	2C9			Samples with Genotype Calls made by INFINITI <sup>a</sup>	Samples with Correct Calls <sup>b</sup>	Samples with No Calls	Samples with Incorrect Calls	Correct Call Rate <sup>d</sup> (%)	Samples with Genotype Calls made by INFINITI <sup>a</sup>	Samples with Correct Calls <sup>b</sup>	Samples with No Calls	Samples with Incorrect Calls	Correct Call Rate <sup>d</sup> (%)	
	*2	*3												VKORC1 3673 (-1639)
1	*1/*2	*1/*3	AA	36	34	34	2	0	94.4	36	36	0	0	100
2	*1/*1	*1/*1	GG	36	36	36	0	0	100	36	36	0	0	100
3	*2/*2	*1/*1	GA	36	35	35	1	0	97.2	36	36	0	0	100
4	*1/*1	*3/*3	GA	36	35	35	1	0	97.2	36	36	0	0	100
5	*1/*2	*1/*1	GG	36	36	36	0	0	100	36	36	0	0	100
6	*1/*1	*1/*1	GG	36	36	36	0	0	100	36	36	0	0	100
7	*1/*1	*1/*1	GG	36	36	36	0	0	100	36	36	0	0	100
8	*1/*1	*1/*3	GA	36	36	36	0	0	100	36	36	0	0	100
9	*1/*1	*1/*1	GG	36	35	35	1	0	97.2	36	36	0	0	100
10	*1/*1	*3/*3	GA	36	36	36	0	0	100	36	36	0	0	100
11	*1/*2	*1/*1	GA	36	36	36	0	0	100	36	36	0	0	100
12	*1/*1	*1/*1	AA	36	36	36	0	0	100	36	36	0	0	100
Total				432	427	427	5	0	98.8	432	432	0	0	100

a Excludes samples with indeterminate / no calls

b A sample with correct call indicates a correct call at all three loci. One incorrect or no call at one out of the three loci for the sample is considered an incorrect call for the whole sample

c Final results reflect one time repeat of samples with indeterminate (no) calls

d Correct call rate = # samples with correct calls / # samples tested (excludes samples with indeterminate/no calls)

### Drug Interference

Evaluation of potential interference from bilirubin, cholesterol, and heparin demonstrated that presence of these compounds in concentrations of 8mg/dl bilirubin, 70mg/dl cholesterol and 133v/dl heparin does not interfere with the INFINITI 2C9 & VKORC1 Multiplex Assay.

### Sample Carry-Over

No sample carry-over was detected when 300ng of a positive sample was followed by 10ng of a second positive sample, and when 300ng of a positive sample was followed by a “No Template Control” or water. All genotype calls were 100% correct.

### Assay Interference

Running the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin and the INFINITI Assay for Factor II & Factor V on the same instrument did not affect the results of the assays, i.e., the INFINITI 2C9 & VKORC1 Multiplex Assay for Warfarin did not affect the results of the INFINITI Assay for Factor II & Factor V, and vice versa.

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