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# HLA-B57 REAL-TIME PCR KIT
# Cat. No: 505R-10-01

## INTRODUCTION
International HIV treatment guidelines recommend HLA-B*57:01 typing before abacavir administration, in order to reduce the incidence of abacavir hypersensitivity reactions, the major cause of early therapy discontinuation[1].

## INTENDED USE
The HLA-B57 Real-Time PCR Kit detect all subtypes of HLA B57 in the **IMGT / HLA Gene FASTA 3.32.0 database** with high specificity. [3].

## TARGETED USER
For professional use only. Testing should be performed by professionals trained in molecular techniques.

## PRINCIPLE OF THE SYSTEM
During the PCR reaction, the DNA polymerase cleaves the probe at the 5′ end and separates the reporter dye from the quencer dye only when the probe hybridizes perfectly to the target DNA. This cleavage results in the fluorescent signal which is monitored by Real-Time PCR detection system. An increase in the fluorescent signal ($C_T$) is proportional to the amount of the specific PCR product [3,4].

## PRODUCT SPECIFICATION
Each isolated DNA should be tested with master mix. The kit provides reagents in a **"ready-to-use"** master mix format which has been specifically adapted to 5′ nuclease PCR for SNP analysis. The test system is designed by SNP Biotechnology for use with sequence specific primers and probes.
The fluorescence of HLA-B57 analysis is FAM. Also each master mix contains an internal control labelled with HEX/JOE dye. Internal Control is Prothrombin gene – FII (OMIM: 176930).

## SYSTEM CONTENTS

| Reagents | 10 rxns | 20 rxns | 50 rxns |
|---|---|---|---|
| HLA-B57 Master Mix | 200 µl | 400 µl | 1000 µl |
| HLA-B57 Positive Control DNA * | 30 µl | 30 µl | 60 µl |
| HLA-B57 Negative Control DNA * | 30 µl | 30 µl | 60 µl |

**Table 1:** Kit content

* Since to Control DNA is a synthetic plasmid, amplification plots of synthetic control DNA may appear slightly different from the sample DNA. Please gently vortex and then spin centrifuge for 1-2 seconds before use the positive control.

## SAMPLE COLLECTION
HLA-B57 Real-Time PCR Kit is approved for use with whole blood samples.
- Standard precautionary instructions must be followed by all healthcare professionals during the collection and transportation of whole blood samples.
- Whole blood samples should be collected in appropriate containers before delivery to the laboratory.
- Freezing and thawing of samples should be avoided.

## STORAGE
- All reagents should be stored at – 20 °C and dark.
- All reagents can be used until the expiration date on the box label.
- Repeated thawing and freezing ( >4X) should be avoided, as this may reduce the sensitivity of the assay.

## DNA EXTRACTION
Blood samples should be collected in appropriate sterile EDTA tubes and can be stored at +4°C up to one month. For more than one month specimen should be stored at -20°C. It is advised to gently mix the tube (with EDTA) after collection of blood to avoid coagulation.
Our system optimized according to GeneAll® Exgene™ Blood SV. It is advised to elute DNA with 150 µl elution buffer for better results.

## PROCEDURE
- Leave the master mix* and controls at RT to melt.
- Before starting work, mix the master mix gently by pipetting
- For each sample, pipet **20 µl master mix** with micropipets of sterile filter tips to each optical white strips or tubes.
- Add **5 µl DNA** into each tube. Please do not pipette DNA before and after addition into well.
- Optical caps are closed, it is recommended to spin the plates/strips at low speed for a short time.
- Run with the programme shown below.

*Master mixes include HotStart Taq DNA Polymerase.

## PCR PROGRAMME

| | | |
|---|---|---|
| 95 °C | 3 Min. | Holding |
| 95 °C | 15 Sec. | 30 Cycles |
| 60 °C | 1 Min. | |

**Table 2:** PCR Programme

Fluorescent dyes are FAM and HEX/JOE.

**<u>This system can be used with the following devices;</u>**
- Bio-Rad CFX96
- ABI Prism ® 7500/7500 Fast
- Roche LightCycler® 480 System
- Rotor Gene Q
- Mic qPCR Cycler

For other two or more channel Real-Time PCR devices (which can read FAM and HEX/JOE dyes), a trial run is recommended.

