

101.814-12 – including *Taq* polymerase, IFU-01  
101.814-12u – without *Taq* polymerase, IFU-02

Visit <https://labproducts.caredx.com> for  
“Instructions for Use” (IFU)

Lot No.: **5H8**

Lot-specific information

**Olerup SSP® DRB1\*04 Add-on**

Product number:	101.814-12 – including <i>Taq</i> pol. 101.814-12u – without <i>Taq</i> pol.
Lot number:	5H8
Expiry date:	2023-03-01
Number of tests:	12
Number of wells per test:	3+1
Storage - pre-aliquoted primers:	dark at -20°C
- PCR Master Mix:	-20°C
- Adhesive PCR seals	RT
- Product Insert	RT

**This Product Description is only valid for Lot No. 5H8.**

Complete product documentation consists of generic Instructions for Use (IFU), lot specific Product Insert, Worksheet and Certificate.

**CHANGES COMPARED TO THE PREVIOUS OLERUP SSP®  
DRB1\*04 ADD-ON LOT (4F1)**

The DRB1\*04 Add-on kit is updated for new alleles to enable separation of:

- Null and Alternatively expressed alleles
- The product documentation has been updated for new alleles of IMGT 3.35.0

The format of the Worksheet has been changed.

The DRB1\*04 Add-on primer set, specificity and interpretation tables have been updated for the DRB1 alleles described since the previous *Olerup SSP®* DRB1\*04 Add-on lot was made (**Lot No. 4F1**).

The DRB1\*04 Add-on primer set is unchanged compared to the previous lot (**Lot No. 4F1**).

Changes in revision R01 compared to R00:

1. The expiration date has been altered due to shelf-life extension.

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Well 4 contains Negative Control primer pairs, that will amplify more than 95% of the Olerup SSP<sup>®</sup> HLA Class I, DRB, DQB1, DPB1 and DQA1 amplicons as well as all the amplicons generated by the control primer pairs matching the human growth hormone gene.

HLA-specific PCR product sizes range from 75 to 200 base pairs.  
The PCR product generated by the positive control primer pair is 430 base pairs.

Length of PCR product	105	200	105	80	75	80	85
<b>5'-primer<sup>1</sup></b>	<b>164</b>	<b>340</b>	<b>440</b>	<b>45</b>	<b>45</b>	<b>43</b>	<b>36</b>
	5'-CAC <sup>3'</sup>	5'-Agg <sup>3'</sup>	5'-TTA <sup>3'</sup>	5'-Tgg <sup>3'</sup>	5'-Tgg <sup>3'</sup>	5'-Tgg <sup>3'</sup>	5'-TAC <sup>3'</sup>
							<b>36</b>
							5'-TAT <sup>3'</sup>
<b>3'-primer<sup>2</sup></b>	<b>231</b>	<b>2<sup>nd</sup> I</b>	<b>507</b>	<b>59</b>	<b>58</b>	<b>57</b>	<b>47</b>
	5'-TgC <sup>3'</sup>	5'-AAA <sup>3'</sup>	5'-TTg <sup>3'</sup>	5'-CTC <sup>3'</sup>	5'-ggC <sup>3'</sup>	5'-CTC <sup>3'</sup>	5'-ACA <sup>3'</sup>
							<b>48</b>
							5'-gCA <sup>3'</sup>
							<b>48</b>
							5'-gCC <sup>3'</sup>
							<b>52</b>
							5'-TgT <sup>3'</sup>
<b>A*</b>	<b>+</b>	<b>+</b>	<b>+</b>				
<b>B*</b>	<b>+</b>	<b>+</b>	<b>+</b>				
<b>C*</b>	<b>+</b>	<b>+</b>	<b>+</b>				
<b>DRB1</b>				<b>+</b>	<b>+</b>		
<b>DRB3</b>				<b>+</b>	<b>+</b>		
<b>DRB5</b>				<b>+</b>			
<b>DQB1</b>					<b>+</b>		
<b>DPB1</b>						<b>+</b>	
<b>DQA1</b>							<b>+</b>

<sup>1</sup>The nucleotide position for HLA class I genes and the codon for HLA class II genes, in the 2<sup>nd</sup> or 3<sup>rd</sup> exon, matching the specificity-determining 3'-end of the primer is given. Nucleotide and codon numbering as on the [www.ebi.ac.uk/imgt/hla](http://www.ebi.ac.uk/imgt/hla) web site. The sequence of the 3 terminal nucleotides of the primer is given.

