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<b>Manual No.</b>	<b>03</b>
<b>Revision</b>	<b>July 05, 2024</b>
<b>Product No.</b>	<b>103</b>
<b>Lot No.</b>	<b>C13-4</b>


**CTS** Collaborative Transplant Study

**WORKING INSTRUCTION**

**HLA-C\***  
**CTS-PCR-SSP TRAY KIT**

**LOCUS- AND LOT-SPECIFIC MANUAL**

To be applied to the following product:

<b>Product No.</b>	<b>Description</b>
103	HLA-C* CTS-PCR-SSP TRAY KIT  <b>IVD CE 0197</b>

**1. Main differences**

- Between Lot C13-4 (the current lot) and Lot C13-3**  
 The kit was updated to cover new alleles included in the IMGT/HLA Sequence Database of January 2024. Deleted and renamed alleles were taken into consideration.

**2. Introduction**

- Intended use: This kit reveals a low/intermediate resolution typing of HLA-C using the PCR-SSP method.  
 Allele coverage: IMGT/HLA Sequence Database Release 3.55.0, January 2024, except:  
 Alleles not covered: C\*01:02:10/01:02:27-01:02:28/01:02:59/01:50/01:75/01:101-01:102/01:168-01:169:02/01:193/01:212, C\*02:180, C\*03:45/03:58/03:86/03:94:01-03:94:02/03:607, C\*04:01:23/04:01:30/04:07:02/04:15:01/04:130/04:166:02/ 04:178/04:268/04:370/04:385N/04:429, C\*05:18:02/05:18:04-05:18:06/ 05:103:01-05:103:02, C\*06:210/06:217, C\*07:01:103/07:02:48/07:02:111/07:02:121/07:30/ 07:41/07:95/07:140:02/07:165/07:241/07:265/07:304/ 07:307/ 07:338/07:342:01-07:342:02/07:347N/07:447/07:487/07:512/07:525/07:599/07:671/07:755/07:812/ 07:815/07:940:02/07:967/07:986:01-07:986:02/07:1036/07:1063N/ 07:1077/ 07:1108, C\*08:16:01-08:16:02, C\*12:195:03, C\*14:92, C\*15:02:21/15:02:25/15:05:15/ 15:10:01/15:10:04/15:23:01/15:63/15:107/15:138/15:208/15:242, C\*16:53/16:68/16:98:02/16:110/16:216, C\*18:17  
 These alleles are considered to be rare.
- This manual is only valid for **Lot No. C13-4**.
- 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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#### 4. Kit Composition

- Number of PCR primer mixes per test: 24:
  - 23 HLA-specific mixes
  - 1 negative control mix
- Number of tests per tray: 4
- Number of trays per kit: 10
- The primer mixes are aliquoted and dried in 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 (Appendix / Table 1) to confirm the correct product size.
- Use the Amplification Pattern Table (Appendix / Table 2) to make the allele assignments or use the SCORE Software for detailed result interpretation.

#### 8. Interpretation Hints

- Weak or false positive reactions can occur if you use a different Taq polymerase. Also, the quality and quantity of DNA is a crucial factor and can affect the mix reactivities. Under suboptimal test conditions, some mixes may be prone to give false positive reactions and, if any, are indicated in Section 9.
- Alleles that are known to amplify weakly are listed with "w" (= weak) in the tables (Appendix).
- Please also refer to Section 7 and 8 of the 'Working instruction for the CTS-PCR-SSP TRAY and MINITRAY KITS' (Manual No. 100A) supplied along with this product.

#### 9. Special notes

- **Amplification of HLA-C\*03** (considering the most common HLA-C\*03 alleles):
  - Mix 3 and mix 4 positive: the DNA has one HLA-C\*03 allele that corresponds to HLA-Cw9.
  - Mix 4 and mix 5 positive: the DNA has one HLA-C\*03 allele that corresponds to HLA-Cw10.
  - All three mixes (3, 4 and 5) positive: the DNA is heterozygous for HLA-C\*03 (Cw9 **and** Cw10).
- **Mix 20 amplifies HLA-C\*15** and can result in PCR products of different sizes:
  - The common alleles **HLA-C\*15:02/05/06/09** etc. usually produce only **one** fragment (a **small** amplicon of 205 bp) due to competition of the primers.
  - **HLA-C\*15:11** produces a single **large** PCR fragment (800 bp).
- **Exclusion/detection of C\*04:09N:**
  - If **only** mix 6 is positive, the DNA may be C\*04 positive (e. g. C\*04:01), but negative for C\*04:09N.
  - In contrast, if mix 6 **and** 7 are both positive, the DNA is positive for HLA-C\*04:09N.
  - **Attention:** The fragment size of mix 7 is relatively **small** (140 bp)!
- PCR-SSP mix no. 1, 5, 12, 15 and 19 will also detect some HLA-A\* specificities (most of them are considered to be rare). Please take this into consideration when interpreting your results.
- PCR-SSP mix no. 2, 5, 6, 11, 12, 15, 16, 20 and 22 will also detect some HLA-B\* specificities (most of them are considered to be rare). Please take this into consideration when interpreting your results.

- The following mixes could give false positive reactions: **Mix 6, 12, 16.**

#### **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 us at:

Phone: +49 6221 564013

Fax: +49 6221 564200

E-mail: [dna.labor@med.uni-heidelberg.de](mailto:dna.labor@med.uni-heidelberg.de)

### 13. Appendix

**Table 1:** Allele specificities and sizes of the PCR products of each **HLA-C\*** CTS-PCR-SSP primer mix (**Lot No. C13-4**) based on IMGT/HLA Sequence Database Release 3.55.0, January 2024

Position				Mix	Allele	Serology	Size
H1	H4	H7	H10	Mix 1	C*01:02:01:01-01:02:09/01:02:11-01:02:18/01:02:19w/01:02:20/01:02:21w/01:02:22-01:02:26/01:02:29-01:02:58/ 01:02:60-01:03:01/01:03:02w/01:03:03-01:36:01/01:36:02w/01:37N-01:49:02/01:51-01:54/01:55w/01:56N-01:66/ 01:67w/01:68-01:74/01:76-01:100/01:103-01:113/01:114:01w/01:114:02-01:121Q/01:122w/01:123-01:130/01:132- 01:155/01:156w/01:157-01:167/01:170-01:176/01:178-01:192/01:194-01:202/01:203?/01:204-01:211N/01:213-01:226/ 01:227?/01:228N-01:240/01:242-01:255/01:256?/01:257N-01:266N, 04:71w/04:436Nw, 05:200, 14:58w, A*01:91w, A*03:99w, A*32:86w	Cw1, -, Null	570 bp
G1	G4	G7	G10	Mix 2	C*01:10, 02:02:01-02:02:03/02:02:06-02:02:55/02:02:56w/02:02:57-02:02:61/02:02:62?/02:02:63-02:40:02/02:42/ 02:44-02:57/02:59-02:77/02:79-02:81/02:83-02:135N/02:136w/02:137-02:164/02:167-02:179/02:181-02:196/02:198- 02:227N, 03:34/03:142/03:261/03:272/03:384/03:386, 04:32/04:77/04:265/04:447, 05:105/05:206, 06:08, 07:15/ 07:850, 08:31/08:185/08:246/08:268, 12:119/12:198, 14:25, 16:29/16:50, 17:01:01:02-17:06/17:08-17:16:02/17:18- 17:22/17:24-17:32/17:34-17:71/17:72?/17:73-17:74, 18:03, B*07:13, B*46:06/46:25/46:30	-, Cw2, Null	570 bp
F1	F4	F7	F10	Mix 3	C*03:03:01:01-03:03:64/03:03:65?/03:03:66-03:03:67/03:11:01-03:11:02/03:13:01:01-03:13:02/03:18:01-03:18:03/ 03:20N-03:22Q/03:30-03:31/03:39/03:43:01-03:43:02/03:49-03:50/03:52-03:53/03:55-03:56/03:59/03:61-03:62/03:66- 03:69/03:75-03:76/03:79/03:81/03:83/03:85/03:88/03:96:02?/03:97/03:102-03:103/03:112/03:116:01-03:116:02/ 03:119:01-03:120/03:122/03:124/03:126-03:127/03:132:01/03:133/03:141-03:142/03:144/03:150/03:152/03:158/ 03:160-03:161/03:165:01/03:167-03:168/03:171/03:175-03:177/03:182/03:185/03:187-03:189N/03:192/03:195- 03:196/03:202-03:207/03:214/03:217/03:220/03:223/03:227-03:231/03:237/03:241-03:243/03:253-03:254/03:262/ 03:267-03:268/03:271-03:276/03:284-03:285/03:288-03:291/03:295/03:304/03:307-03:308/03:312/03:316N/03:319- 03:321/03:324-03:325/03:327/03:336/03:339w/03:341/03:345-03:346/03:351-03:352/03:356-03:357/03:360/03:363N- 03:364/03:367/03:370/03:372:01-03:372:02/03:374-03:375/03:377N-03:378/03:380N/03:383/03:389/03:395/03:398/ 03:413-03:414/03:416/03:418/03:421N-03:422/03:427-03:428/03:430/03:432N-03:433/03:436/03:438/03:440/ 03:444N/03:447N/03:450/03:457/03:460-03:461/03:471-03:472/03:474/03:476-03:477/03:479/03:481/03:490/03:495/ 03:503/03:506-03:507/03:509N/03:514-03:517/03:519-03:520/03:524/03:527-03:529/03:533/03:534w/03:537/03:541- 03:542/03:545/03:550-03:551/03:556/03:559-03:560N/03:563/03:567-03:568/03:573-03:574/03:578-03:579/03:582- 03:583/03:585-03:587/03:592/03:594-03:595/03:597-03:598/03:601/03:606/03:608-03:609/03:611?/03:616-03:617/ 03:622/03:624/03:628N/03:632/03:634-03:636N/03:639-03:640/03:645/03:651	Cw9(w3), -, Null, Cw3	535 bp

