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Manual No.	04
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Product No.	104
Lot No.	DR42-1


**CTS** Collaborative Transplant Study

## WORKING INSTRUCTION

### HLA-DRB1\* CTS-PCR-SSP TRAY KIT

#### LOCUS- AND LOT-SPECIFIC MANUAL

To be applied to the following product:

Product No.	Description
104	HLA-DRB1* CTS-PCR-SSP TRAY KIT 

#### 1. Main differences

- **Between Lot DR42-1 (the current lot) and Lot DR42-0:**  
 The kit was updated to cover new alleles included in the IMGT/HLA Sequence Database of January 2017. Deleted and renamed alleles were taken into consideration.

#### 2. Introduction

- Intended use: This kit reveals a low/intermediate resolution typing of HLA-DRB1\* (besides HLA-DRB3\*/4\*/5\* low resolution) by the PCR-SSP method.
- Allele coverage IMGT/HLA Sequence Database Release 3.27.0, January 2017, except: HLA-DRB1\* 01:02:12/01:18:01-01:18:02/01:22/01:33N/01:44:01-01:44:02/01:60/01:76, DRB1\*04:11:04/04:156, DRB1\*08:01:06/08:57/08:80, DRB1\*09:09/09:23, DRB1\*10:12, DRB1\*11:02:03/11:04:13/11:86/11:94/11:110/11:123/11:156/11:167/11:172/11:185/11:187/11:192/11:208, DRB1\*12:31N/12:42/12:57, DRB1\*13:195, DRB1\*15:01:22/15:34/15:115N, DRB3\*02:26-02:27/02:47/02:58.
- These alleles are considered to be rare and can be detected e. g. by sequencing with the CTS-SEQUENCE Kits (you may contact us for further information).
- This manual is only valid for **Lot No. DR42-1**.
- This manual should be used together with the Main Manual (General Information) which is the 'Working instruction for the CTS-PCR-SSP TRAY and MINITRAY KITS' (Manual No. 100A).

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Table 2: Amplification patterns of HLA-DRB1* and other HLA-DRB* alleles detected by the HLA-DRB1* CTS-PCR-SSP primer mixes (Lot No. DR42-1) based on IMGT/HLA Sequence Database Release 3.27.0, January 2017 .....	11
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#### 4. Kit Composition

- Number of PCR primer mixes per test: 24 (23 allele-specific mixes and 1 negative control mix)
- Number of tests per tray: 4
- Number of trays per kit: 10
- The primer mixes are aliquoted and dried in thin-walled, red PCR-Trays.
- PCR buffer: 3.0 ml of Mastermix SSP (without Taq polymerase).

For storage condition, please refer to Section 1 of the 'Working instruction for the CTS-PCR-SSP TRAY and MINITRAY KITS' (Manual No. 100A) supplied along with this product.

#### 5. Materials, Reagents and Equipment not supplied

Please refer to Section 2 of the 'Working instruction for the CTS-PCR-SSP TRAY and MINITRAY KITS' (Manual No. 100A) supplied along with this product.

#### 6. Sample Requirements, PCR and Gel Electrophoresis

Please refer to Section 3 to 6 of the 'Working instruction for the CTS-PCR-SSP TRAY and MINITRAY KITS' (Manual No. 100A) supplied along with this product.

#### 7. Result Evaluation

- Check the approximate size of the PCR product against the Primer Mix Specificity Table (Table 1) to confirm the correct product size.
- Use the Amplification Pattern Tables (Table 2) to make allele assignment. Alternatively, you can use the SCORE Software ([www.IHWG.org](http://www.IHWG.org)) for detailed result interpretation.

#### 8. Interpretation Hints

- The quality and quantity of DNA as well as of the Taq polymerase are extremely crucial factors. If your bands are too weak, you might try to adjust these two factors until you obtain optimal results.
- Please also refer to Section 7 of the 'Working instruction for the CTS-PCR-SSP TRAY and MINITRAY KITS' (Manual No. 100A) supplied along with this product.

#### 9. Special notes

- Mix 6 and mix 7 detect (among other alleles) the most common HLA-DRB1\*03 alleles which correspond either to serological split HLA-DR17 or HLA-DR18, respectively.

#### 10. Troubleshooting

Please refer to Section 8 of the 'Working instruction for the CTS-PCR-SSP TRAY and MINITRAY KITS' (Manual No. 100A) supplied along with this product.

#### 11. Precaution

Please refer to Material Safety Data Sheet for the CTS-PCR-SSP TRAY and MINITRAY KITS (Manual No. 100B) supplied along with this product.

#### 12. Contact

If you have any particular questions concerning this kit, which are not answered in this or the Main Manual, please do not hesitate to contact me or my coworkers at:

Phone: +49 6221 564013  
Fax: +49 6221 564200  
E-mail: [hien.tran@med.uni-heidelberg.de](mailto:hien.tran@med.uni-heidelberg.de)

Hien Tran, M.D.

### 13. Appendix

**Table 1:** Sizes of the PCR products and allele specificities of each **HLA-DRB1\*** CTS-PCR-SSP primer mix (**Lot No. DR42-1**) based on IMGT/HLA Sequence Database Release 3.27.0, January 2017