<sup>2</sup>The nucleotide position for HLA class I genes and the codon for HLA class II genes, in the 2<sup>nd</sup> or 3<sup>rd</sup> exon or the 2<sup>nd</sup> intron, matching the specificity-determining 3'-end of the primer is given in the anti-sense direction. Nucleotide and codon numbering as on the [www.ebi.ac.uk/imgt/hla](http://www.ebi.ac.uk/imgt/hla) web site. The sequence of the 3 terminal nucleotides of the primer is given.

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## PRODUCT DESCRIPTION

### DRB1\*04 Add-on SSP subtyping

#### CONTENT

The primer set contains 5'- and 3'-primers for separating the DRB1\*04:92 from the DRB1\*04:07 alleles.

The primer set also resolves the SBT heterozygous ambiguities:

DRB1\*04:02:01, 04:03:01 = DRB1\*04:37, 04:88

DRB1\*04:02:01, 04:04:01 = DRB1\*04:37, 04:56

#### PLATE LAYOUT

Each test consists of 4 PCR reactions in an 8 well cut PCR plate. Wells 5 to 8 are empty.

1	2	3	NC	empty	empty	empty	empty
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The 8 well cut PCR plate is marked with '5H8' in silver/gray ink.

Well No. 1 is marked with the Lot No. '5H8'.

Wells 1 to 3 – DRB1\*04 Add-on high resolution primers.

Well 4 – Negative Control (NC).

A faint row of numbers is seen between wells 1 and 2 or wells 7 and 8 of the PCR trays. These stem from the manufacture of the trays, and should be disregarded.

The PCR plates are covered with a PCR-compatible foil.

**Please note:** When removing each 8 well PCR plate, make sure that the remaining plates stay covered. Use a scalpel or a similar instrument to carefully cut the foil between the plates.

#### INTERPRETATION

The interpretation of DRB1\*04 Add-on PCR-SSP subtypings will be influenced by many other DRB1\*04 alleles. For further details see Specificity Table.

#### UNIQUELY IDENTIFIED ALLELES

The DRB1\*04:07 and DRB1\*04:92 alleles give different patterns in the DRB1\*04 Add-on subtyping kit<sup>1,2</sup>.

The primer set also resolves the SBT heterozygous ambiguities:

DRB1\*04:02:01, 04:03:01 = DRB1\*04:37, 04:88

DRB1\*04:02:01, 04:04:01 = DRB1\*04:37, 04:56

<sup>1</sup>Based on DRB alleles listed on the IMGT/HLA web page 2019-January-23, release 3.35.0, [www.ebi.ac.uk/imgt/hla](http://www.ebi.ac.uk/imgt/hla).

<sup>2</sup>Alleles that have been deleted from or renamed in the official WHO HLA Nomenclature up to and including the last IMGT/HLA database release can be retrieved from web page <http://hla.alleles.org/alleles/deleted.html>.