Position				Mix	Allele	Serology	Size
E1	E4	E7	E10	Mix 4	C*01:02:68/01:02:71/01:97/01:131, 03:02:01-03:02:20/03:02:22-03:02:27/03:02:29?/03:02:30-03:03:31/03:03:33-03:03:42/03:03:43w/03:03:44-03:04:22/03:04:23w/03:04:24-03:04:26/03:04:28/03:04:30w/03:04:31-03:04:58/03:04:60-03:04:87/03:04:88?/03:04:89?/03:04:90-03:06:02/03:08-03:11:02/03:13:01:01-03:13:02/03:16-03:24/03:26:01-03:40:01/03:40:03-03:42:01/03:43:01/03:44/03:46-03:57:02/03:59-03:85/03:87:02-03:93/03:95-03:98/03:100-03:101/03:103-03:118/03:119:02-03:129/03:131-03:139/03:141-03:162/03:164-03:178/03:180-03:183/03:184:01w/03:184:02-03:189N/03:190w/03:191-03:219/03:221-03:242/03:244Q-03:262/03:263:03w/03:264-03:266/03:269-03:272/03:273w/03:275-03:276/03:277Nw/03:278-03:296:02/03:298-03:310/03:311w/03:312-03:315/03:317-03:330/03:332-03:360/03:362-03:376/03:378-03:446N/03:448Q-03:460/03:462N-03:513/03:515-03:551/03:552?/03:553-03:578/03:579?/03:580-03:584/03:585?/03:586Q-03:606/03:608/03:610-03:652/03:654, 04:11/04:29/04:36/04:55/04:172/04:214/04:449/04:473, 07:02:32/07:17:03/07:141:03/07:242/07:857/07:953, 08:01:07/08:02:07/08:33:02, 12:02:19/12:03:20/12:85:02/12:233/12:397, 14:02:01:01-14:02:01:32/14:02:03-14:02:36/14:02:38?/14:02:39-14:02:41/14:03:01:01-14:03:05/14:05-14:11/14:13-14:16/14:18-14:48/14:50-14:63/14:65-14:71/14:72w/14:73-14:76/14:78-14:81/14:83-14:91/14:93N-14:107/14:109-14:139/14:141N-14:159, 16:01:06, B*14:02:30?	-, Cw10(w3), Cw9(w3), Null, Cw3	450 bp
D1	D4	D7	D10	Mix 5	C*01:65/01:131, 03:02:01-03:02:15/03:02:16w/03:02:17-03:02:32/03:04:01:01-03:04:37/03:04:39-03:04:59/03:04:60w/03:04:61-03:04:101/03:05:01:01-03:10/03:14/03:17:01-03:17:02/03:19/03:23N-03:29/03:33-03:38:02/03:40:01-03:40:04/03:42:01-03:42:02/03:44/03:46-03:48/03:51/03:54/03:57:01-03:57:02/03:63-03:65/03:70-03:74/03:77-03:78/03:80:01-03:80:02/03:82/03:84/03:87:01-03:87:02/03:89-03:93/03:95/03:98/03:100-03:101/03:104-03:111/03:114-03:115:02/03:117-03:118/03:121N/03:123/03:125:01-03:125:02/03:128-03:131/03:134-03:135/03:137-03:140:01:02/03:143/03:145-03:149/03:153-03:157/03:159/03:162-03:164/03:166/03:169Q-03:170/03:172-03:174/03:178-03:181/03:183-03:184:02/03:186:01-03:186:02/03:190-03:191/03:193/03:197-03:201N/03:208N-03:213/03:215-03:216/03:218-03:219/03:221-03:222/03:224N-03:226/03:232-03:236/03:238-03:240/03:244Q-03:250/03:252/03:255-03:259/03:261/03:263:01-03:266/03:269-03:270/03:277N-03:282/03:283w/03:287:01-03:287:02/03:292/03:294/03:296:01-03:296:02/03:298-03:303/03:305-03:306/03:309-03:311/03:313/03:315/03:317-03:318N/03:323N/03:326/03:328-03:335/03:337-03:338/03:340/03:342-03:344:01:02/03:347-03:350/03:353-03:355/03:358-03:359/03:361-03:362/03:365-03:366N/03:368-03:369/03:371/03:373/03:376/03:379/03:381-03:382/03:385-03:388/03:390-03:394/03:396:01N/03:396:02N?/03:397/03:399-03:412/03:415/03:417/03:419-03:420/03:423-03:426/03:429/03:431/03:434/03:437/03:439/03:441-03:443/03:445N-03:446N/03:448Q-03:449N/03:452-03:456/03:458-03:459/03:462N-03:470N/03:473/03:475/03:478/03:480:01-03:480:02/03:482-03:489/03:491:01-03:494/03:496-03:502Q/03:504-03:505/03:508N/03:510N-03:511N/03:513/03:518/03:521-03:523/03:525-03:526/03:530-03:532/03:538-03:539/03:543-03:544/03:546-03:549/03:552-03:555/03:557-03:558/03:561-03:562/03:564-03:566/03:569-03:572/03:575Q-03:577/03:580-03:581/03:584/03:588-03:589/03:593/03:596/03:599-03:600/03:602-03:605/03:610/03:612-03:615/03:618N-03:621/03:623/03:625N-03:626/03:627?/03:629-03:631/03:633/03:637:01-03:638/03:641-03:644/03:646-03:650/03:652-03:654, 05:201, 15:171/15:218, A*03:146, A*24:449, A*68:118, B*15:96/15:331, B*27:118, B*35:537, B*44:274, B*51:238, B*56:37	-, Cw10(w3), Cw3, Null, B62(15)	535 bp

Position				Mix	Allele	Serology	Size
C1	C4	C7	C10	Mix 6	C*02:02:11/02:61:02/02:197/02:209, 04:01:01:01-04:01:01:29/04:01:01:31-04:01:22/04:01:24-04:01:29/04:01:31-04:01:157/04:03:01:01-04:03:08/04:03:10-04:07:01/04:08-04:14/04:15:02-04:20/04:23-04:36/04:38-04:79/04:81-04:99/04:101-04:117/04:118w/04:119-04:129/04:131-04:166:01/04:166:03-04:177/04:179-04:186/04:187w/04:188-04:267/04:269-04:359/04:361-04:366/04:368-04:369N/04:371N-04:384/04:386/04:388-04:403/04:404w/04:405-04:421/04:423-04:428Q/04:430-04:460/04:461?/04:462-04:476/04:478-04:495/04:497-04:509N/04:511-04:514, 05:01:20/05:64:01, 08:02:06/08:19:01/08:62:01/08:144:01, 12:02:09/12:03:65/12:10:01/12:31:01/12:96/12:233/12:328/12:397, 15:02:37/15:78:02/15:194/15:246, 16:49:02/16:104, B*07:02:77, B*08:01:36, B*13:02:40, B*15:01:50/15:436, B*18:03:02, B*37:01:06, B*55:01:25, B*67:02:01:01-67:02:01:02	Cw2, -, Cw4, Null, B37	475 bp
B1	B4	B7	B10	Mix 7	C*04:09N	Null	140 bp
A1	A4	A7	A10	Mix 8	C*02:02:65/02:22, 04:223:01/04:387, 05:01:01:01-05:01:01:85/05:01:03-05:01:17/05:01:19/05:01:21-05:01:30/05:01:33-05:01:68/05:01:70-05:01:76/05:03-05:04:01/05:05:01-05:18:01/05:18:03/05:19/05:21-05:31/05:33-05:102/05:104-05:106:01/05:108/05:110-05:127/05:130-05:146/05:149-05:169N/05:170w/05:171:01:01-05:206/05:208N-05:214/05:216:01:01-05:216:01:02/05:217w/05:218-05:244N/05:246-05:258/05:259N?/05:260N-05:293, 06:02:52, 08:10, 16:02:05	-, Cw5, Null	430 bp
H2	H5	H8	H11	Mix 9	C*02:51, 04:223:01-04:223:02/04:387, 05:01:01:01-05:01:11/05:01:13-05:01:58/05:01:60/05:01:61?/05:01:62-05:01:76/05:03-05:11/05:13-05:17/05:19-05:29:01/05:30-05:44:02/05:46:01:01-05:96/05:98-05:102/05:104-05:105/05:108-05:114/05:116-05:133/05:135-05:139/05:141-05:142/05:144-05:150/05:152-05:227/05:229-05:244N/05:246-05:270N/05:271N?/05:273-05:283/05:284?/05:285-05:293, 08:02:01:01-08:02:10/08:02:12-08:02:39/08:04:01:01-08:05/08:07/08:12:01:01-08:13/08:15:01-08:15:02/08:17-08:19:02/08:23/08:25/08:28-08:32/08:34/08:37/08:43/08:45/08:47-08:49/08:51-08:53/08:55N/08:57/08:62:01-08:63/08:67-08:71/08:73-08:77/08:90/08:92-08:94/08:100/08:103:01:01-08:104/08:108/08:110-08:116/08:120/08:123/08:125-08:126/08:132/08:134/08:139-08:140/08:142/08:146/08:149-08:152/08:156/08:158-08:159/08:161N/08:166-08:172/08:179-08:185/08:188/08:191/08:195/08:198/08:200-08:202/08:206-08:207:02/08:211/08:213-08:216/08:218/08:222/08:223?/08:224N-08:227/08:229-08:231/08:233/08:237-08:240/08:242-08:243/08:245-08:248/08:256-08:258/08:262-08:264/08:266-08:271/08:274-08:275, 12:144/12:185, 16:27	-, Cw5, Null, Cw8	575 bp
G2	G5	G8	G11	Mix 10	C*01:23/01:58, 04:37/04:230/04:360/04:477/04:496/04:510, 06:02:01:01-06:02:01:97/06:02:03-06:02:45/06:02:47-06:02:83/06:02:84w/06:02:85-06:29/06:31-06:34:02/06:36-06:46N/06:48/06:50-06:57/06:59-06:71/06:73-06:85/06:87-06:100/06:102:01-06:116N/06:118-06:125/06:128N-06:130/06:132:01-06:135/06:137-06:138/06:139w/06:140-06:141/06:145w/06:146-06:170/06:171:01:01Nw-06:171:01:02Nw/06:172-06:197/06:199-06:203/06:205-06:209:02/06:211:01:01N-06:216/06:218-06:263N/06:265-06:303/06:305-06:325/06:326Q?/06:327-06:333/06:334?/06:335-06:343/06:344?/06:345-06:357N/06:359N-06:372, 07:31:01-07:31:02/07:364/07:514:01-07:514:02, 12:28/12:135/12:325, 16:26/16:46/16:55/16:64	-, Cw6, Null	310 bp