Position				Mix	Allele	Serology	Size
H1	H4	H7	H10	Mix1	DRB1*01:01:01:01:02:11/01:03-01:17/01:19-01:21/01:23-01:32/01:34-01:38/01:39Nw-01:40Nw/01:41-01:43/01:45-01:48/01:49w/01:50-01:59/01:61-01:64/01:65:01w-01:65:02w/01:66-01:75/01:77-01:78	DR1, -, DR103, Null	140 bp
G1	G4	G7	G10	Mix2	DRB1*01:03/01:39Nw/01:42/01:61	DR103, Null, -	200 bp
F1	F4	F7	F10	Mix3	<b>DRB1*15:01:01:01-15:01:21/15:01:23-15:33/15:35-15:112/15:113Nw/15:114/15:116-15:142, DRB1*16:09:01-16:10/16:33/16:36-16:37</b>	DR15(2), -, DR2, Null, DR16(2)	<b>see below</b>
					DRB1*15:01:01:01-15:01:21/15:01:23-15:01:28/15:01:30-15:02:09/15:02:11-15:02:17/15:03:01:01-15:05/15:08/15:10/15:12-15:33/15:35-15:46/15:49-15:58/15:60-15:64/15:66:01-15:67/15:69-15:72/15:74-15:76/15:78-15:87/15:89-15:93/15:95/15:98-15:106/15:108-15:112/15:113Nw/15:114/15:116-15:124/15:126-15:129N/15:131-15:135/15:137N-15:142, DRB1*16:09:01-16:10/16:33/16:36-16:37	DR15(2), -, DR2, Null, DR16(2)	140 bp
					DRB1*15:01:01:01-15:01:06/15:01:08-15:01:13/15:01:15-15:01:21/15:01:24-15:09/15:11-15:20/15:22-15:24/15:26/15:28-15:33/15:35-15:43/15:45/15:47-15:49/15:51-15:53/15:55-15:65/15:67-15:79/15:81-15:83/15:85-15:90/15:92-15:99/15:101-15:102/15:104-15:112/15:113Nw/15:114/15:116/15:118/15:121/15:123-15:126/15:128/15:130-15:142	DR15(2), -, DR2, Null	215 bp
E1	E4	E7	E10	Mix4	DRB1*15:21, DRB1*16:01:01-16:01:08/16:01:09w/16:01:10-16:05:02/16:07-16:46	-, DR16(2), DR2, Null	210bp
D1	D4	D7	D10	Mix5	DRB1*03:01:01:01-03:01:02/03:01:02w/03:01:03/03:01:05-03:01:13/03:01:14w/03:01:15-03:02:01/03:02:02w/03:02:03-03:05:02/03:05:03w/03:06-03:08/03:09?/03:10-03:11:01/03:12?/03:13:01/03:13:02w/03:14-03:15:01/03:15:02w/03:16-03:41:02/03:43-03:75/03:77-03:83/03:85-03:86/03:88-03:91/03:93-03:96/03:98-03:110/03:112-03:124/03:127w/03:128-03:129/03:130w/03:131-03:134/03:135w/03:136-03:137, DRB1*11:07:01/11:07:02w/11:53/11:103:01-11:103:02/11:105/11:107/11:125/11:136/11:173, DRB1*14:104w/14:111w/14:171, DRB3*01:14w	DR17(3), -, DR18(3), DR3, Null, DR11(5)	225 bp
C1	C4	C7	C10	Mix6	DRB1*03:01:01:01-03:01:25/03:04:01-03:04:02/03:06/03:08/03:10-03:11:01/03:12?/03:13:01-03:13:02/03:15:01-03:16/03:18-03:20/03:22-03:23/03:25-03:26/03:28/03:30-03:34/03:36-03:37/03:39/03:42-03:48/03:50-03:52/03:54w/03:55-03:56/03:58-03:62/03:64-03:73/03:75-03:80/03:82-03:87/03:89/03:91-03:96/03:98-03:99/03:100:01w-03:100:02w/03:104/03:106-03:112/03:114/03:116-03:118/03:121/03:123-03:129/03:132-03:137, DRB1*09:06, DRB1*11:59/11:83/11:135/11:182, DRB1*13:27/13:71/13:129/13:144/13:176, DRB1*14:82/14:95/14:132, DRB3*01:34	DR17(3), -, DR3, Null, DR13(6)	220 bp
B1	B4	B7	B10	Mix7	DRB1*03:02:01-03:02:03/03:05:01-03:05:03/03:09/03:14/03:27/03:29/03:38/03:53/03:74/03:81/03:88/03:90/03:102-03:103/03:115/03:122/03:130-03:131, DRB1*11:09/11:20/11:28:02/11:87/11:122, DRB1*13:02:01-13:02:03/13:02:05-13:02:13/13:05:01-13:05:03/13:26:01-13:26:02/13:29/13:31/13:34/13:36/13:39/13:41/13:50:02-13:50:03/13:56/13:63/13:65/13:67/13:73-13:74/13:85/13:96:01-13:96:02/13:99/13:103-13:104/13:109/13:119-13:120/13:123-13:124/13:126/13:128/13:136/13:139-13:140/13:142N-13:143/13:145/13:147/13:155/13:157-13:159/13:165/13:168/13:170-13:171:02/13:179/13:189/13:196/13:198-13:199/13:202-13:203/13:207-13:212/13:220/13:225, DRB1*14:02:01-14:03:02/14:09/14:13/14:19?/14:24/14:27:01-14:27:02/14:30/14:46-14:48/14:51/14:63/14:67/14:85/14:89/14:98/14:109/14:115/14:134-14:135/14:144/14:174/14:179, DRB1*16:08, DRB3*01:08, DRB3*02:06?/02:20	DR18(3), -, DR3, DR11(5), DR13(6), Null, DR14(6), DR1403	190 bp

Position				Mix	Allele	Serology	Size
A1	A4	A7	A10	Mix8	<b>DRB1*03:49, DRB1*04:01:01:01-04:05:11/04:05:13-04:11:03/04:12-04:155/04:157N-04:221, DRB1*08:38, DRB1*11:22/11:102:01-11:102:02/11:175, DRB1*14:10/14:57/14:143/14:161/14:182</b>	-, DR4, Null, DR14(6)	<b>see below</b>
					DRB1*04:28/04:35/04:42-04:43/04:59/04:147/04:199/04:210, DRB1*11:22	DR4, -	145 bp
					DRB1*04:01:01:01-04:01:06/04:01:08-04:01:10/04:01:12-04:05:04/04:05:06-04:05:11/04:05:13-04:11:03/04:12-04:27/04:29-04:34/04:36-04:41/04:44:01-04:48/04:50-04:58/04:60-04:63/04:65/04:67-04:84/04:86-04:146/04:148-04:155/04:157N-04:161/04:163-04:173/04:175-04:191/04:193-04:195/04:197-04:198/04:200-04:209/04:211/04:94:02N/04:214N-04:219/04:221, DRB1*14:10/14:57/14:143/14:182	DR4, -, Null, DR14(6)	145 bp
					DRB1*04:01:01:01-04:01:07/04:01:09-04:01:17/04:05:01-04:05:11/04:05:13-04:05:18/04:07:01-04:09/04:14/04:16-04:17:02/04:19-04:21/04:24/04:26/04:28-04:31/04:33-04:35/04:38/04:43/04:45/04:47-04:48/04:54/04:57/04:61-04:63/04:69/04:72:01-04:72:02/04:74-04:77/04:80-04:84/04:86-04:87/04:89-04:90/04:92/04:98:01-04:98:02/04:102-04:107/04:111-04:113/04:115-04:117/04:119N/04:123/04:125/04:127-04:132/04:135/04:137/04:139-04:141/04:145/04:152-04:153/04:155/04:158N-04:160/04:162/04:166/04:170-04:175/04:178N-04:179/04:184-04:185/04:187-04:190/04:194/04:196-04:197/04:199-04:200/04:202/04:205-04:206/04:208-04:209/04:94:02N/04:214N/04:216-04:217, DRB1*11:22, DRB1*14:143	DR4, -, Null	260 bp
					DRB1*03:49, DRB1*04:28/04:35/04:42-04:43/04:59/04:147/04:199/04:210, DRB1*11:102:01-11:102:02/11:175	-, DR4	85 bp
					DRB1*04:01:01:01-04:01:06/04:01:08-04:01:10/04:01:12-04:02:03/04:02:05-04:05:04/04:05:06-04:05:11/04:05:13-04:05:16/04:05:18-04:11:03/04:12-04:27/04:29-04:34/04:36-04:41/04:44:01-04:58/04:60-04:62/04:64-04:109/04:111-04:122/04:124-04:146/04:148-04:155/04:157N-04:160/04:163-04:171/04:173/04:175-04:195/04:197-04:198/04:201/04:203-04:209/04:94:02N/04:213-04:221, DRB1*08:38, DRB1*14:161	DR4, -, Null	85 bp
					DRB1*04:01:01:01-04:01:07/04:01:09-04:01:17/04:05:01-04:05:11/04:05:13-04:05:16/04:05:18/04:07:01-04:09/04:14/04:16-04:17:02/04:19-04:21/04:24/04:26/04:28-04:31/04:33-04:35/04:38/04:43/04:45/04:47-04:48/04:54/04:57/04:61-04:62/04:64/04:66/04:69/04:72:01-04:72:02/04:74-04:77/04:80-04:84/04:86-04:87/04:89-04:90/04:92/04:98:01-04:98:02/04:102-04:107/04:111-04:113/04:115-04:117/04:119N/04:125/04:127-04:132/04:135/04:137/04:139-04:141/04:145/04:152-04:153/04:155/04:158N-04:160/04:162/04:166/04:170-04:171/04:173-04:175/04:178N-04:179/04:184-04:185/04:187-04:190/04:192/04:194/04:196-04:197/04:199/04:205-04:206/04:208-04:209/04:94:02N/04:213-04:214N/04:216-04:217, DRB1*08:38, DRB1*11:175	DR4, -, Null	200 bp
H2	H5	H8	H11	Mix9	<b>DRB1*01:21w, DRB1*07:01:01:01-07:01:21/07:03-07:76</b>	-, DR7, Null	<b>see below</b>
					DRB1*07:01:01:01-07:01:06/07:01:09-07:01:11/07:01:13-07:01:14/07:01:16-07:01:18/07:01:21/07:03-07:05/07:08-07:11/07:14-07:27/07:29-07:44/07:46-07:56/07:58N-07:76	DR7, -, Null	115 bp
					DRB1*01:21w, DRB1*07:01:01:01-07:01:03/07:01:05-07:01:13/07:01:15-07:01:21/07:03/07:05-07:10N/07:12-07:24/07:26N-07:31/07:33-07:34/07:36-07:58N/07:60/07:62-07:76	-, DR7, Null	190 bp