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**SPECIFICITY TABLE**

**DRB1\*04 Add-on SSP subtyping**

**Specificities and sizes of the PCR products of the 3+1 primer mixes used for DRB1\*04 Add-on SSP subtyping**

Primer Mix	Size of spec. PCR product <sup>1</sup>	Size of control band <sup>2</sup>	Amplified DRB1*04 alleles <sup>3,4</sup>
1	170 bp	515 bp	*04:01:01:01-04:01:15, 04:01:17-04:04:06, 04:04:08-04:04:15, 04:06:01-04:08:02, 04:08:04, 04:11:03, 04:13-04:14, 04:16, 04:18-04:23, 04:25, 04:26 <sup>w</sup> , 04:27, 04:31-04:33, 04:35-04:44:02, 04:46-04:47, 04:49-04:56:02, 04:58-04:60, 04:63, 04:65, 04:68, 04:70-04:76, 04:78-04:79, 04:85, 04:88, 04:92-04:98:02, 04:100-04:102, 04:105:01-04:105:02, 04:109-04:115, 04:117-04:124, 04:127-04:130, 04:132-04:135, 04:139-04:144, 04:148-04:151, 04:153, 04:155-04:159, 04:161, 04:163-04:168, 04:171-04:172, 04:174-04:177, 04:179-04:190, 04:192-04:200, 04:204-04:206, 04:208-04:212N, 04:215-04:226:02, 04:228, 04:230-04:231, 04:233-04:234, 04:236-04:244, 04:246-04:249, 04:252-04:254, 04:256-04:263, 04:266N-04:272
2 <sup>5</sup>	75 bp	430 bp	*04:92
3	200 bp	430 bp	*04:37, 04:58, 04:132, 04:206
4 <sup>6</sup>	-	-	<b>Negative Control</b>

<sup>1</sup>Alleles are assigned by the presence of specific PCR product(s). However, the sizes of the specific PCR products may be helpful in the interpretation of DRB1\*04 SSP typings.

When the primers in a primer mix can give rise to HLA-specific PCR products of more than one length this is indicated if the size difference is more than 20 base pairs. Size differences of 20 base pairs or less are not given. For high resolution SSP kits, the alleles listed are specified according to amplicon length.

Nonspecific amplifications, i.e. a ladder or a smear of bands, may sometimes be seen. GC-rich primers have a higher tendency of giving rise to nonspecific amplifications than other primers.

PCR fragments longer than the control bands may sometimes be observed. Such bands should be disregarded and do not influence the interpretation of the SSP typings.

PCR fragments migrating faster than the control bands, but slower than a 400 bp fragment may be seen in some gel read-outs. Such bands can be disregarded and do not influence the interpretation of the SSP typings.

Some primers may give rise to primer oligomer artifacts. Sometimes this phenomenon is an inherent feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low amount of DNA in the PCR reactions, taking too long time in setting up the PCR reactions, working at elevated room temperature or using thermal cyclers that are not pre-heated.

<sup>2</sup>The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 1 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases.

<sup>3</sup>For several DRB1 alleles 1<sup>st</sup> and/or 3<sup>rd</sup> exon(s) and beyond, as well as intron nucleotide sequences, are not available. In these instances it is not known whether some of the primers of the SSP sets are

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completely matched with the target sequences or not. Assumption is made that unknown sequences in these regions are conserved within allelic groups.

<sup>4</sup>Due to the sharing of sequence motifs many DRB1\*04 alleles are amplified by primer mix 1.

<sup>5</sup>HLA-specific PCR products shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR products.

<sup>6</sup>Primer mix 4 contains a negative control, which will amplify more than 95% of HLA amplicons as well as the amplicons generated by the control primer pairs matching the human growth hormone gene. HLA-specific PCR product sizes range from 75 to 200 base pairs and the PCR product generated by the HGH positive control primer pair is 430 base pairs.

‘w’, might be weakly amplified.

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## PRIMER SPECIFICATION

Well No.	1	2	3
Length of spec. PCR product	170	75	200
Length of int. pos. control <sup>1</sup>	515	430	430
5'-primer(s) <sup>2</sup>	13(125)	196(674)	13(125)
	5' -ACA 3'	5' -ACA 3'	5' -ACA 3'
3'-primer(s) <sup>3</sup>	57(256)	207(706)	67(286)
	5' -ATC 3'	5' -CAT 3'	5' -gAg 3'
	57(256)		
	5' -ATC 3'		
	58(261)		
	5' -TCA 3'		
Well No.	1	2	3

<sup>1</sup>The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 1 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases.

<sup>2</sup>The nucleotide position matching the specificity-determining 3'-end of the primer is given. Nucleotide numbering as on the [www.ebi.ac.uk/imgt/hla](http://www.ebi.ac.uk/imgt/hla) web site. The sequence of the 3 terminal nucleotides of the primer is given.