Position				Mix	Allele	Serology	Size
F2	F5	F8	F11	Mix 11	C*06:31/06:118, 07:01:01:01-07:01:02:15/07:01:04-07:01:13/07:01:15-07:01:62/07:01:63w/07:01:64-07:01:102/ 07:01:104-07:02:24/07:02:25w-07:02:26w/07:02:27-07:02:47/07:02:49-07:02:55/07:02:57-07:02:110/07:02:112- 07:02:120/07:02:122-07:02:145/07:02:146?/07:02:147-07:21/07:22w/07:23-07:25/07:27:01-07:29:02/07:31:01-07:32N/ 07:35-07:40/07:42-07:61N/07:62w/07:63/07:65-07:91/07:93:01-07:94/07:97-07:130/07:131:01w/07:132w/07:133:01- 07:136/07:137:01w/07:137:02/07:138w-07:139w/07:141:01-07:164N/07:166-07:240/07:243-07:245/07:247-07:264N/ 07:266/07:267w/07:268-07:292/07:293w/07:294/07:297-07:303/07:305-07:306/07:308-07:313/07:315/07:318-07:321/ 07:322w/07:323-07:324/07:326-07:337/07:339-07:341:02/07:343:01:01-07:346/07:348-07:350N/07:352-07:367/ 07:368:02w/07:369-07:401/07:403-07:446/07:448/07:450:01-07:486/07:488-07:511/07:513Q-07:516/07:518/07:519w/ 07:520-07:524/07:526:01-07:577/07:580-07:582Q/07:584-07:598/07:600:01N-07:600:02N/07:601w/07:602-07:670/ 07:672N-07:698/07:699w/07:700-07:713Q/07:715:01-07:722/07:725-07:754N/07:757-07:811/07:813-07:814/07:816- 07:820N/07:822-07:844/07:846:01-07:849N/07:851-07:869/07:871-07:890/07:892-07:893/07:895-07:910/07:911?/ 07:912-07:915/07:916?/07:917-07:922/07:923?/07:924-07:935/07:937-07:938/07:939?/07:941-07:952/07:954N- 07:966/07:968-07:969/07:971-07:985:02/07:987-07:988/07:990-07:1025/07:1026?/07:1027-07:1035/07:1037N- 07:1062N/07:1064-07:1076/07:1078-07:1107, 16:21/16:80, B*08:143	-, Cw7, Null	720 bp
E2	E5	E8	E11	Mix 12	C*01:160, 06:31w/06:118, 07:01:01:01-07:01:02:15/07:01:04-07:01:44/07:01:45w/07:01:46-07:01:56/07:01:58- 07:01:90/07:01:91w/07:01:92-07:01:102/07:01:104-07:02:39/07:02:41-07:02:47/07:02:49-07:02:110/07:02:112- 07:02:120/07:02:123-07:02:145/07:02:146?/07:02:147-07:03/07:05-07:10/07:13:01:01-07:18:09/07:18:11-07:19/07:21/ 07:22w/07:23-07:29:02/07:31:01-07:33N/07:35-07:40/07:42-07:44/07:46-07:62/07:65-07:67/07:69-07:72/07:74-07:91/ 07:93:01-07:94/07:97-07:100/07:102-07:135/07:136w/07:137:02/07:138w/07:141:01-07:141:03/07:143-07:150Q/ 07:152N-07:164N/07:166-07:171/07:173-07:180/07:182-07:198N/07:200-07:240/07:243-07:263/07:264Nw/07:266- 07:271/07:273-07:294/07:296-07:301/07:303/07:305-07:306/07:308-07:322/07:325-07:327/07:330:01-07:330:02/ 07:331w/07:332-07:335/07:337/07:339-07:341:02/07:343:01:01-07:346/07:348-07:353/07:356/07:359-07:360/07:362- 07:363/07:366-07:375/07:377/07:379-07:384/07:386-07:389/07:391-07:393N/07:396-07:402:02/07:404-07:405:02/ 07:407-07:419/07:421-07:425/07:427/07:429-07:446/07:448-07:458/07:460-07:465/07:468-07:479/07:481-07:486/ 07:488-07:500/07:502-07:511/07:513Q-07:522/07:524/07:526:01-07:528/07:529w/07:530:01-07:533/07:536-07:561/ 07:564-07:568/07:570-07:577/07:579-07:582Q/07:584/07:587-07:598/07:601-07:621/07:623-07:624/07:627-07:650:02/ 07:652-07:654/07:657-07:663Q/07:665-07:670/07:673/07:675N-07:677/07:678w/07:679-07:692/07:694-07:697Q/ 07:699-07:722/07:724-07:741/07:743N-07:750N/07:752N-07:754N/07:756-07:779:01:02/07:781-07:796N/07:798- 07:811/07:813-07:814/07:816-07:827/07:829-07:830/07:832-07:837/07:840N-07:843/07:844w/07:845-07:846:02/ 07:847w/07:848-07:849N/07:851/07:853-07:857/07:859-07:867/07:869-07:875/07:877-07:880/07:882-07:890/07:893- 07:894/07:898-07:900/07:902-07:910/07:911?/07:912-07:916/07:918-07:925/07:927-07:928/07:930-07:938/07:939?/ 07:942?/07:943-07:947/07:949-07:950/07:952/07:954N-07:966/07:968-07:969/07:970N?/07:971-07:973/07:975- 07:985:02/07:987-07:1009/07:1011/07:1013-07:1031/07:1032?/07:1034-07:1035/07:1037N-07:1062N/07:1064- 07:1069/07:1071/07:1073/07:1075-07:1076/07:1078-07:1079Q/07:1080?/07:1081?/07:1082-07:1084/07:1086-07:1089/ 07:1091-07:1103/07:1105-07:1107, 08:14/08:80, 16:80, A*01:199, A*11:133, B*07:51/07:220/07:226/07:332, B*08:143, B*15:200, B*39:60/39:82/39:136	-, Cw7, Null	675 bp
D2	D5	D8	D11	Mix 13	C*01:43, 02:87, 03:280/03:530, 07:101/07:148/07:161/07:583, 08:01:01:01-08:01:07/08:01:09-08:02:17/08:02:18w/ 08:02:19-08:09/08:11-08:12:01:02/08:14-08:15:02/08:17/08:18w/08:19:01-08:24/08:26N-08:54/08:56-08:63/08:65- 08:93/08:95-08:145/08:146w/08:147-08:232/08:233?/08:234-08:272/08:273?/08:274-08:275, 12:127/12:203, 16:139	-, Cw8, Null	165 bp



Position				Mix	Allele	Serology	Size
C2	C5	C8	C11	Mix 14	C*01:04w/01:21, 07:01:20/07:01:27/07:02:38/07:04:08/07:17:04, 08:160w, 12:02:01-12:02:05/12:02:07/12:02:09-12:02:11/12:02:13/12:02:15-12:02:18/12:02:20-12:02:29/12:02:31-12:02:33/12:02:35-12:02:39/12:02:41-12:02:49/12:02:51-12:02:52/12:03:19/12:03:32/12:08/12:10:01-12:10:02/12:14:02/12:16:01-12:16:02/12:18:01/12:22/12:27/12:30/12:36/12:40/12:44/12:49w/12:56/12:64/12:67-12:69/12:72-12:74/12:80N/12:83-12:85:01/12:86/12:96/12:103-12:106/12:112/12:114/12:117/12:123-12:124/12:126-12:128/12:130/12:132/12:134/12:136-12:137/12:142/12:145/12:148N/12:151/12:155Q/12:161-12:162/12:166/12:168-12:169/12:177/12:179/12:183/12:193/12:196/12:198/12:200/12:204/12:207-12:208/12:212/12:214/12:217/12:219N/12:221-12:222/12:226/12:228/12:231/12:234/12:236N/12:239-12:241/12:243/12:247/12:250/12:252/12:255/12:261/12:263/12:268/12:270N/12:275/12:279-12:281/12:285/12:287/12:294/12:296/12:298/12:303-12:304/12:307-12:308/12:315/12:327N/12:329N/12:335-12:336/12:338/12:344/12:351Q/12:359/12:363/12:371/12:381/12:383?/12:387-12:388/12:391-12:392/12:396, 14:02:21w/14:03:05w	-, Null	465 bp
B2	B5	B8	B11	Mix 15	C*01:04/01:21, 02:02:70, 03:03:40, 05:01:60/05:106:02, 08:01:19/08:02:02/08:160, 12:02:01-12:02:13/12:02:15-12:02:18/12:02:20-12:02:23/12:02:25-12:02:29/12:02:31-12:02:33/12:02:35-12:02:39/12:02:41-12:02:49/12:02:51-12:03:01:64/12:03:03-12:03:07/12:03:09-12:03:15/12:03:18-12:03:19/12:03:21-12:03:26/12:03:28-12:03:29/12:03:31-12:03:32/12:03:33w/12:03:35-12:03:72/12:03:73?/12:03:74-12:03:83/12:04:02:01-12:04:02:02/12:05:01-12:08/12:10:01-12:13:01:02/12:14:02-12:18:01/12:20-12:24:01/12:25/12:27/12:29-12:32/12:34-12:58/12:60-12:72/12:74-12:75/12:77-12:85:01/12:86-12:131/12:133-12:134/12:136-12:143/12:145/12:147-12:180/12:182-12:184/12:186-12:195:02/12:196-12:223/12:225-12:232N/12:234-12:286/12:288-12:298/12:300-12:304/12:306-12:324N/12:326-12:378/12:379?/12:380-12:396, 14:02:08/14:02:21/14:03:05, 15:02:14/15:02:39, 16:01:17/16:02:13/16:15:02, A*03:01:64, A*30:01:14, A*33:03:65, B*27:05:27, B*35:205:02, B*40:02:21, B*57:01:24	-, Cw8, Null	425 bp
A2	A5	A8	A11	Mix 16	C*02:12/02:49w/02:55:01w-02:55:02w/02:115, 03:15w/03:27/03:38:01-03:38:02/03:69/03:130w/03:136/03:163w/03:246/03:274w/03:297w/03:431/03:461w, 04:03:01:01w-04:03:01:05w/04:03:03w-04:03:11w/04:06:01w-04:06:03w/04:16w/04:80w/04:103:01w-04:103:02w/04:107w/04:147w/04:160:01w-04:160:02w/04:171w/04:190w/04:256w/04:286w/04:294w/04:299w/04:335w/04:337w/04:351:01w-04:351:02w/04:357w/04:363w/04:381w/04:383w/04:393w/04:400w/04:402w/04:473/04:489w/04:506w, 05:42w/05:46:01:01w-05:46:01:02w, 06:03:01w-06:03:02w/06:76:01w-06:76:02w/06:132:01w-06:132:02w, 07:26:01:01-07:26:03/07:92/07:96:01-07:96:02/07:314:01-07:314:03/07:317/07:351/07:578/07:583/07:723/07:756/07:821N/07:845/07:870/07:891/07:894, 08:05/08:21/08:25/08:137, 12:02:01-12:03:12/12:03:13w/12:03:14-12:03:83/12:04:01w-12:04:03w/12:06/12:07w/12:08/12:10:01-12:11/12:12w/12:13:01:01-12:15/12:18:01-12:20/12:22-12:32/12:34-12:40/12:41w/12:42Q-12:48/12:50-12:53/12:54w/12:56-12:59/12:60w/12:61-12:97/12:99:01-12:114/12:116-12:125/12:126w/12:127-12:141/12:142w/12:143-12:145/12:146w/12:148N-12:163/12:164?/12:165-12:187/12:189-12:194/12:196-12:214/12:216/12:218-12:268/12:270N-12:298/12:300/12:302-12:324N/12:325w/12:326-12:352/12:353w/12:354-12:357/12:358?/12:359-12:361/12:362w-12:363w/12:364-12:372/12:373?/12:374-12:382/12:383?/12:384-12:397, 15:03w/15:16:01w-15:16:02w/15:25, 16:15:02/16:25w/16:64/16:189w/16:201, 17:01:01:02w-17:03:01:09w/17:03:03w-17:19w/17:21w/17:22/17:23w-17:26w/17:28w-17:39w/17:41w-17:57w/17:58?/17:59w-17:61w/17:62/17:63w-17:74w, 18:09w, A*25:55w, B*07:13/07:15/07:160w/07:463w, B*35:570w, B*67:02:01:01-67:02:01:02	-, Null, B7	230 bp