**<u>If you use;</u>**
ABI Prism® system, please choose **"none"** as passive reference and quencher.
Mic qPCR Cycler, please adjust gain settings, **"Green Auto Gain"** to **20** and **"Yellow Auto Gain"** to **10**.

**Supplied Materials**
- White PCR plates/strips with optical covers*

*The PCR Plate/strip tube and caps seriously affect the amplification curve quality. Therefore, white PCR plates/strips and optical caps provided by the manufacturer should be used with the kit.

**Required Materials (Not Provided)**
- PCR Cabinet
- Vortex Mixer
- Desktop Microcentrifuge (For 2.0ml tubes and PCR strip tubes), plate spin for studies using PCR plates.
- Automated or spin column based DNA isolation Kit
- Disposible powder-free laboratory gloves
- Micropipettes (0.5ml-1000ml)
- Micropipette tips
- Standard laboratory equipments.

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## DATA ANALYSIS

After the run is completed data are analysed using the software with HEX/JOE and FAM dyes. The below results were studied with Bio-Rad CFX96. The threshold values for both FAM and HEX/JOE dyes were set to 500, based on experiments conducted using the Bio-Rad CFX96 Real-Time PCR system, the GeneAll® Exgene™ Blood SV Isolation Kit, and white PCR strips supplied by SNP Biotechnology. Threshold values may vary depending on the PCR device, DNA isolation kit, and the type or brand of PCR strips/tubes used.

Internal control amplification plots must be seen in all wells except NTC and has been labelled with HEX/JOE dye. The $C_T$ value of internal controls should be **$20 \leq C_T \leq 28$**. These values are optimised according to the GeneAll® Exgene™ Blood SV Isolation Kit and Bio-Rad CFX96 Real-Time PCR Device. $C_T$ values may vary ±2/3 cycle according to the other DNA isolation systems and Real-Time PCR devices (Figure 1).

The presence of amplification plots at the FAM dye should be evaluated as **"HLA B57 Positive".** Amplification $C_T$ values should be **$20 \leq C_T \leq 28$** for positive DNA samples and positive control at FAM dye. These ranges may differ depending on the PCR instrument, threshold values and tubes used. For positive samples; Amplification plots of internal control (HEX/JOE) and HLA B57 (FAM) should be close to each other and $C_T$ differences should not exceed 2 (Figure 2).
If there is no amplification plot at the FAM dye, the sample is evaluated as HLA B57 negative (Figure 3).