Position				Mix	Allele	Serology	Size
G2	G5	G8	G11	Mix10	DRB1*08:01:01-08:01:02/08:01:04-08:01:05/08:02:01-08:04:01/08:04:03-08:19/08:21-08:30:03/08:32-08:56/08:58-08:66/08:68-08:79/08:81-08:82, DRB1*11:67/11:193:01-11:193:02, DRB1*12:16:01-12:16:03/12:22/12:39/12:46, DRB1*14:04:01-14:04:03/14:15/14:28/14:31/14:50/14:68:01-14:68:02/14:71/14:73/14:76/14:79/14:93/14:107/14:120/14:138/14:145/14:148/14:152N/14:180	DR8, -, Null, DR1404, DR14(6)	see below
					DRB1*08:01:01-08:01:02/08:01:04-08:01:05/08:03:02-08:03:06/08:05-08:06/08:10/08:12/08:14/08:16-08:18/08:22-08:23/08:26-08:27/08:29/08:32-08:33/08:35-08:40/08:43/08:46/08:48/08:50/08:53-08:56/08:58/08:60N/08:62/08:64-08:66/08:68/08:70-08:71/08:74/08:76-08:79, DRB1*12:46	DR8, -, Null	165 bp
					DRB1*08:08, DRB1*14:04:01-14:04:03/14:28/14:31/14:50/14:68:01-14:68:02/14:71/14:73/14:76/14:79/14:93/14:107/14:120/14:138/14:145/14:148/14:152N/14:180	-, DR1404, DR14(6), Null	165 bp
					DRB1*08:01:01-08:01:02/08:01:04-08:01:05/08:02:01-08:04:01/08:04:03-08:04:07/08:06-08:17/08:19/08:21-08:23/08:26-08:28/08:30:01-08:30:03/08:32-08:39/08:42/08:44-08:46/08:48-08:55/08:58-08:66/08:68-08:79/08:81-08:82, DRB1*11:67, DRB1*14:15	DR8, -, Null	215 bp
					DRB1*08:01:01-08:01:02/08:01:04-08:01:05/08:02:01-08:03:06/08:05/08:07-08:09/08:11/08:13-08:19/08:21/08:23-08:27/08:29-08:30:02/08:32-08:38/08:40-08:47/08:49/08:51/08:53/08:56/08:58/08:60N-08:63/08:66/08:68-08:69/08:71-08:74/08:76-08:79, DRB1*11:193:01-11:193:02, DRB1*12:16:01-12:16:03/12:22/12:39, DRB1*14:68:01-14:68:02/14:93	DR8, -, Null	250 bp
F2	F5	F8	F11	Mix11	DRB1*09:01:02-09:05/09:07-09:08/09:10-09:22/09:24-09:30	DR9, -	220 bp
E2	E5	E8	E11	Mix12	DRB1*01:34w, DRB1*10:01:01:01-10:11/10:13-10:20	-, DR10	205 bp
D2	D5	D8	D11	Mix13	DRB1*01:75, DRB1*03:08/03:65, DRB1*04:15/04:61/04:138/04:145/04:154/04:170, DRB1*08:31/08:41/08:63/08:75, DRB1*11:01:01:01-11:02:02/11:02:04-11:04:12/11:04:14-11:11:01/11:11:03-11:21/11:22?/11:23:01-11:25/11:26?/11:27:01-11:39/11:40?/11:41-11:70/11:72-11:85/11:87-11:93/11:95-11:109/11:111-11:122/11:124-11:155/11:157-11:166/11:168-11:171/11:173-11:184/11:186/11:188-11:191/11:193:01-11:202/11:203w/11:204-11:207, DRB1*12:04/12:49, DRB1*14:11, DRB1*15:99/15:109, DRB1*16:16/16:27, DRB3*02:18, DRB5*01:13	-, DR4, DR11(5), DR11(5)/DR13(6), Null, DR14(6)	125 bp
C2	C5	C8	C11	Mix14	DRB1*08:25/08:32/08:47/08:53, DRB1*12:01:01:01-12:01:04/12:01:05w/12:01:06-12:19/12:20w/12:21-12:30/12:32-12:41/12:43-12:56/12:58-12:64	-, DR12(5), Null	see below
					DRB1*08:32/08:53, DRB1*12:01:01:01-12:01:03/12:01:05w/12:01:06-12:02:06/12:03:02-12:13/12:15-12:19/12:20w/12:21-12:28/12:30/12:32-12:35/12:37/12:39-12:41/12:43-12:44/12:46-12:50/12:53-12:55/12:59-12:62/12:64	-, DR12(5), Null	105 bp
					DRB1*08:25/08:47, DRB1*12:01:01:01-12:01:03/12:01:03-12:01:04/12:01:05w/12:01:06-12:02:03/12:02:05-12:15/12:16:02-12:19/12:20w/12:21/12:23-12:30/12:32-12:41/12:43-12:48/12:50-12:56/12:58-12:64	-, DR12(5), Null	210 bp
B2	B5	B8	B11	Mix15	DRB1*03:125, DRB1*11:09/11:16/11:20/11:28:02/11:40w/11:58:01/11:59w/11:83/11:87/11:113/11:115/11:122w/11:182, DRB1*13:01:01:01-13:02:13/13:05:01-13:06/13:10/13:15-13:16/13:18/13:26:01-13:28/13:31-13:32/13:34-13:36/13:39-13:42/13:50:02-13:51/13:53/13:59/13:61:01-13:61:02/13:63w/13:65/13:67/13:69/13:73-13:74/13:79-13:80/13:85/13:87/13:91-13:93/13:96:01-13:96:02/13:98-13:99/13:102-13:105/13:109-13:110/13:111w/13:112-13:113N/13:117/13:120-13:121/13:123-13:128/13:130-13:131/13:136-13:148/13:153/13:155-13:160/13:165-13:166/13:168/13:170-13:171:02/13:173/13:176-13:177/13:179/13:183-13:187/13:189-13:191/13:198-13:203/13:205/13:207-13:215/13:217-13:218/13:220-13:222/13:223w/13:225-13:226, DRB1*14:27:01-14:27:02/14:63/14:67/14:78, DRB1*16:08	-, DR11(5), DR11(5)/DR13(6), DR13(6), Null, DR14(6)	130 bp