Position				Mix	Allele	Serology	Size
H3	H6	H9	H12	Mix 17	C*01:14/01:154w, 02:05:01-02:05:03, 04:37/04:230/04:360/04:477/04:496/04:510, 05:16/05:85/05:107/05:241, 06:02:01:01-06:02:01:97/06:02:03-06:02:11/06:02:13-06:02:64/06:02:65w/06:02:66-06:02:67/06:02:69-06:02:90/06:02:92-06:10/06:12-06:34:02/06:36-06:46N/06:48/06:50-06:51/06:53:01-06:57/06:59-06:60/06:62-06:68/06:70:01-06:71/06:73-06:81/06:83-06:100/06:102:01-06:116N/06:118-06:121/06:122w/06:123/06:124w/06:125-06:126/06:128N-06:130/06:132:01-06:135/06:137-06:138/06:139w/06:140-06:141/06:145w/06:146/06:148-06:159/06:161-06:182/06:183w/06:185-06:209:02/06:211:01:01N-06:216/06:218-06:247/06:249-06:251/06:253-06:263N/06:265-06:279/06:280w/06:281N-06:303/06:305-06:325/06:326Q?/06:327-06:333/06:334?/06:335-06:357N/06:359N-06:372, 12:04:01-12:05:02/12:09/12:33/12:135w/12:154w/12:353, 15:37/15:55/15:58/15:102/15:125/15:133, 16:02:01:01-16:02:14/16:02:16-16:02:17/16:02:18w/16:02:19-16:02:20/16:09/16:12/16:19/16:25/16:37w/16:46-16:48/16:60/16:63/16:69-16:70/16:74/16:77N/16:84/16:88-16:91/16:99/16:101-16:103/16:107-16:108/16:120-16:121/16:123N/16:133/16:136/16:140/16:143-16:145/16:153/16:155-16:156/16:163/16:166-16:167/16:176/16:179/16:181/16:194-16:195N/16:202/16:212/16:215, 17:21	-, Cw6, Null	340 bp
G3	G6	G9	G12	Mix 18	C*02:02:01-02:02:03/02:02:06-02:02:11/02:02:13-02:02:20/02:02:22-02:02:34/02:02:35w/02:02:36-02:02:71/02:04-02:11/02:12w/02:13-02:15/02:17/02:19-02:26:03/02:28-02:31/02:33-02:40/02:42-02:64/02:66-02:71/02:72w/02:73-02:86/02:88-02:114/02:116-02:125/02:126w/02:127-02:128/02:130/02:132-02:134/02:136/02:138-02:148/02:149w/02:150N-02:179/02:181-02:196/02:198-02:227N, 04:94:01-04:94:02/04:360/04:477/04:496, 05:08/05:52/05:89/05:106:01-05:106:02, 06:02:01:01-06:02:01:97/06:02:03-06:02:11/06:02:13-06:02:64/06:02:65w/06:02:66-06:02:67/06:02:69-06:02:90/06:02:92-06:03:02/06:07-06:10/06:12-06:39/06:40w/06:41-06:51/06:53:01-06:60/06:62-06:68/06:70:01-06:78/06:80-06:81/06:83-06:117/06:119-06:121/06:122w/06:123/06:124w/06:125-06:146/06:148-06:152N/06:154-06:159/06:161-06:182/06:183w/06:185-06:196/06:198-06:203/06:205-06:209:02/06:211:01:01N-06:216/06:218-06:247/06:249-06:251/06:253-06:270/06:272-06:279/06:280w/06:281N-06:316N/06:317?/06:318-06:372, 12:04:01-12:05:02/12:21/12:33/12:41/12:60/12:72w/12:135w/12:146/12:154w/12:353, 15:74/15:214, 16:91, 18:03	Cw2, -, Null, Cw6	515 bp
F3	F6	F9	F12	Mix 19	C*01:177/01:241?, 03:231/03:557, 04:23/04:54:01-04:54:02/04:100/04:108/04:360/04:367/04:422/04:477/04:496/04:510, 07:64/07:402:01-07:402:02, 12:55/12:269, 14:02:01:01-14:32/14:34w/14:35N-14:40/14:41w/14:42-14:77/14:80-14:91/14:93N-14:95/14:96w/14:97N-14:109/14:111-14:135/14:136?/14:137-14:146/14:148N-14:159, 15:36, 16:150, A*23:52/23:128, A*24:73/24:174/24:325/24:504/24:613	-, Null	600 bp

Position				Mix	Allele	Serology	Size
E3	E6	E9	E12	Mix 20	C*03:08/03:29/03:31/03:246/03:542w/03:555, 07:96:01-07:96:02/07:263/07:756, 15:02:01:01-15:02:20/15:02:22-15:02:24/15:02:26-15:05:07/15:05:09w/15:05:10-15:05:14/15:05:16-15:09:02/15:10:02-15:10:03/15:11-15:13:03/15:15-15:19/15:21-15:22/15:23:02-15:24/15:26/15:27?/15:28-15:35/15:37-15:42/15:43?/15:44:01-15:62/15:64-15:103/15:104w/15:105Q-15:106/15:108-15:137/15:139-15:207/15:209-15:241/15:243Q-15:269N, 16:70, B*56:01:09w, B*82:01:01:01w-82:04w	-, Null, B82	see below
					C*03:08/03:29/03:31/03:246/03:542w/03:555, 07:96:01-07:96:02/07:263/07:756, 15:02:01:01-15:02:20/15:02:22-15:02:24/15:02:26-15:05:07/15:05:09w/15:05:10-15:05:14/15:05:16-15:09:02/15:10:02-15:10:03/15:12-15:13:03/15:15/15:18-15:19/15:21-15:22/15:23:02-15:24/15:26/15:28-15:35/15:37-15:42/15:44:01-15:62/15:64-15:103/15:104w/15:105Q-15:106/15:108-15:137/15:139-15:207/15:209-15:241/15:243Q-15:269N, 16:70, B*56:01:09w, B*82:01:01:01w-82:04w	-, Null, B82	205 bp
					C*15:02:01:01-15:02:20/15:02:22-15:02:24/15:02:26-15:02:32/15:02:33:02-15:05:07/15:05:09w/15:05:10-15:05:14/15:05:16-15:09:02/15:10:02-15:10:03/15:11-15:13:03/15:15-15:19/15:21-15:22/15:23:02-15:24/15:26/15:27?/15:28-15:35/15:37-15:42/15:43?/15:44:01-15:62/15:64-15:101/15:103/15:104w/15:105Q-15:106/15:108-15:129/15:131-15:137/15:139-15:207/15:209-15:213N/15:215-15:241/15:243Q-15:269N	-, Null	800 bp
D3	D6	D9	D12	Mix 21	C*16:01:01:01-16:02:01:06/16:02:02?-16:02:13?/16:02:14-16:02:16/16:02:17?/16:02:18-16:02:20/16:04:01:01-16:04:01:03/16:04:03/16:04:04?-16:04:05?/16:06-16:08/16:09?-16:17?/16:18/16:19?-16:23?/16:24-16:26/16:27?-16:34?/16:36?-16:37?/16:38-16:39:01/16:39:02?/16:41?/16:42/16:43?-16:45?/16:46/16:47?/16:49:01?/16:49:02-16:52/16:54?-16:58?/16:59/16:60?-16:67?/16:69?-16:72?/16:73-16:74/16:75?-16:76?/16:77N/16:78?-16:83?/16:84-16:85/16:86?-16:87?/16:89N?-16:95?/16:96/16:97?-16:98:01?/16:99?-16:100?/16:101-16:102/16:103?-16:105?/16:106/16:107?-16:109?/16:111-16:112/16:113?/16:114/16:115?-16:117?/16:118/16:119?/16:120-16:123N/16:124?/16:125-16:172/16:173?/16:174Q-16:175/16:176?/16:177-16:198/16:200-16:215	-, Null	470 bp
C3	C6	C9	C12	Mix 22	C*04:447/04:480, 05:206, 08:185, 17:01:01:02-17:01:13/17:01:14w/17:01:15-17:06/17:09-17:32/17:34-17:55/17:57-17:69/17:72-17:74, B*37:70	-, Null	210 bp
B3	B6	B9	B12	Mix 23	C*03:39/03:67/03:344:01:01-03:344:01:02, 04:42:01-04:42:02/04:220, 06:02:08/06:34:02, 07:02:32/07:17:03/07:141:03/07:242/07:857/07:953, 14:147, 18:01:01:01-18:08/18:10-18:15/18:16?/18:18-18:19	Cw3, -, Null	655 bp
A3	A6	A9	A12	Mix 24	Negative Control		none (90 bp)

**Amplification control (internal positive control):** 90 base pairs (bp)

**w** = weak

**?** = nucleotide sequence information not available for the primer matching sequence or alleles with unknown reactivities

**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)

Remarks to mix 20: **Mix 20** amplifies **HLA-C\*15** and can result in PCR products of different sizes: The common alleles **HLA-C\*15:02/05/06/09** etc. usually produce only **one** PCR fragment (a **small** amplicon of 205 bp) due to competition of the primers; **HLA-C\*15:11** produces a single **large** PCR fragment (800 bp).