<sup>3</sup>The nucleotide position matching the specificity-determining 3'-end of the primer is given in the anti-sense direction. Nucleotide numbering as on the [www.ebi.ac.uk/imgt/hla](http://www.ebi.ac.uk/imgt/hla) web site. The sequence of the 3 terminal nucleotides of the primer is given.

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CELL LINE VALIDATION SHEET						
DRB1*04 Add-on SSP subtyping kit <sup>2</sup>						
				Well		
				1	2	3
				Prod. No.:	201904001	201904002
				201904003		
IHWC cell line <sup>1</sup>		DRB1				
1	9001 SA	*01:01		-	-	-
2	9280 LK707	*15:02	*04:05	-	-	-
3	9011 E4181324	*15:02		-	-	-
4	9275 GU373	*03:01		-	-	-
5	9009 KAS011	*16:01		-	-	-
6	9353 SM	*04:07	*08:03	+	-	-
7	9020 QBL	*03:01		-	-	-
8	9025 DEU	*04:01		+	-	-
9	9026 YAR	*04:02		+	-	-
10	9107 LKT3	*04:05		-	-	-
11	9051 PITOUT	*07:01		-	-	-
12	9052 DBB	*07:01		-	-	-
13	9004 JESTHOM	*01:01		-	-	-
14	9071 OLGA	*08:02		-	-	-
15	9075 DKB	*09:01		-	-	-
16	9037 SWEIG007	*11:01		-	-	-
17	9282 CTM3953540	*03:01	*13:01	-	-	-
18	9257 32367	*09:01	*11:01	-	-	-
19	9038 BM16	*12:01		-	-	-
20	9059 SLE005	*13:02		-	-	-
21	9064 AMALA	*14:02		-	-	-
22	9056 KOSE	*13:02	*14:54	-	-	-
23	9124 IHL	*08:03	*14:14	-	-	-
24	9035 JBUSH	*11:01		-	-	-
25	9049 IBW9	*07:01		-	-	-
26	9285 WT49	*03:01		-	-	-
27	9191 CH1007	*04:05	*10:01	-	-	-
28	9320 BEL5GB	*04:16	*07:01	+	-	-
29	9050 MOU	*07:01		-	-	-
30	9021 RSH	*03:02		-	-	-
31	9019 DUCAF	*03:01		-	-	-
32	9297 HAG	*13:03		-	-	-
33	9098 MT14B	*04:04		+	-	-
34	9104 DHIF	*11:01		-	-	-
35	9302 SSTO	*04:03		+	-	-
36	9024 KT17	*04:03	*04:06	+	-	-
37	9065 HHKB	*13:01		-	-	-
38	9099 LZL	*14:02		-	-	-
39	9315 CML	*03:01	*04:01	+	-	-
40	9134 WHONP199	*07:01	*09:01	-	-	-
41	9055 H0301	*13:02		-	-	-
42	9066 TAB089	*08:03		-	-	-
43	9076 T7526	*09:01		-	-	-
44	9057 TEM	*14:01		-	-	-
45	9239 SHJO	*07:01		-	-	-
46	9013 SCHU	*15:01		-	-	-
47	9045 TUBO	*11:04	*12:01	-	-	-
48	9303 TER-ND	*01:03		-	-	-

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<sup>1</sup>The provided cell line HLA specificities are retrieved from the <http://www.ihwg.org/hla> web site. The specificity of an individual cell line may thus be subject to change.

<sup>2</sup>The specificity of each primer solution in the kit has been tested against 48 well characterized cell line DNAs and where applicable, additional cell line DNAs.

No DNAs carrying the alleles to be amplified by primer solutions 2 and 3 were available. The specificity of the primers in primer solution 3 was tested by separately adding additional 5'-primers respectively 3'-primers. In primer solution 2 it was only possible to test the 5'-primer, the 3'-primer was not possible to test. In primer solution 1 one of the 3'-primers could not be tested.



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