Position				Mix	Allele	Serology	Size
A2	A5	A8	A11	Mix16	DRB1*03:12?, DRB1*11:03:01-11:03:02/11:11:01/11:11:03/11:36/11:40-11:41/11:55/11:59/11:63:01-11:63:02/11:68/11:76/11:85/11:122/11:138-11:139/11:151/11:161/11:168/11:176, DRB1*13:03:01-13:04/13:12:01-13:13/13:20-13:21:02/13:24/13:29/13:30?/13:32-13:33:03/13:38/13:43/13:48-13:49/13:54/13:55?/13:58/13:63/13:65-13:66:02/13:71/13:75/13:78/13:81/13:88-13:90/13:93-13:95/13:101/13:108/13:111/13:115/13:118/13:120/13:122/13:133-13:134/13:139/13:149/13:151-13:152/13:154/13:161/13:164/13:167/13:169/13:174/13:188/13:194/13:216/13:219/13:227-13:228/13:230, DRB1*14:13/14:63/14:65/14:78/14:85/14:169-14:170	DR3, DR11(5), -, DR13(6), DR14(6)	see below
					DRB1*03:12?, DRB1*13:03:01-13:04/13:12:01-13:13/13:21:01-13:21:02/13:30?/13:32-13:33:03/13:38/13:48-13:49/13:55?/13:58/13:65-13:66:02/13:75/13:81/13:88-13:90/13:93-13:95/13:101/13:108/13:115/13:118/13:120/13:122/13:133-13:134/13:139/13:151-13:152/13:154/13:161/13:164/13:167/13:169/13:174/13:188/13:194/13:216/13:219/13:227-13:228/13:230, DRB1*14:13/14:63/14:65/14:78/14:85/14:169-14:170	DR3, DR13(6), -, DR14(6)	170 bp
					DRB1*03:12?, DRB1*11:03:01-11:03:02/11:11:01/11:11:03/11:36/11:40-11:41/11:55/11:59/11:63:01-11:63:02/11:68/11:76/11:85/11:122/11:138-11:139/11:151/11:161/11:168/11:176, DRB1*13:20-13:21:02/13:24/13:29/13:43/13:49/13:54/13:55?/13:63/13:71/13:75/13:78/13:108/13:111/13:149, DRB1*14:13/14:65/14:85/14:169-14:170	DR3, DR11(5), -, DR13(6), DR14(6)	200 bp
H3	H6	H9	H12	Mix17	DRB1*11:09/11:28:02/11:40w/11:58:01/11:59w/11:83/11:87/11:113/11:115/11:122w/11:182, DRB1*13:05:01-13:05:03/13:18/13:26:01-13:26:02/13:42/13:50:02-13:50:03/13:63w/13:111w/13:136/13:144/13:158/13:189/13:199/13:203, DRB1*14:27:01-14:27:02, DRB1*16:08	DR11(5), -, DR13(6), DR14(6)	130 bp
G3	G6	G9	G12	Mix18	DRB1*03:01:01-03:01:06/03:01:07w/03:01:08-03:01:13/03:01:14w/03:01:15-03:07/03:09?/03:10-03:11:01/03:12?/03:13:01-03:37/03:38w/03:39-03:41:02/03:43-03:45/03:46w/03:47-03:58/03:59w/03:60-03:64/03:66-03:78/03:79w/03:80-03:86/03:88-03:110/03:112-03:126/03:127w/03:128-03:129/03:130w/03:131-03:134/03:135w/03:136-03:137, DRB1*08:01:01-08:01:02/08:01:04-08:01:05/08:02:01-08:04:01/08:04:03-08:24:02/08:25w/08:26-08:30:03/08:32-08:33/08:34w/08:35-08:40/08:42-08:46/08:47w/08:48-08:51/08:52w/08:53-08:56/08:58-08:62/08:64-08:68/08:70-08:74/08:76-08:79/08:81-08:82, DRB1*12:01:01-12:01:07w/12:01:09w-12:02:05w/12:02:07w-12:03:03w/12:05w-12:08w/12:09/12:10w-12:17w/12:19w-12:23w/12:24N-12:25/12:26w-12:30w/12:32w/12:34w-12:41w/12:43w-12:45w/12:46/12:48/12:50w-12:53w/12:54/12:55w-12:56w/12:58w-12:61w/12:62/12:63w-12:64w, DRB1*13:01:01-13:02:11/13:02:12w/13:02:13-13:29/13:30?/13:31-13:53/13:54w/13:55?/13:56-13:66:02/13:68-13:76/13:77w/13:78-13:99/13:100w/13:101-13:102/13:103w/13:104-13:159/13:160w/13:161/13:162w/13:163-13:164/13:165w/13:166-13:182/13:184-13:194/13:196-13:198/13:199w/13:201-13:217/13:218w/13:219-13:227/13:229-13:231, DRB1*14:01:01-14:09/14:12:01-14:38:02/14:40-14:45/14:47/14:48w/14:49-14:54:01/14:54:03-14:56/14:58-14:60/14:62-14:65/14:67-14:124/14:125w/14:126:01-14:140/14:142/14:144-14:147/14:149-14:176/14:177w/14:178-14:181/14:183-14:184, DRB3*01:14w	DR17(3), -, DR18(3), DR3, Null, DR8, DR12(5), DR13(6), DR14(6), DR1403, DR1404, DR6	see below
					DRB1*03:01:06/03:01:07w/03:01:09/03:01:14w/03:01:15/03:09?/03:13:01-03:13:02/03:46w/03:50/03:59w/03:64/03:67N/03:69/03:86/03:88/03:117/03:130w/03:135w, DRB1*13:02:12w/13:39/13:78-13:79/13:103w/13:112/13:121/13:128/13:142N/13:160w/13:163/13:165w/13:173/13:181/13:199w/13:218w, DRB1*14:08/14:23:02/14:34/14:64/14:72/14:109/14:115/14:130	DR17(3), -, Null, DR14(6)	170 bp
					DRB1*03:10, DRB1*13:43/13:45/13:159/13:171:01/13:179/13:191/13:197/13:217, DRB1*14:01:01-14:01:04/14:07:01-14:07:02/14:16/14:22/14:25-14:26/14:32:01-14:32:03/14:35/14:38:01-14:38:02/14:49/14:53-14:54:01/14:54:03-14:55/14:58/14:60/14:62/14:69-14:70/14:74-14:75/14:82/14:86-14:88/14:90/14:92N/14:97/14:99/14:101/14:104-14:105/14:110-14:114/14:117-14:119/14:122/14:124/14:125w/14:128-14:129/14:131-14:133/14:137N/14:139-14:140/14:142/14:146-14:147/14:149-14:151/14:153/14:157-14:158/14:162-14:164/14:166N/14:168/14:171-14:173/14:178/14:184	DR17(3), -, DR14(6), DR6, DR13(6), Null	175 bp