**Table 2:** Amplification patterns for all HLA-C\* alleles detected by the **HLA-C\*** CTS-PCR-SSP reagents (**Lot No. C13-4**) based on IMGT/HLA Sequence Database Release 3.55.0, January 2024

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	
C*01:02:01:01-01:02:09/01:02:11-01:02:18/01:02:20/01:02:22-01:02:26/01:02:29-01:02:58/ 01:02:60-01:02:67/01:02:69-01:02:70/01:02:72-01:03:01/01:03:03/01:05-01:09:02/01:11-01:13/ 01:15:01-01:20/01:22/01:24-01:36:01/01:37N-01:42/01:44-01:49:02/01:51-01:54/01:56N-01:57/ 01:59-01:64/01:66/01:68-01:74/01:76-01:96/01:98N-01:100/01:103-01:113/01:114:02-01:121Q/ 01:123-01:130/01:132-01:153/01:155/01:157-01:159/01:161-01:167/01:170-01:176/01:178- 01:192/01:194-01:202/01:204-01:211N/01:213-01:226/01:228N-01:240/01:242-01:255/01:257N- 01:266N	Cw1, -, Null	1																							
C*01:02:19/01:02:21/01:03:02/01:36:02/01:55/01:67/01:114:01/01:122/01:156, A*01:91, A*03:99, A*32:86	-	w																							
C*01:02:68/01:02:71/01:97	-	1			4																				
C*01:04	-	1													w	15									
C*01:10	-	1	2																						
C*01:14	-	1																17							
C*01:21	-	1													14	15									
C*01:23/01:58	-	1									10														
C*01:43	-	1												13											
C*01:65	-	1				5																			

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
C*01:131, 03:02:01-03:02:15/03:02:17-03:02:20/03:02:22-03:02:27/03:02:30-03:02:32/ 03:04:01-01-03:04:22/03:04:24-03:04:26/03:04:28/03:04:31-03:04:37/03:04:39-03:04:58/ 03:04:61-03:04:87/03:04:90-03:04:101/03:05:01-01-03:06:02/03:09-03:10/03:17:01-03:17:02/ 03:19/03:23N-03:24/03:26:01-03:26:02/03:28/03:33/03:35:01-03:37:02/03:40:01/03:40:03- 03:40:04/03:42:01/03:44/03:46-03:48/03:51/03:54/03:57:01-03:57:02/03:63-03:65/03:70-03:74/ 03:77-03:78/03:80:01-03:80:02/03:82/03:84/03:87:02/03:89-03:93/03:95/03:98/03:100-03:101/ 03:104-03:111/03:114-03:115:02/03:117-03:118/03:121N/03:123/03:125:01-03:125:02/03:128- 03:129/03:131/03:134-03:135/03:137-03:139/03:143/03:145-03:149/03:153-03:157/03:159/ 03:162/03:164/03:166/03:169Q-03:170/03:172-03:174/03:178/03:180-03:181/03:183/ 03:184:02/03:186:01-03:186:02/03:191/03:193/03:197-03:201N/03:208N-03:213/03:215- 03:216/03:218-03:219/03:221-03:222/03:224N-03:226/03:232-03:236/03:238-03:240/03:244Q- 03:245/03:247-03:250/03:252/03:255-03:259/03:264-03:266/03:269-03:270/03:278-03:279/ 03:281-03:282/03:287:01-03:287:02/03:292/03:294/03:296:01-03:296:02/03:298-03:303/ 03:305-03:306/03:309-03:310/03:313/03:315/03:317-03:318N/03:323N/03:326/03:328-03:330/ 03:332-03:335/03:337-03:338/03:340/03:342-03:343/03:347-03:350/03:353-03:355/03:358- 03:359/03:362/03:365-03:366N/03:368-03:369/03:371/03:373/03:376/03:379/03:381-03:382/ 03:385/03:387-03:388/03:390-03:394/03:396:01N/03:397/03:399-03:412/03:415/03:417/ 03:419-03:420/03:423-03:426/03:429/03:434/03:437/03:439/03:441-03:443/03:445N-03:446N/ 03:448Q-03:449N/03:452-03:456/03:458-03:459/03:462N-03:470N/03:473/03:475/03:478/ 03:480:01-03:480:02/03:482-03:489/03:491:01-03:494/03:496-03:502Q/03:504-03:505/ 03:508N/03:510N-03:511N/03:513/03:518/03:521-03:523/03:525-03:526/03:531N-03:532/ 03:538-03:539/03:543-03:544/03:546-03:549/03:553-03:554/03:558/03:561-03:562/03:564- 03:566/03:569-03:572/03:575Q-03:577/03:580-03:581/03:584/03:588-03:589/03:593/03:596/ 03:599-03:600/03:602-03:605/03:610/03:612-03:615/03:618N-03:621/03:623/03:625N-03:626/ 03:629-03:631/03:633/03:637:01-03:638/03:641-03:644/03:646-03:650/03:652/03:654	-, Cw10(w3), Cw3, Null				4	5																		
C*01:154	-	1																w						
C*01:160	-	1											12											
C*01:177, 04:100/04:367/04:422, 07:64, 14:02:02/14:02:37/14:02:42/14:04/14:12/14:17/14:49/ 14:64/14:77/14:82/14:108/14:140, 15:36, A*23:52/23:128, A*24:73/24:174/24:325/24:504/ 24:613	-																			19				
C*01:203/01:227/01:256	-	?																						
C*01:241	-																			?				
C*02:02:01-02:02:03/02:02:06-02:02:10/02:02:13-02:02:20/02:02:22-02:02:34/02:02:36- 02:02:55/02:02:57-02:02:61/02:02:63-02:02:64/02:02:66-02:02:69/02:02:71/02:04/02:06:01- 02:11/02:13-02:15/02:17/02:19-02:21/02:23-02:26/03:02:28-02:31/02:33-02:40/02:42/02:44- 02:48/02:50/02:52N-02:54/02:56-02:57/02:59-02:61:01/02:62-02:64/02:66-02:71/02:73-02:77/ 02:79-02:81/02:83-02:86/02:88-02:114/02:116-02:125/02:127-02:128/02:130/02:132-02:134/ 02:138-02:148/02:150N-02:164/02:167-02:179/02:181-02:196/02:198-02:208/02:210-02:227N	Cw2, -, Null		2																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
C*02:02:11/02:61:02/02:209	Cw2, -		2				6												18					
C*02:02:12/02:02:21/02:03/02:16:02:01-02:16:02:02/02:18/02:27:01-02:27:02/02:32/02:65/02:129/02:131/02:135N/02:137, 07:850, B*46:06/46:25/46:30	-, Null		2																					
C*02:02:35/02:72/02:126/02:149	-		2																w					
C*02:02:56/02:136	-		w																18					
C*02:02:62	-		?																18					
C*02:02:65/02:22	-		2						8										18					
C*02:02:70	-		2													15			18					
C*02:05:01-02:05:03	-		2															17	18					
C*02:12	-		2														16		w					
C*02:43:01-02:43:02/02:58/02:78/02:82/02:165N-02:166, 06:35/06:47/06:49N/06:58/06:72/06:101/06:117/06:127:01-01-06:127:02/06:131/06:136/06:142-06:144/06:264/06:304/06:358	-, Null																		18					
C*02:49/02:55:01-02:55:02	-		2														w		18					
C*02:51	-		2						9										18					
C*02:87	-		2											13										
C*02:115, B*07:13	-		2														16							
C*02:197, 04:01:01:01-04:01:01:29/04:01:01:31-04:01:22/04:01:24-04:01:29/04:01:31-04:01:157/04:03:02/04:04:01:01-04:05/04:07:01/04:08/04:10/04:12-04:14/04:15:02-04:15:03/04:17-04:20/04:24-04:28/04:30-04:31/04:33-04:35:02/04:38-04:41/04:43-04:53/04:56-04:70/04:72-04:76/04:78-04:79/04:81-04:93N/04:95N-04:99/04:101-04:102/04:104-04:106/04:109-04:117/04:119-04:129/04:131-04:146/04:148-04:159/04:161-04:166:01/04:166:03-04:170N/04:173N-04:177/04:179-04:186/04:188-04:189/04:191N-04:213/04:215N-04:219/04:221-04:222/04:224-04:229:02/04:231-04:255N/04:257-04:264/04:266-04:267/04:269-04:285/04:287-04:293/04:295-04:298/04:300N-04:334/04:336/04:338Q-04:350N/04:352-04:356/04:358-04:359/04:361-04:362N/04:364N-04:366/04:368-04:369N/04:371N-04:380/04:382Q/04:384/04:386/04:388-04:392/04:394-04:399/04:401/04:403/04:405-04:421/04:423-04:428Q/04:430-04:435/04:437-04:446/04:448/04:450-04:460/04:462-04:472/04:474-04:476/04:478-04:479/04:481-04:488/04:490-04:495/04:497-04:505/04:507-04:509N/04:511-04:514, B*07:02:77, B*08:01:36, B*13:02:40, B*15:01:50/15:436, B*18:03:02, B*37:01:06, B*55:01:25	-, Cw4, Null, B37						6																	
C*03:02:16/03:04:60/03:283	-				4	w																		
C*03:02:21/03:02:28/03:04:27/03:04:29/03:04:59/03:07:01:01-03:07:03/03:14/03:25/03:40:02/03:42:02/03:87:01/03:140:01:01-03:140:01:02/03:179/03:263:01-03:263:02/03:331/03:361/03:653N, A*03:146, A*24:449, A*68:118, B*15:96/15:331, B*27:118, B*35:537, B*44:274, B*51:238, B*56:37	-, Cw3, Null, B62(15)					5																		
C*03:02:29/03:04:88-03:04:89/03:552	-				?	5																		