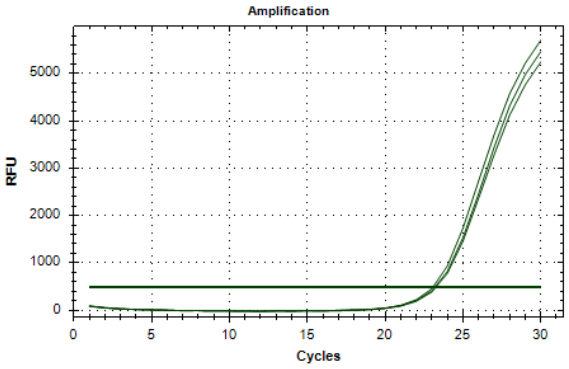


**Figure 1:** Internal Control plots – HEX/JOE Dye

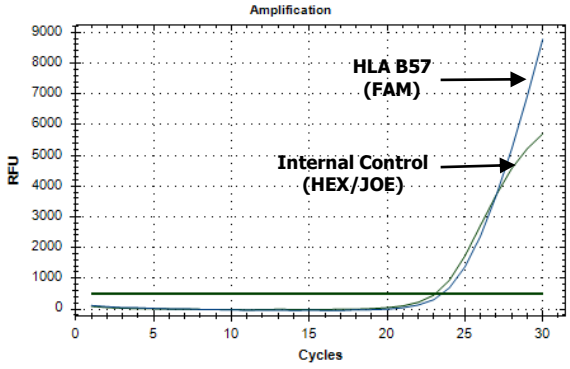


**Figure 2:** HLA-B57 Positive Sample (FAM and HEX/JOE Dyes)

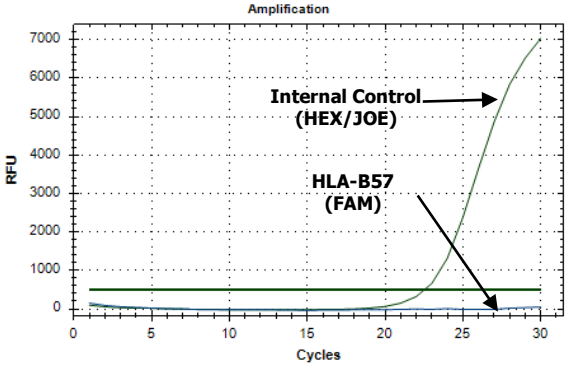


**Figure 3 :** HLA-B57 Negative Sample (HEX/JOE and FAM Dyes)

## CAUTIONS

- All reagents should be stored at suitable conditions.
- Do not use the PCR master mixes forgotten at room temperature.
- Thaw PCR master mix at room temperature and slowly mix by inverting before use.
- Shelf-life of PCR master mix is 12 months. Please check the manufacturing data before use.
- Only use in vitro diagnostics.

## DISPOSAL OF KIT

Dispose of it according to the legal regulations of your region

## SYMBOLS AND DESCRIPTIONS

| | | | |
|---|---|---|---|
| REF | Catalog Number | CE | CE Mark |
| LOT | Lot Number | UDI | Unique Device Identifier<br>(01)Device Identifier<br>(17)Expiry Date<br>(10)Lot Number |
| | Manufacturer | Σ | Test Quantity |
| | Fragile | -20 °C | Storage Temperature |
| | Protect from directly sunlight | IVD | In Vitro Diagnostics |
| | Expiry Date | | |

**Table 3:** Symbols and descriptions

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## TROUBLESHOOTING PROBLEMS AND SOLUTIONS

| Problem | Reason | Solution |
|---|---|---|
| Internal control does not work/ low amplification | Absence of DNA / DNA extraction problems | Repeat test |
| | Absence of DNA / DNA extraction problems | • DNA extraction should be repeated.<br>• DNA extraction should be replaced with one of the recommended methods. |
| | Sample is containing PCR inhibitor(s) | |
| No target DNA/internal control amplification curves in all wells | Error in temperature/time settings in PCR program | Correct any errors in the temperature/time settings in the PCR Program and repeat the test. |
| | Sample is containing PCR inhibitor(s) | • DNA extraction should be repeated.<br>• DNA extraction should be replaced with one of the recommended methods. |
| Positive control result and/or $C_T$ values are lower or higher than the value mentioned in User Manual. | Error in temperature/time settings in PCR program | Correct any errors in the temperature/time settings in the PCR Program and repeat the test. |
| $C_T$ values are not valid (higher or lower) according to User Manual | Excessive or insufficient DNA sample | • Repeat the test.<br>• DNA extraction should be repeated. |
| Low and/or invalid amplification curves | Stability problems arising from repeated thawing and freezing ( >4X) | Repeated thawing and freezing ( >4X) should be avoided, as this may reduce the sensitivity of the assay. |
| | Sample is containing PCR inhibitor(s) | • DNA extraction should be repeated.<br>• DNA extraction should be replaced with one of the recommended methods. |
| | Stability problems arising from unavailable storage conditions. | All reagents should be stored at – 20 °C and dark. |
| | Bubble formation or pipetting error during pipetting | After adding the master mix and sample, it is recommended to spin the plates/strips at low speed for a short time. |
| For further questions, please contact us **tech@snp.com.tr** | | |

**Table 4:** Troubleshooting problems and solutions

## REFERENCES

1. Cinzia Dello Russo, Lucia Lisi, Alessia Lofaro, Simona Di Giambenedetto, Bruno Federico, Giordano Madeddu, Marianna Salerno, Maria Stella Mura, Antonella Pirazzoli, Andrea de Luca, Roberto Cauda and & Pierluigi Navarra. "Novel sensitive, specific and rapid pharmacogenomic test for the prediction of abacavir hypersensitivity reaction: HLA-B*57:01 detection by real-time PCR". Pharmacogenomics (2011) 12(4), 567–576.
2. https://ftp.ebi.ac.uk/pub/databases/ipd/imgt/hla/hla_nuc.fasta
3. Yolanda S Lie and Christos J Petropoulos. "Advances in quantitative PCR technology: 5' nuclease assays". Current Opinion in Biotechnology Volume 9, Issue 1, February 1998, Pages 43-48.
4. Luis Ugozzoli and R. Bruce Wallace. "Allele-Specific Polymerase Chain Reaction". A Companion to Methods in Enzymology Vol. 2, No. 1, February, pp. 42-48, 1991.