Position			Mix	Allele	Serology	Size
				DRB1*03:01:01:01-03:01:05/03:01:07w/03:01:08-03:01:13/03:01:14w/03:01:15-03:07/03:09?/03:11:01/03:12?/03:13:01-03:37/03:38w/03:39-03:41:02/03:43-03:45/03:47-03:58/03:59w/03:60-03:63/03:66-03:78/03:79w/03:80-03:86/03:88-03:91/03:93-03:110/03:112-03:126/03:127w/03:128-03:129/03:131-03:134/03:135w/03:136-03:137, DRB1*08:20, DRB1*13:01:01:01-13:02:11/13:02:12w/13:02:13-13:16/13:18-13:29/13:30?/13:31-13:42/13:44/13:46-13:53/13:54w/13:55?/13:56-13:66:02/13:68-13:76/13:77w/13:78-13:99/13:100w/13:101-13:102/13:103w/13:104-13:115/13:117-13:158/13:160w/13:161/13:162w/13:163-13:164/13:166-13:170/13:171:02-13:174/13:176-13:178/13:180-13:182/13:184-13:190/13:192-13:194/13:196/13:198/13:199w/13:201-13:213/13:215-13:216/13:218w/13:219-13:227/13:229-13:231, DRB1*14:02:01-14:03:02/14:05:01-14:06:03/14:09/14:12:01-14:14/14:17-14:21/14:23:01/14:23:03-14:24/14:27:01-14:27:02/14:29-14:30/14:33/14:36-14:37/14:40-14:45/14:47/14:48w/14:51/14:56/14:59/14:63-14:65/14:67/14:77-14:78/14:80-14:81/14:83-14:85/14:89/14:91/14:94-14:96/14:98/14:100/14:102-14:103/14:106/14:108-14:109/14:115-14:116/14:121/14:123/14:127:01-14:127:02/14:130/14:134-14:136/14:144/14:154-14:156/14:159-14:161/14:165/14:167/14:169-14:170/14:174/14:176/14:177w/14:179/14:181/14:183, DRB3*01:14w	DR17(3), -, DR18(3), DR3, Null, DR13(6), DR14(6), DR1403, DR6	175 bp
				DRB1*08:15/08:21, DRB1*12:48	-	165 bp
				DRB1*08:08, DRB1*14:04:01-14:04:03/14:28/14:31/14:50/14:68:01-14:68:02/14:71/14:73/14:76/14:79/14:93/14:107/14:120/14:138/14:140/14:145/14:152N/14:180	-, DR1404, DR14(6), Null	165 bp
				DRB1*03:92, DRB1*08:01:01-08:01:02/08:01:04-08:01:05/08:02:01-08:04:01/08:04:03-08:07/08:09-08:14/08:16-08:19/08:21-08:24:02/08:25w/08:26-08:30:03/08:32-08:33/08:34w/08:35-08:40/08:42-08:46/08:47w/08:48-08:51/08:52w/08:53-08:56/08:58-08:62/08:64-08:68/08:70-08:74/08:76-08:79/08:81-08:82, DRB1*12:01:01:01w-12:01:07w/12:01:09w-12:02:05w/12:02:07w-12:03:03w/12:05w-12:08w/12:09/12:10w-12:17w/12:19w-12:23w/12:24N-12:25/12:26w-12:30w/12:32w/12:34w-12:41w/12:43w-12:45w/12:46/12:48/12:50w-12:53w/12:54/12:55w-12:56w/12:58w-12:61w/12:62/12:63w-12:64w, DRB1*13:17/13:116/13:175/13:214, DRB1*14:15/14:52/14:126:01-14:126:02/14:175	-, DR8, Null, DR12(5), DR13(6)	170 bp



Position				Mix	Allele	Serology	Size
F3	F6	F9	F12	Mix19	DRB1*03:10/03:97/03:126, DRB1*08:08/08:29, DRB1*11:17/11:52-11:54:02/11:89/11:150/11:159/11:202, DRB1*13:43/13:45/13:76/13:159/13:171:01/13:179/13:188/13:191/13:197/13:206/13:217, DRB1*14:01:01-14:01:04/14:04:01-14:05:04/14:07:01-14:08/14:11/14:14/14:16/14:18/14:22-14:23:04/14:25-14:26/14:28/14:31-14:33/14:35-14:36/14:38:01-14:39/14:42-14:45/14:49-14:51/14:53-14:56/14:58-14:62/14:64/14:68:01-14:76/14:79/14:82/14:86-14:88/14:90-14:93/14:95-14:97/14:99/14:101/14:103-14:107/14:110-14:114/14:117-14:120/14:122/14:124/14:125w/14:126:01-14:126:02/14:128-14:134/14:137N-14:140/14:142/14:145-14:155/14:157-14:158/14:160-14:164/14:166N-14:169/14:171-14:173/14:175/14:178/14:180/14:184	DR17(3), -, DR11(5), DR14(6), DR1404, DR6, DR13(6), Null	see below
					DRB1*08:08, DRB1*14:04:01-14:04:03/14:28/14:31/14:50/14:61/14:68:01-14:68:02/14:71/14:73/14:76/14:79/14:93/14:107/14:120/14:138/14:145/14:152N/14:180	-, DR1404, DR14(6), Null	175 bp
					DRB1*08:29, DRB1*14:04:01-14:04:02/14:11/14:28/14:50/14:61/14:68:01/14:71/14:73/14:93/14:120/14:126:01-14:126:02/14:138/14:145/14:148/14:152N/14:175	-, DR1404, DR14(6), Null	225 bp
					DRB1*03:10, DRB1*13:43/13:45/13:159/13:171:01/13:179/13:191/13:197/13:217, DRB1*14:01:01-14:01:04/14:07:01-14:07:02/14:16/14:22/14:25-14:26/14:32:01-14:32:03/14:35/14:38:01-14:39/14:49/14:53-14:54:01/14:54:03-14:55/14:58/14:60/14:62/14:69-14:70/14:74-14:75/14:82/14:86-14:88/14:90/14:92N/14:97/14:99/14:104-14:105/14:110-14:114/14:117-14:119/14:122/14:124/14:125w/14:128-14:129/14:131-14:133/14:137N/14:139-14:140/14:142/14:146-14:147/14:149-14:151/14:153/14:157-14:158/14:162-14:164/14:166N/14:168/14:171-14:173/14:184	DR17(3), -, DR14(6), DR6, DR13(6), Null	175 bp
					DRB1*03:97/03:126, DRB1*11:17/11:52-11:54:02/11:89/11:150/11:159/11:202, DRB1*13:76/13:188/13:206, DRB1*14:01:01-14:01:04/14:05:01-14:05:04/14:07:01-14:08/14:14/14:18/14:23:01-14:23:04/14:26/14:33/14:35-14:36/14:38:01/14:39/14:42-14:45/14:51/14:54:01-14:54:05/14:56/14:58-14:60/14:62/14:64/14:70/14:72/14:75/14:82/14:86/14:88/14:90-14:92N/14:95-14:97/14:99/14:101/14:103/14:106/14:110/14:112-14:114/14:117-14:118/14:122/14:124/14:125w/14:129-14:134/14:137N/14:139-14:140/14:142/14:146-14:147/14:149-14:151/14:153-14:155/14:157-14:158/14:160-14:163/14:166N-14:169/14:178/14:184	-, DR11(5), DR14(6), DR6, Null	225 bp
E3	E6	E9	E12	Mix20	DRB1*03:126, DRB1*04:211, DRB1*11:09/11:28:02w/11:58:01w/11:83/11:87/11:113/11:115w/11:182, DRB1*12:58, DRB1*13:05:01-13:06/13:18/13:26:01-13:26:02/13:42/13:50:02w-13:50:03w/13:56/13:77/13:119/13:136/13:144/13:146/13:156-13:158/13:163/13:181/13:189w/13:193/13:199/13:203, DRB1*14:02:01-14:03:02/14:06:01-14:06:03/14:09/14:12:01-14:13/14:17-14:18/14:27:01-14:27:02/14:29-14:30/14:33/14:46-14:48/14:51-14:52/14:59/14:63-14:64/14:67/14:78/14:80-14:81/14:83/14:85/14:89/14:95/14:98w/14:106/14:108/14:115/14:121/14:132-14:135/14:144/14:154/14:165/14:170/14:174/14:176-14:177/14:179, DRB1*16:08w	-, DR11(5), DR13(6), DR14(6), DR1403, DR6	see below
					DRB1*03:126, DRB1*04:211, DRB1*11:09/11:28:02w/11:58:01w/11:83/11:87/11:113/11:115w/11:182, DRB1*12:58, DRB1*13:05:01-13:06/13:26:01-13:26:02/13:42/13:50:02w-13:50:03w/13:56/13:77/13:136/13:157/13:163/13:181/13:189w/13:193/13:199/13:203, DRB1*14:02:01-14:02:03/14:06:01-14:06:03/14:09/14:13/14:17-14:18/14:29-14:30/14:33/14:46-14:48/14:51-14:52/14:59/14:64/14:80-14:81/14:83/14:95/14:98w/14:106/14:108/14:121/14:132-14:134/14:154/14:165/14:170/14:176-14:177/14:179, DRB1*16:08w	-, DR11(5), DR13(6), DR14(6), DR6	145 bp
					DRB1*13:18/13:119/13:144/13:146/13:156/13:158, DRB1*14:03:01-14:03:02/14:12:01-14:12:02/14:27:01-14:27:02/14:63/14:67/14:78/14:85/14:89/14:98w/14:115/14:135/14:144/14:174	DR13(6), -, DR1403, DR14(6)	150 bp