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
C*03:03:01:01-03:03:31/03:03:33-03:03:39/03:03:41-03:03:42/03:03:44-03:03:64/03:03:66-03:03:67/03:11:01-03:11:02/03:13:01-03:13:02/03:18:01-03:18:03/03:20N-03:22Q/03:30/03:43:01/03:49-03:50/03:52-03:53/03:55-03:56/03:59/03:61-03:62/03:66/03:68/03:75-03:76/03:79/03:81/03:83/03:85/03:88/03:97/03:103/03:112/03:116:01-03:116:02/03:119:02-03:120/03:122/03:124/03:126-03:127/03:132:01/03:133/03:141/03:144/03:150/03:152/03:158/03:160-03:161/03:165:01/03:167-03:168/03:171/03:175-03:177/03:182/03:185/03:187-03:189N/03:192/03:195-03:196/03:202-03:207/03:214/03:217/03:223/03:227-03:230/03:237/03:241-03:242/03:253-03:254/03:262/03:271/03:275-03:276/03:284-03:285/03:288-03:291/03:295/03:304/03:307-03:308/03:312/03:319-03:321/03:324-03:325/03:327/03:336/03:341/03:345-03:346/03:351-03:352/03:356-03:357/03:360/03:363N-03:364/03:367/03:370/03:372:01-03:372:02/03:374-03:375/03:378/03:380N/03:383/03:389/03:395/03:398/03:413-03:414/03:416/03:418/03:421N-03:422/03:427-03:428/03:430/03:432N-03:433/03:436/03:438/03:440/03:444N/03:450/03:457/03:460/03:471-03:472/03:474/03:476-03:477/03:479/03:481/03:490/03:495/03:503/03:506-03:507/03:509N/03:515-03:517/03:519-03:520/03:524/03:527-03:529/03:533/03:537/03:541/03:545/03:550-03:551/03:556/03:559-03:560N/03:563/03:567-03:568/03:573-03:574/03:578/03:582-03:583/03:586Q-03:587/03:592/03:594-03:595/03:597-03:598/03:601/03:606/03:608/03:616-03:617/03:622/03:624/03:628N/03:632/03:634-03:636N/03:639-03:640/03:645/03:651	Cw9(w3), -, Null, Cw3			3	4																			
C*03:03:32/03:43:02/03:102/03:119:01/03:220/03:243/03:267-03:268/03:316N/03:377N/03:447N/03:514/03:609	-, Null			3																				
C*03:03:40	-			3	4											15								
C*03:03:43/03:273	-			3	w																			
C*03:03:65/03:96:02/03:611	-			?	4																			
C*03:04:23/03:04:30/03:184:01/03:190/03:263:03/03:277N/03:311	-, Null				w	5																		
C*03:04:38/03:04:102/03:16/03:32:01:01-03:32:01:02/03:41:01-03:41:02/03:60/03:96:01/03:113:01-03:113:02/03:132:02/03:151/03:165:02/03:194/03:251/03:260/03:286/03:293/03:314/03:322/03:435/03:451/03:512/03:535:01:01-03:536/03:540/03:590-03:591, 14:33/14:78-14:79/14:110	-				4																			
C*03:08/03:29/03:555	-				4	5															20			
C*03:15/03:297, 04:03:09/04:80, 17:07/17:33, 18:09, A*25:55, B*07:160/07:463, B*35:570	-															w								
C*03:27/03:38:01-03:38:02/03:431	-				4	5										16								
C*03:31	-			3	4																20			
C*03:34/03:261/03:386	-		2		4	5																		
C*03:39/03:67	Cw3, -			3	4																			23
C*03:69	-			3	4											16								

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
C*03:130/03:163	-					5											w							
C*03:136, 12:02:19/12:03:20/12:85:02	-				4												16							
C*03:142/03:272	-		2	3	4																			
C*03:231	-			3	4															19				
C*03:246	-				4	5											16				20			
C*03:274/03:461	-			3													w							
C*03:280/03:530	-				4	5								13										
C*03:339/03:534	-			w	4																			
C*03:344:01:01-03:344:01:02	-				4	5																		23
C*03:384	-		2		4																			
C*03:396:02N/03:627	Null, -				4	?																		
C*03:542	-			3	4																w			
C*03:557	-				4	5														19				
C*03:579/03:585	-			3	?																			
C*04:03:01:01-04:03:01:05/04:03:03-04:03:08/04:03:10-04:03:11/04:06:01-04:06:03/04:16/04:103:01-04:103:02/04:107/04:147/04:160:01-04:160:02/04:171/04:190/04:256/04:286/04:294/04:299/04:335/04:337/04:351:01-04:351:02/04:357/04:363/04:381/04:383/04:393/04:400/04:402/04:489/04:506	-						6										w							
C*04:09N	Null						6	7																
C*04:11/04:29/04:36/04:55/04:172/04:214/04:449	-				4		6																	
C*04:23/04:54:01-04:54:02/04:108	-						6													19				
C*04:32/04:77/04:265	-		2				6																	
C*04:37, 06:04:01-06:06:01:02/06:79N/06:153:01-06:153:02/06:197/06:271	-, Cw6, Null										10							17						
C*04:42:01-04:42:02/04:220	-						6																	23
C*04:71/04:436N	-, Null	w					6																	
C*04:94:01-04:94:02	-						6													18				
C*04:118/04:187/04:404	-					w																		
C*04:223:01, 05:64:01	-						6		8	9														
C*04:223:02, 05:01:20	-						6			9														
C*04:230	-						6				10							17						
C*04:360/04:477/04:496	-										10							17	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
C*04:387, 05:01:01:01-05:01:01:85/05:01:03-05:01:11/05:01:13-05:01:17/05:01:19/05:01:21-05:01:30/05:01:33-05:01:58/05:01:62-05:01:68/05:01:70-05:01:76/05:03-05:04:01/05:05:01-05:07N/05:09:01-05:11/05:13-05:15/05:17/05:19/05:21-05:29:01/05:30-05:31/05:33-05:41/05:43-05:44:02/05:47-05:51Q/05:53-05:63/05:64:02-05:84/05:86-05:88/05:90-05:96/05:98-05:102/05:104/05:108/05:110-05:114/05:116-05:127/05:130-05:133/05:135-05:139/05:141-05:142/05:144-05:146/05:149-05:150/05:152-05:169N/05:171:01:01-05:199/05:202Q-05:205/05:208N-05:214/05:216:01:01-05:216:01:02/05:218-05:227/05:229-05:240/05:242-05:244N/05:246-05:258/05:260N-05:270N/05:273-05:283/05:285-05:293	-, Cw5, Null								8	9														
C*04:447	-		2				6																	22
C*04:461	-						?																	
C*04:473, 12:233/12:397	-				4		6									16								
C*04:480	-						6																22	
C*04:510	-										10						17	19						
C*05:01:02/05:01:18/05:01:31-05:01:32/05:01:69/05:04:02/05:20/05:32/05:109/05:128N-05:129/05:147-05:148/05:207/05:215, 08:13/08:55N/08:94	Cw5, -, Null									9														
C*05:01:12/05:01:59/05:12/05:18:01/05:18:03/05:29:02/05:45/05:97/05:115/05:134/05:140/05:143/05:151/05:228/05:272, 08:10	-								8															
C*05:01:60	-								8	9						15								
C*05:01:61/05:271N/05:284	-, Null								8	?														
C*05:08/05:52/05:89	-								8	9									18					
C*05:16/05:85/05:241	-								8	9								17						
C*05:42/05:46:01:01-05:46:01:02	-								8	9						w								
C*05:105	-		2						8	9														
C*05:106:01	-								8											18				
C*05:106:02, 12:21	-															15			18					
C*05:107, 06:204, 12:09, 16:48/16:88	-																	17						
C*05:170/05:217	-								w	9														
C*05:200	-		1						8	9														
C*05:201	-					5			8	9														
C*05:206	-		2						8	9													22	
C*05:259N	Null								?	9														

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
C*06:02:01:01-06:02:01:97/06:02:03-06:02:07/06:02:09-06:02:11/06:02:13-06:02:45/06:02:47-06:02:51/06:02:53-06:02:64/06:02:66-06:02:67/06:02:69-06:02:83/06:02:85-06:02:90/06:02:92-06:02:112/06:07/06:09:01-06:10/06:12-06:29/06:32-06:34:01/06:36-06:39/06:41-06:46N/06:48/06:50-06:51/06:53:01-06:57/06:59-06:60/06:62-06:68/06:70:01-06:71/06:73-06:75/06:77-06:78/06:80-06:81/06:83-06:85/06:87-06:100/06:102:01-06:116N/06:119-06:121/06:123/06:125/06:128N-06:130/06:133-06:135/06:137-06:138/06:140-06:141/06:146/06:148-06:152N/06:154-06:159/06:161-06:170/06:172-06:182/06:185-06:196/06:199-06:203/06:205-06:209:02/06:211:01:01N-06:216/06:218-06:247/06:249-06:251/06:253-06:263N/06:265-06:270/06:272-06:279/06:281N-06:303/06:305-06:316N/06:318-06:325/06:327-06:333/06:335-06:343/06:345-06:357N/06:359N-06:372	Cw6, -, Null										10							17	18					
C*06:02:08/06:34:02	-										10							17	18					23
C*06:02:12/06:02:68/06:02:91/06:11/06:52/06:61/06:69/06:82/06:147/06:160/06:184/06:248/06:252	-										10													
C*06:02:46/06:30/06:86/06:126/06:198, 12:33	-																	17	18					
C*06:02:52	-								8		10							17	18					
C*06:02:65/06:122/06:124/06:183/06:280	-										10							w	w					
C*06:02:84/06:171:01:01N-06:171:01:02N	-, Null										w							17	18					
C*06:03:01-06:03:02/06:76:01-06:76:02/06:132:01-06:132:02	-										10						w	17	18					
C*06:08	-		2								10							17	18					
C*06:31	-										10	11	w					17	18					
C*06:40	-										10							17	w					
C*06:118	-										10	11	12					17						
C*06:139/06:145	-										w							w	18					
C*06:317	-										10							17	?					
C*06:326Q/06:334	-										?							?	18					
C*06:344	-										?							17	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	
C*07:01:01:01-07:01:02:15/07:01:04-07:01:13/07:01:15-07:01:19/07:01:21-07:01:26/07:01:28-07:01:44/07:01:46-07:01:56/07:01:58-07:01:62/07:01:64-07:01:90/07:01:92-07:01:102/07:01:104-07:02:24/07:02:27-07:02:31/07:02:33-07:02:37/07:02:39/07:02:41-07:02:47/07:02:49-07:02:55/07:02:57-07:02:110/07:02:112-07:02:120/07:02:123-07:02:145/07:02:147-07:03/07:05-07:10/07:13:01:01-07:14/07:16-07:17:02/07:18:01:01-07:18:09/07:18:11-07:19/07:21/07:23-07:25/07:27:01-07:29:02/07:32N/07:35-07:40/07:42-07:44/07:46-07:61N/07:65-07:67/07:69-07:72/07:74-07:91/07:93:01-07:94/07:97-07:100/07:102-07:130/07:133:01-07:135/07:137:02/07:141:01-07:141:02/07:143-07:147/07:149-07:150Q/07:152N-07:160/07:162-07:164N/07:166-07:171/07:173-07:180/07:182-07:198N/07:200-07:240/07:243-07:245/07:247-07:262/07:266/07:268-07:271/07:273-07:292/07:294/07:297-07:301/07:303/07:305-07:306/07:308-07:313/07:315/07:318-07:321/07:326-07:327/07:330:01-07:330:02/07:332-07:335/07:337/07:339-07:341:02/07:343:01:01-07:346/07:348-07:350N/07:352-07:353/07:356/07:359-07:360/07:362-07:363/07:366-07:367/07:369-07:375/07:377/07:379-07:384/07:386-07:389/07:391-07:393N/07:396-07:401/07:404-07:405:02/07:407-07:419/07:421-07:425/07:427/07:429-07:446/07:448/07:450:01-07:458/07:460-07:465/07:468-07:479/07:481-07:486/07:488-07:500/07:502-07:511/07:513Q/07:515-07:516/07:518/07:520-07:522/07:524/07:526:01-07:528/07:530:01-07:533/07:536-07:561/07:564-07:568/07:570-07:577/07:580-07:582Q/07:584/07:587-07:598/07:602-07:621/07:623-07:624/07:627-07:650:02/07:652-07:654/07:657-07:663Q/07:665-07:670/07:673/07:675N-07:677/07:679-07:692/07:694-07:697Q/07:700-07:713Q/07:715:01-07:722/07:725-07:741/07:743N-07:750N/07:752N-07:754N/07:757-07:779:01:02/07:781-07:796N/07:798-07:811/07:813-07:814/07:816-07:820N/07:822-07:827/07:829-07:830/07:832-07:837/07:840N-07:843/07:846:01-07:846:02/07:848-07:849N/07:851/07:853-07:856N/07:859-07:867/07:869/07:871-07:875/07:877-07:880/07:882-07:890/07:893/07:898-07:900/07:902-07:910/07:912-07:915/07:918-07:922/07:924-07:925/07:927-07:928/07:930-07:935/07:937-07:938/07:943-07:947/07:949-07:950/07:952/07:954N-07:966/07:968-07:969/07:971-07:973/07:975-07:985:02/07:987-07:988/07:990-07:1009/07:1011/07:1013-07:1025/07:1027-07:1031/07:1034-07:1035/07:1037N-07:1062N/07:1064-07:1069/07:1071/07:1073/07:1075-07:1076/07:1078-07:1079Q/07:1082-07:1084/07:1086-07:1089/07:1091-07:1103/07:1105-07:1107, B*08:143	Cw7, -, Null											11	12												
C*07:01:14/07:02:56/07:33N/07:131:02/07:246:01-07:246:02/07:296/07:316/07:325/07:368:01/07:449/07:517/07:579/07:714/07:724/07:936N/07:989, A*01:199, A*11:133, B*07:51/07:220/07:226/07:332, B*15:200, B*39:60/39:82/39:136	-, Null												12												
C*07:01:20/07:01:27/07:02:38/07:17:04	-											11	12	14											
C*07:01:45/07:01:91/07:136/07:264N/07:331/07:529/07:678/07:844/07:847	-, Null											11	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
C*07:01:57/07:02:40/07:02:122/07:04:01:01-07:04:07/07:04:09-07:04:30/07:11-07:12/07:18:10/07:20:01-07:20:02/07:45/07:63/07:68/07:73:01-07:73:02/07:142/07:151/07:172:01-07:172:02/07:181/07:199:01-07:199:02/07:272/07:302/07:323-07:324/07:328-07:329N/07:336/07:354-07:355/07:357-07:358/07:361/07:365/07:376/07:378/07:385/07:390/07:394-07:395/07:403/07:406/07:420/07:426/07:428/07:459/07:466-07:467/07:480/07:501/07:523/07:534-07:535/07:562-07:563/07:569/07:585-07:586/07:600:01N-07:600:02N/07:622/07:625-07:626/07:651/07:655-07:656/07:664/07:672N/07:674/07:693/07:698/07:742/07:751N/07:780/07:797N/07:828/07:831/07:838-07:839N/07:852/07:858/07:868/07:876/07:881N/07:892/07:895-07:897/07:901/07:917/07:926/07:929/07:941/07:948/07:951/07:974Q/07:1010/07:1012/07:1033/07:1070/07:1072/07:1074N/07:1085/07:1090/07:1104	-, Cw7, Null											11												
C*07:01:63/07:02:25-07:02:26/07:62/07:131:01/07:132/07:267/07:293/07:322/07:368:02/07:519/07:601/07:699	-											w	12											
C*07:02:32/07:17:03/07:141:03/07:857	-				4							11	12											23
C*07:02:146/07:911/07:939	-											?	?											
C*07:04:08	-											11			14									
C*07:15	-		2									11	12											
C*07:22/07:138	-											w	w											
C*07:26:01:01-07:26:03/07:314:01-07:314:03/07:317/07:351/07:821N/07:845/07:870/07:894	-, Null												12				16							
C*07:31:01-07:31:02/07:514:01-07:514:02	-										10	11	12											
C*07:92/07:578/07:723/07:891, 12:02:14/12:02:30/12:02:34/12:02:40/12:02:50/12:03:02/12:03:08/12:03:16-12:03:17/12:03:27/12:03:30/12:03:34:01-12:03:34:02/12:14:01/12:18:02-12:19/12:24:02/12:26/12:59/12:76/12:181/12:224/12:305, 15:25, B*07:15	-, B7																16							
C*07:96:01-07:96:02	-																16				20			
C*07:101	-											11		13										
C*07:137:01/07:139	-											w												
C*07:148/07:161	-											11	12	13										
C*07:242/07:953, 14:147	-				4																			23
C*07:263	-											11	12									20		
C*07:364	-										10	11												
C*07:402:01-07:402:02	-												12							19				
C*07:583, 08:21/08:137	-													13			16							
C*07:756	-												12				16				20			
C*07:916/07:923/07:1026	-											?	12											
C*07:942/07:1032/07:1080-07:1081	-											11	?											

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
C*07:970N	Null												?											
C*08:01:01:01-08:01:06/08:01:09-08:01:18/08:01:20-08:01:37/08:02:11:01-08:02:11:02/ 08:03:01:01-08:03:05/08:06/08:08:01-08:09/08:11/08:20/08:22:01:01-08:22:02/08:24/08:26N- 08:27/08:33:01/08:33:03-08:33:06/08:35-08:36N/08:38-08:42/08:44/08:46/08:50/08:54/08:56/ 08:58-08:61/08:65-08:66/08:72:01-08:72:02/08:78-08:79/08:81-08:89N/08:91/08:95-08:99/ 08:101-08:102/08:105-08:107/08:109/08:117-08:119/08:121N-08:122/08:124/08:127N-08:131/ 08:133/08:135-08:136/08:138/08:141Q/08:143/08:144:02-08:145/08:147-08:148/08:153- 08:155/08:157/08:162-08:165/08:173N-08:178/08:186-08:187/08:189-08:190/08:192-08:194/ 08:196-08:197/08:199/08:203-08:205/08:208N-08:210/08:212/08:217/08:219-08:221/08:228/ 08:232/08:234-08:236N/08:241/08:244/08:249-08:255/08:259-08:261/08:265/08:272	Cw8, -, Null													13										
C*08:01:07/08:33:02	-				4									13										
C*08:01:19	-													13	15									
C*08:02:01:01-08:02:01:42/08:02:03-08:02:05/08:02:08-08:02:10/08:02:12-08:02:17/08:02:19- 08:02:39/08:04:01:01-08:04:03/08:07/08:12:01:01-08:12:01:02/08:15:01-08:15:02/08:17/ 08:19:02/08:23/08:28-08:30/08:32/08:34/08:37/08:43/08:45/08:47-08:49/08:51-08:53/08:57/ 08:62:02-08:63/08:67-08:71/08:73-08:77/08:90/08:92-08:93/08:100/08:103:01:01-08:104/ 08:108/08:110-08:116/08:120/08:123/08:125-08:126/08:132/08:134/08:139-08:140/08:142/ 08:149-08:152/08:156/08:158-08:159/08:161N/08:166-08:172/08:179-08:184/08:188/08:191/ 08:195/08:198/08:200-08:202/08:206-08:207:02/08:211/08:213-08:216/08:218/08:222/ 08:224N-08:227/08:229-08:231/08:237-08:240/08:242-08:243/08:245/08:247-08:248/08:256- 08:258/08:262-08:264/08:266-08:267/08:269-08:271/08:274-08:275	Cw8, -, Null									9				13										
C*08:02:02	Cw8									9				13	15									
C*08:02:06/08:19:01/08:62:01	-						6			9				13										
C*08:02:07	-				4					9				13										
C*08:02:18/08:18/08:146	-									9				w										
C*08:05	-									9				13		16								
C*08:14/08:80	-												12	13										
C*08:25, 12:144/12:185	-									9						16								
C*08:31/08:246/08:268	-			2						9				13										
C*08:144:01	-						6							13										
C*08:160	-													13	w	15								
C*08:185	-			2						9				13									22	
C*08:223	-									?				13										
C*08:233	-									9				?										