Position				Mix	Allele	Serology	Size
D3	D6	D9	D12	Mix21	<b>DRB1*09:07, DRB4*01:02?, DRB5*01:01:01-01:25/01:26w/01:27N-01:29, DRB5*02:02-02:16</b>	-, DR51, Null	<b>see below</b>
					DRB4*01:02?, DRB5*01:01:01-01:11/01:14-01:25/01:26w/01:27N-01:29, DRB5*02:02-02:16	-, DR51, Null	175 bp
					DRB5*01:13	-	175 bp
					DRB1*09:07, DRB4*01:02?, DRB5*01:12	-	210 bp
C3	C6	C9	C12	Mix22	DRB1*03:42/03:87, DRB1*14:141, DRB3*01:01:02:01-01:13/01:15-01:41, DRB3*02:01-02:25/02:28-02:46/02:48-02:57/02:59-02:61Q, DRB3*03:01:01-03:11	-, DR52, Null	215 bp
B3	B6	B9	B12	Mix23	<b>DRB4*01:01:01-01:04/01:05?/01:06-01:07:02/01:08?/01:09-01:22/01:23w/01:24-01:26/01:27?/01:28-01:48, DRB4*02:01N, DRB4*03:01N</b>	DR53, -, Null	<b>see below</b>
					DRB4*01:01:01-01:04/01:05?/01:06-01:07:02/01:09-01:22/01:23w/01:24-01:26/01:28-01:48, DRB4*02:01N	DR53, -, Null	215 bp
					DRB4*01:01:01-01:04/01:05?/01:06-01:07:02/01:09-01:22/01:23w/01:24-01:26/01:28-01:48, DRB4*02:01N, DRB4*03:01N	DR53, -, Null	255 bp
A3	A6	A9	A12	Mix24	Negative Control	-	None (440 bp)

**Mix 7:** HLA-DRB1\*03:81 serology unclear.

**Amplification control (internal positive control):** 440 base pairs (bp)

**w** = weak

**?** = nucleotide sequence information not available for the primer matching sequence

**Bold:** mixes which result in PCR fragments of different sizes (the specificities are first indicated all in one row, then split into several groups in the subsequent rows depending on the fragment size)

**Table 2:** Amplification patterns of **HLA-DRB1\*** and other HLA-DRB\* alleles detected by the HLA-DRB1\* CTS-PCR-SSP primer mixes (**Lot No. DR42-1**) based on IMGT/HLA Sequence Database Release 3.27.0, January 2017

Allele	Serology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DRB1*01:01:01-01:02:11/01:04-01:17/01:19-01:20:02/01:23-01:32/01:35-01:38/01:41/01:43/01:45-01:48/01:50-01:59/01:62N-01:64/01:66-01:74/01:77-01:78	DR1, -, Null	1																						
DRB1*01:03/01:42/01:61	DR103, -	1	2																					
DRB1*01:21	-	1								w														
DRB1*01:34	-	1											w											
DRB1*01:39N	Null	w	w																					
DRB1*01:40N/01:49/01:65:01-01:65:02	Null, -	w																						
DRB1*01:75	-	1												13										
DRB1*03:01:01:01-03:01:01:02/03:01:03/03:01:05-03:01:06/03:01:08-03:01:13/03:01:15-03:01:25/03:04:01-03:04:02/03:06/03:11:01/03:13:01/03:15:01/03:16/03:18-03:20/03:22-03:23/03:25-03:26/03:28/03:30-03:34/03:36-03:37/03:39/03:43-03:45/03:47-03:48/03:50-03:52/03:55-03:56/03:58/03:60-03:62/03:64/03:66-03:73/03:75/03:77-03:78/03:80/03:82-03:83/03:85-03:86/03:89/03:91/03:93-03:96/03:98-03:99/03:104/03:106-03:110/03:112/03:114/03:116-03:118/03:121/03:123-03:124/03:128-03:129/03:132-03:134/03:136-03:137	DR17(3), -, DR3, Null					5	6												18					
DRB1*03:01:02/03:13:02/03:15:02	DR17(3), -					w	6												18					
DRB1*03:01:04/03:76/03:84/03:92, DRB1*13:129	DR17(3), -						6												18					
DRB1*03:01:07/03:46/03:59/03:79	DR17(3), -					5	6												w					
DRB1*03:01:14/03:127/03:135	-					w	6												w					
DRB1*03:02:01/03:02:03/03:05:01-03:05:02/03:14/03:27/03:29/03:53/03:74/03:81/03:88/03:90/03:102-03:103/03:115/03:122/03:131	DR18(3), -, DR3					5		7											18					
DRB1*03:02:02/03:05:03	DR18(3), DR3					w		7											18					
DRB1*03:03/03:07/03:17/03:21/03:24/03:35/03:40-03:41:02/03:57/03:63/03:101/03:105/03:113/03:119-03:120	DR18(3), DR3, -					5													18					
DRB1*03:08/03:65	-					5	6							13										
DRB1*03:09	-					?		7											?					
DRB1*03:10	DR17(3)					5	6												18	19				
DRB1*03:12	DR3					?	?										?		?					
DRB1*03:38	-					5		7											w					
DRB1*03:42/03:87, DRB3*01:34	-						6																22	