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
C*08:273	-													?										
C*12:02:01-12:02:05/12:02:07/12:02:10-12:02:11/12:02:13/12:02:15-12:02:18/12:02:20-12:02:23/12:02:25-12:02:29/12:02:31-12:02:33/12:02:35-12:02:39/12:02:41-12:02:49/12:02:51-12:02:52/12:03:19/12:03:32/12:08/12:10:02/12:14:02/12:18:01/12:22/12:27/12:30/12:36/12:40/12:44/12:56/12:64/12:67-12:69/12:74/12:80N/12:83-12:85:01/12:86/12:103-12:106/12:112/12:114/12:117/12:123-12:124/12:128/12:130/12:134/12:136-12:137/12:145/12:148N/12:151/12:155Q/12:161-12:162/12:166/12:168-12:169/12:177/12:179/12:183/12:193/12:196/12:200/12:204/12:207-12:208/12:212/12:214/12:219N/12:221-12:222/12:226/12:228/12:231/12:234/12:236N/12:239-12:241/12:243/12:247/12:250/12:252/12:255/12:261/12:263/12:268/12:270N/12:275/12:279-12:281/12:285/12:294/12:296/12:298/12:303-12:304/12:307-12:308/12:315/12:327N/12:329N/12:335-12:336/12:338/12:344/12:351Q/12:359/12:371/12:381/12:387-12:388/12:391-12:392/12:396	-, Null														14	15	16							
C*12:02:06/12:02:08/12:02:12/12:03:01:01-12:03:01:64/12:03:03-12:03:07/12:03:09-12:03:12/12:03:14-12:03:15/12:03:18/12:03:21-12:03:26/12:03:28-12:03:29/12:03:31/12:03:35-12:03:64/12:03:66-12:03:72/12:03:74-12:03:83/12:06/12:10:03-12:11/12:13:01:01-12:13:01:02/12:15/12:20/12:23-12:24:01/12:25/12:29/12:31:02-12:32/12:34-12:35/12:37-12:39N/12:42Q-12:43/12:45-12:48/12:50-12:53/12:57:01-12:58/12:61-12:63/12:65-12:66/12:70-12:71/12:75/12:77-12:79/12:81-12:82/12:87-12:95/12:97/12:99:01-12:102/12:107-12:111/12:113/12:116/12:118/12:120-12:122/12:125/12:129/12:131/12:133/12:138-12:141/12:143/12:149-12:150/12:152-12:153/12:156-12:160/12:163/12:165/12:167/12:170-12:176/12:178/12:180/12:182/12:184/12:186-12:187/12:189-12:192/12:194/12:197/12:199/12:201-12:202/12:205-12:206/12:209-12:211/12:213/12:216/12:218/12:220/12:223/12:225/12:227/12:229-12:230/12:232N/12:235/12:237-12:238/12:242/12:244-12:246/12:248-12:249/12:251/12:253-12:254/12:256-12:260:02/12:262/12:264-12:267/12:271-12:274:01N/12:276-12:278/12:282-12:284/12:286/12:288-12:293/12:295N/12:297/12:300/12:302/12:306/12:309-12:314/12:316-12:324N/12:326/12:330Q-12:334/12:337/12:339-12:343N/12:345N-12:350/12:352/12:354-12:357/12:360-12:361/12:364-12:370/12:372/12:374-12:378/12:380/12:382/12:384-12:386/12:389-12:390/12:393Q-12:395	-, Null															15	16							
C*12:02:09/12:10:01/12:96	-						6								14	15	16							
C*12:02:24/12:73/12:132/12:287	-														14		16							
C*12:03:13/12:07/12:12/12:54/12:362	-															15	w							
C*12:03:33	-															w	16							
C*12:03:65/12:31:01/12:328	-						6									15	16							
C*12:03:73/12:379	-															?	16							
C*12:04:01/12:04:03	-																w	17	18					
C*12:04:02:01-12:04:02:02/12:353	-															15	w	17	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
C*12:05:01-12:05:02	-															15		17	18					
C*12:16:01-12:16:02/12:217	-														14	15								
C*12:17/12:98/12:115/12:147/12:188/12:195:01-12:195:02/12:215/12:301, A*03:01:64, A*30:01:14, A*33:03:65, B*27:05:27, B*35:205:02, B*40:02:21, B*57:01:24	-															15								
C*12:28	-										10						16							
C*12:41/12:60	-															15	w		18					
C*12:49	-														w	15								
C*12:55/12:269	-															15				19				
C*12:72	-														14	15	16		w					
C*12:119	-			2												15	16							
C*12:126/12:142/12:363	-														14	15	w							
C*12:127	-													13	14	15	16							
C*12:135	-										10						16	w	w					
C*12:146	-																w		18					
C*12:154	-															15	16	w	w					
C*12:164/12:358/12:373	-															15	?							
C*12:198	-			2												14	15	16						
C*12:203	-														13	15	16							
C*12:325	-										10						w							
C*12:383	-														?	15	?							
C*14:02:01:01-14:02:01:32/14:02:03-14:02:07/14:02:09-14:02:20/14:02:22-14:02:36/14:02:39-14:02:41/14:03:01:01-14:03:04/14:05-14:11/14:13-14:16/14:18-14:24:02/14:26-14:32/14:35N-14:40/14:42-14:48/14:50-14:57/14:59-14:63/14:65-14:71/14:73-14:76/14:80-14:81/14:83-14:91/14:93N-14:95/14:97N-14:107/14:109/14:111-14:135/14:137-14:139/14:141N-14:146/14:148N-14:159	-, Null				4															19				
C*14:02:08	-				4											15				19				
C*14:02:21/14:03:05	-				4										w	15				19				
C*14:02:38	-				?															19				
C*14:25	-			2	4															19				
C*14:34/14:41/14:96	-				4															w				
C*14:58	-		w		4															19				
C*14:72	-				w															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
C*14:136	-				4															?				
C*15:02:01:01-15:02:13/15:02:15-15:02:20/15:02:22-15:02:24/15:02:26-15:02:36/15:02:38/ 15:02:40-15:02:64/15:04:01:01-15:05:07/15:05:10-15:05:14/15:05:16-15:09:02/15:10:02- 15:10:03/15:11-15:13:03/15:15/15:17-15:19/15:21-15:22/15:23:02-15:24/15:26/15:28-15:35/ 15:38-15:42/15:44:01-15:54/15:56-15:57/15:59-15:62/15:64-15:73/15:75-15:78:01/15:79- 15:101/15:103/15:105Q-15:106/15:108-15:124/15:126-15:132/15:134-15:137/15:139-15:170/ 15:172-15:193/15:195-15:207/15:209-15:213N/15:215-15:217/15:219-15:241/15:243Q-15:245/ 15:247N-15:269N	-, Null																				20			
C*15:02:14/15:02:39	-															15					20			
C*15:02:37/15:78:02/15:194/15:246	-						6														20			
C*15:03/15:16:01-15:16:02	-																w				20			
C*15:05:09/15:104, B*56:01:09, B*82:01:01:01-82:04	-, B82																				w			
C*15:27/15:43	-																				?			
C*15:37/15:55/15:58/15:102/15:125/15:133	-																	17			20			
C*15:74/15:214	-																		18		20			
C*15:171/15:218	-					5															20			
C*16:01:01:01-16:01:05/16:01:07-16:01:16/16:01:18-16:01:47/16:02:15/16:04:01:01- 16:04:01:03/16:04:03/16:06-16:08/16:18/16:24/16:38-16:39:01/16:42/16:51-16:52/16:59/ 16:73/16:85/16:96/16:106/16:111-16:112/16:114/16:118/16:122/16:125-16:132N/16:134- 16:135/16:137-16:138/16:141-16:142/16:146-16:149/16:151-16:152/16:154/16:157-16:162/ 16:164-16:165/16:168-16:172/16:174Q-16:175/16:177-16:178/16:180/16:182-16:188/16:190- 16:193/16:196-16:198/16:200/16:203-16:211/16:213-16:214	-, Null																					21		
C*16:01:06	-				4																	21		
C*16:01:17	-															15						21		
C*16:02:01:01-16:02:01:06/16:02:14/16:02:16/16:02:19-16:02:20/16:74/16:77N/16:84/16:101- 16:102/16:120-16:121/16:123N/16:133/16:136/16:140/16:143-16:145/16:153/16:155-16:156/ 16:163/16:166-16:167/16:179/16:181/16:194-16:195N/16:202/16:212/16:215	-, Null																	17				21		
C*16:02:02-16:02:04/16:02:06-16:02:12/16:02:17/16:09/16:12/16:19/16:47/16:60/16:63/16:69/ 16:89N-16:90/16:99/16:103/16:107-16:108/16:176	-, Null																	17				?		
C*16:02:05	-								8									17				?		
C*16:02:13	-															15		17				?		
C*16:02:18	-																w					21		



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	
C*16:04:04-16:04:05/16:10-16:11/16:13-16:14/16:16Q-16:17/16:20/16:22-16:23/16:28/16:30N-16:34/16:36/16:39:02/16:41/16:43-16:45/16:49:01/16:54/16:56-16:58/16:61-16:62/16:65-16:67/16:71-16:72/16:75-16:76/16:78-16:79/16:81-16:83/16:86-16:87/16:92-16:95/16:97-16:98:01/16:100/16:105/16:109/16:113/16:115-16:117/16:119/16:124/16:173	-, Null																							?	
C*16:15:02	-															15	16								?
C*16:21	-											11													?
C*16:25	-															w	17								21
C*16:26	-										10														21
C*16:27	-									9															?
C*16:29	-		2																						?
C*16:37	-																w								?
C*16:46	-										10						17								21
C*16:49:02	-					6																			21
C*16:50	-		2																						21
C*16:55	-										10														?
C*16:64	-										10						16								?
C*16:70	-																17			20					?
C*16:80	-											11	12												?
C*16:91	-																17	18							?
C*16:104	-					6																			?
C*16:139	-													13											21
C*16:150	-																			19					21
C*16:189	-																w								21
C*16:201	-																16								21
C*17:01:01:02-17:01:13/17:01:15-17:03:01:09/17:03:03-17:06/17:09-17:16:02/17:18-17:19/17:24-17:26/17:28-17:32/17:34-17:39/17:41-17:55/17:57/17:59-17:61/17:63-17:69/17:73-17:74	-		2														w								22
C*17:01:14	-		2														w								w
C*17:03:02/17:20/17:27N/17:40	-, Null		2																						22
C*17:08/17:56/17:70-17:71	-		2														w								
C*17:17/17:23	-																w								22
C*17:21	-		2														w	17							22
C*17:22/17:62	-		2														16								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
C*17:58	-		2														?						22	
C*17:72	-		?														w						22	
C*18:01:01:01-18:02:05/18:04-18:08/18:10-18:15/18:18-18:19	-, Null																							23
C*18:03	-		2																18					23
C*18:16	-																							?
B*14:02:30	-				?																			
B*37:70	-																							22
B*67:02:01:01-67:02:01:02	-						6										16							

w = weak

? = nucleotide sequence information not available for the primer matching sequence or alleles with unknown reactivities

14. Certificate of Analysis



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**CTS** Collaborative Transplant Study

## Certificate of Analysis

### HLA-C\* CTS-PCR-SSP Tray Kit

Product number	103
Lot number	C13-4
Number of HLA-specific primer mixes per test	23

#### Mix specifications

The specificity of each primer pair has been tested against a panel of well characterized DNAs.

#### Result

No false positive or false negative amplifications were obtained under our test conditions of the bulk reagents.

Date of approval	05.07.2024
Approved by	H. Tran, M.D. Quality Control, Supervisor