Allele	Serology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DRB1*03:49	-					5			8										18					
DRB1*03:54/03:100:01-03:100:02	-					5	w												18					
DRB1*03:97, DRB1*13:45/13:76/13:197/13:206, DRB1*14:01:01-14:01:04/ 14:05:01-14:05:04/14:07:01-14:08/14:14/14:16/14:22-14:23:04/14:25-14:26/ 14:32:01-14:32:03/14:35-14:36/14:38:01-14:38:02/14:42-14:45/14:49/14:53- 14:54:01/14:54:03-14:56/14:58/14:60/14:62/14:69-14:70/14:72/14:74- 14:75/14:86-14:88/14:90-14:92N/14:96-14:97/14:99/14:101/14:103/14:105/ 14:110/14:112-14:114/14:117-14:119/14:122/14:124/14:126:01-14:126:02/ 14:128-14:131/14:137N/14:139-14:140/14:142/14:146-14:147/14:149- 14:151/14:153/14:155/14:157-14:158/14:160/14:162-14:164/14:166N- 14:168/14:172-14:173/14:175/14:178/14:184	-, DR14(6), DR6, DR13(6), Null																		18	19				
DRB1*03:111, DRB1*09:06	-						6																	
DRB1*03:125, DRB1*13:27/13:176	-, DR13(6)						6									15			18					
DRB1*03:126, DRB1*14:95/14:132	-						6												18	19	20			
DRB1*03:130	-					w		7											w					
DRB1*04:01:01:01-04:05:11/04:05:13-04:11:03/04:12-04:14/04:16-04:60/ 04:62-04:137/04:139-04:144/04:146-04:153/04:155/04:157N-04:169/04:171- 04:210/04:212N-04:221, DRB1*14:10/14:57/14:143/14:182	DR4, -, Null, DR14(6)								8															
DRB1*04:15/04:61/04:138/04:145/04:154/04:170, DRB1*11:102:01- 11:102:02/11:175	DR4, -								8				13											
DRB1*04:211	-								8												20			
DRB1*07:01:01:01-07:01:21/07:03-07:76	DR7, -, Null									9														
DRB1*08:01:01-08:01:02/08:01:04-08:01:05/08:02:01-08:04:01/08:04:03- 08:07/08:09-08:19/08:21-08:24:02/08:26-08:28/08:30:01-08:30:03/08:33/ 08:35-08:37/08:39-08:40/08:42-08:46/08:48-08:51/08:54-08:56/08:58-08:62/ 08:64-08:66/08:68/08:70-08:74/08:76-08:79/08:81-08:82, DRB1*14:15	DR8, -, Null										10								18					
DRB1*08:08/08:29, DRB1*14:04:01-14:04:03/14:28/14:31/14:50/14:68:01- 14:68:02/14:71/14:73/14:76/14:79/14:93/14:107/14:120/14:138/14:145/ 14:152N/14:180	-, DR1404, DR14(6), Null										10								18	19				

Allele	Serology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DRB1*08:20/08:67, DRB1*13:07:01-13:09/13:11:01-13:11:02/13:14:01-13:14:03/13:17/13:19/13:22-13:23:02/13:25/13:37/13:44/13:46-13:47/13:50:01/13:52/13:57/13:60/13:62/13:64/13:68/13:70/13:72/13:82-13:84/13:86/13:97:01-13:97:02/13:106-13:107/13:114/13:116/13:132/13:135/13:150/13:172/13:175/13:178/13:180/13:182/13:192/13:204/13:224/13:229/13:231, DRB1*14:20-14:21/14:34/14:37/14:40-14:41/14:77/14:84/14:94/14:100/14:102/14:116/14:123/14:127:01-14:127:02/14:136/14:156/14:159/14:181/14:183	-, DR13(6), DR14(6)																		18					
DRB1*08:25/08:47, DRB1*12:16:01-12:16:03/12:22/12:39	-										10				14				w					
DRB1*08:31, DRB1*11:01:01:01-11:02:02/11:02:04-11:02:05/11:04:01-11:04:12/11:04:14-11:06:03/11:08:01-11:08:03/11:10:01-11:10:02/11:12:01-11:15/11:18-11:19:03/11:21/11:23:01-11:25/11:27:01-11:28:01/11:29:01-11:35/11:37:01-11:39/11:42-11:51/11:56-11:57/11:58:02/11:60-11:62:02/11:64-11:66/11:69-11:70/11:72-11:75/11:77-11:82/11:84:01-11:84:03/11:88/11:90-11:93/11:95-11:101:02/11:104/11:106/11:108-11:109/11:111-11:112/11:114/11:116-11:121/11:124/11:126-11:134/11:137/11:140-11:149/11:152-11:155/11:157-11:158/11:160/11:162-11:166/11:169N-11:171/11:174/11:177-11:181/11:183-11:184/11:186/11:188-11:191/11:194-11:201/11:204-11:207	DR11(5), -, Null													13										
DRB1*08:32/08:53, DRB1*12:46	-										10				14				18					
DRB1*08:34/08:52	-										10								w					
DRB1*08:38	-								8		10								18					
DRB1*08:41/08:63/08:75, DRB1*11:67/11:193:01-11:193:02	-										10			13										
DRB1*08:69	-										10													
DRB1*09:01:02-09:05/09:08/09:10-09:22/09:24-09:30	DR9, -											11												
DRB1*09:07	-											11										21		
DRB1*10:01:01:01-10:11/10:13-10:20	DR10, -												12											
DRB1*11:03:01-11:03:02/11:11:01/11:11:03/11:36/11:41/11:55/11:63:01-11:63:02/11:68/11:76/11:85/11:138-11:139/11:151/11:161/11:168/11:176	DR11(5), -													13		16								
DRB1*11:07:01/11:103:01-11:103:02/11:105/11:107/11:125/11:136/11:173	DR11(5), -					5								13										
DRB1*11:07:02	-					w								13										
DRB1*11:09/11:87	DR11(5), -							7						13	15		17				20			
DRB1*11:16	DR11(5)/DR13(6)													13	15									

Allele	Serology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DRB1*11:17/11:52/11:54:01-11:54:02/11:89/11:150/11:159/11:202, DRB1*14:11	-, DR11(5), DR14(6)													13						19				
DRB1*11:20	DR11(5)							7						13	15									
DRB1*11:22	-								8					?										
DRB1*11:26	DR11(5)													?										
DRB1*11:28:02	-							7						13	15		17				w			
DRB1*11:40	-													?	w	16	w							
DRB1*11:53	-				5									13						19				
DRB1*11:58:01/11:115	-													13	15		17				w			
DRB1*11:59	-					6								13	w	16	w							
DRB1*11:83/11:182	-					6								13	15		17				20			
DRB1*11:113	-													13	15		17				20			
DRB1*11:122	-							7						13	w	16	w							
DRB1*11:135	-					6								13										
DRB1*11:203	-													w										
DRB1*12:01:01:01-12:01:04/12:01:06-12:01:07/12:01:09-12:02:05/12:02:07- 12:03:03/12:05-12:08/12:10-12:15/12:17/12:19/12:21/12:23/12:26-12:30/ 12:32/12:34-12:38/12:40-12:41/12:43-12:45/12:50-12:53/12:55-12:56/12:59- 12:61/12:63-12:64	DR12(5), -, Null														14				w					
DRB1*12:01:05/12:20	-														w				w					
DRB1*12:01:08/12:02:06/12:18/12:33/12:47	-														14									
DRB1*12:04/12:49	-													13	14									
DRB1*12:09/12:24N-12:25/12:48/12:54/12:62	-, Null														14				18					
DRB1*12:58	-														14				w		20			
DRB1*13:01:01:01-13:01:16/13:02:04/13:10/13:15-13:16/13:28/13:35/ 13:40/13:51/13:53/13:59/13:61:01-13:61:02/13:69/13:79-13:80/13:87/ 13:91-13:92/13:98/13:102/13:105/13:110/13:112-13:113N/13:117/13:121/ 13:125/13:127/13:130-13:131/13:137N-13:138/13:141/13:148/13:153/ 13:166/13:173/13:177/13:184-13:187/13:190/13:201/13:205/13:213- 13:215/13:221-13:222/13:226	DR13(6), -, Null															15			18					

Allele	Serology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DRB1*13:02:01-13:02:03/13:02:05-13:02:11/13:02:13/13:31/13:34/13:36/13:39/13:41/13:73-13:74/13:85/13:96:01-13:96:02/13:99/13:104/13:109/13:123-13:124/13:126/13:128/13:140/13:142N-13:143/13:145/13:147/13:155/13:168/13:170/13:171:02/13:198/13:202/13:207-13:212/13:220/13:225	DR13(6), -, Null							7								15			18					
DRB1*13:02:12/13:103/13:165	-							7								15			w					
DRB1*13:03:01-13:04/13:12:01-13:13/13:20-13:21:02/13:24/13:33:01-13:33:03/13:38/13:48-13:49/13:58/13:66:01-13:66:02/13:75/13:78/13:81/13:88-13:90/13:94:01-13:95/13:101/13:108/13:115/13:118/13:122/13:133-13:134/13:149/13:151-13:152/13:154/13:161/13:164/13:167/13:169/13:174/13:194/13:216/13:219/13:227/13:230, DRB1*14:65	DR13(6), -																16		18					
DRB1*13:05:01-13:05:03/13:26:01-13:26:02/13:136/13:158/13:203, DRB1*14:27:01-14:27:02	DR13(6), -, DR14(6)							7								15		17	18		20			
DRB1*13:06/13:146/13:156	DR13(6), -															15			18		20			
DRB1*13:18/13:42	DR13(6)															15		17	18		20			
DRB1*13:29	DR13(6)							7									16		18					
DRB1*13:30/13:55	-																?		?					
DRB1*13:32/13:93	-															15	16		18					
DRB1*13:43/13:188, DRB1*14:169	-																16		18	19				
DRB1*13:50:02-13:50:03/13:189	-							7								15		17	18		w			
DRB1*13:54	DR14(6)																16		w					
DRB1*13:56/13:119, DRB1*14:02:01-14:03:02/14:09/14:30/14:47/14:89/14:115/14:135/14:144/14:174/14:179	-, DR14(6), DR1403							7											18		20			
DRB1*13:63	-							7								w	16	w	18					
DRB1*13:65/13:120/13:139	-							7								15	16		18					
DRB1*13:67	-							7								15								
DRB1*13:71	-						6										16		18					
DRB1*13:77, DRB1*14:177	-																		w		20			
DRB1*13:100/13:162	-																		w					
DRB1*13:111	-															w	16	w	18					
DRB1*13:144	-						6									15		17	18		20			
DRB1*13:157, DRB1*14:67	-							7								15			18		20			
DRB1*13:159/13:171:01/13:179	-							7								15			18	19				
DRB1*13:160/13:218	-															15			w					

Allele	Serology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DRB1*13:163/13:181/13:193, DRB1*14:06:01-14:06:03/14:12:01-14:12:02/ 14:17/14:29/14:52/14:80-14:81/14:83/14:108/14:121/14:165/14:176	-, DR14(6), DR6																		18		20			
DRB1*13:183/13:200N	-, Null															15								
DRB1*13:191/13:217	-															15			18	19				
DRB1*13:196, DRB1*14:24/14:109	-							7											18					
DRB1*13:199	-							7								15		17	w		20			
DRB1*13:223	-															w			18					
DRB1*13:228	-																16							
DRB1*14:13/14:85	DR14(6), -							7									16		18		20			
DRB1*14:18/14:33/14:59/14:64/14:106/14:133/14:154	DR6, -																		18	19	20			
DRB1*14:19	DR14(6)							?											18					
DRB1*14:39/14:54:02/14:61	-																			19				
DRB1*14:46	-							7													20			
DRB1*14:48	-							7											w		20			
DRB1*14:51/14:134	-							7											18	19	20			
DRB1*14:63	-							7								15	16		18		20			
DRB1*14:78	-															15	16		18		20			
DRB1*14:82	-						6												18	19				
DRB1*14:98	-							7											18		w			
DRB1*14:104/14:111	-					w													18	19				
DRB1*14:125	-																		w	w				
DRB1*14:141, DRB3*01:01:02:01-01:07/01:09-01:13/01:15-01:33/01:35- 01:41, DRB3*02:01-02:05/02:07-02:17/02:19/02:21-02:25/02:28-02:46/ 02:48-02:57/02:59-02:61Q, DRB3*03:01:01-03:11	-, DR52, Null																						22	
DRB1*14:148	-										10										19			
DRB1*14:161	-								8										18	19				
DRB1*14:170	-																16		18		20			
DRB1*14:171	-					5													18	19				
DRB1*15:01:01:01-15:01:21/15:01:23-15:20/15:22-15:33/15:35-15:98/ 15:100-15:108/15:110-15:112/15:114/15:116-15:142	DR15(2), -, DR2, Null			3																				
DRB1*15:21, DRB1*16:09:01-16:10/16:33/16:36-16:37	-, DR16(2)			3	4																			
DRB1*15:99/15:109	-			3											13									



Allele	Serology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DRB1*15:113N	Null			w																				
DRB1*16:01:01-16:01:08/16:01:10-16:05:02/16:07/16:11-16:15/16:17-16:26/ 16:28-16:32/16:34-16:35/16:38-16:46	DR16(2), -, DR2, Null				4																			
DRB1*16:01:09	-				w																			
DRB1*16:08	-				4			7								15		17			w			
DRB1*16:16/16:27	-				4									13										
DRB3*01:08, DRB3*02:20	-							7															22	
DRB3*01:14	-					w													w					
DRB3*02:06	-							?															22	
DRB3*02:18	-													13									22	
DRB4*01:01:01-01:01:02/01:03:01-01:01:04/01:06-01:07:02/01:09-01:22/ 01:24-01:26/01:28-01:48, DRB4*02:01N, DRB4*03:01N	DR53, -, Null																							23
DRB4*01:02	-																					?		23
DRB4*01:05/01:08/01:27	DR53, -																							?
DRB4*01:23	-																							w
DRB5*01:01:01-01:12/01:14-01:25/01:27N-01:29, DRB5*02:02-02:16	DR51, -, Null																						21	
DRB5*01:13	-													13									21	
DRB5*01:26	-																						w	

w = weak

? = nucleotide sequence information not available for the primer matching sequence