RH (ISBT 004) Blood Group Alleles: RHCE

The Rh blood group system consists of 55 antigens, many of which are encode at the *RHCE* locus and also include a number encoded by hybrid *RHCE* with *RHD*. Commonly encountered antigens include C, E, c, e, f, Ce, C^w, C^x, V, VS, cE, and CE. The less common include hrS, hr^B, E^w, Hr_0, Hr, C^G, Rh26 c-like, hr^H, Rh32, Rh33, Rh35, Be_a, Rh39, Rh41, Rh42, Crawford, Nou, Riv, Sec, Dav, JAL, STEM, MAR, JAHK , LOCR, CENR, CEST, CELO, CEAG, PARG and CEVF. Antigens encoded from either *RHCE* or *RHD* loci include G, FPTT, BARC, DAK, Rh29, Hr^B and CEWA. The protein consists of 12 membrane-spanning domains and 417 amino acids.

Gene name: *RHCE*
Number of exons: 10
Initiation codon: within exon 1
Stop codon: within exon 10

Entrez Gene ID: 6006
LRG ID: LRG_797
NCBI RefSeq: NG_009208 (gene)
NM_020485 (mRNA)
NP_065231 (protein)

Preferred: *RHCE*01 or RHCE*ce*
*RHCE*02* or *RHCE*Ce*
*RHCE*03* or *RHCE*cE*
*RHCE*04* or *RHCE*CE*

RHCE

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
RH:4 or c **RH:5 or e** **RH:6 or f** **(ce)**	***RHCE*01* or *RHCE*ce*** *RHCE*c* *RHCE*e*	**Reference nucleotides** c.307C c.676G	 2 5	 p.Pro103 p.Ala226			8220426	Reference Sequence NG_009208.3	 rs676785 rs609320		
	RHCE*01.01 ***RHCE*ce.01***	c.48G>C	1	p.Trp16Cys	Asian:rare Black: common Caucasian: rare		11380456	DQ266400 Westhoff, C.M.	rs586178	*RHCE*ce48C*	
partial e	***RHCE*01.02.01***	c.48G>C	1	p.Trp16Cys	Asian: unknown Black: rare		22804620	KY369953	rs586178	*RHCE*ce48C,*	***RHCE*ceTI***

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
partial c	***RHCE*ce.02.01***	c.1025C>T	7	p.Thr342Ile	Caucasian: unknown			Vege, S	rs1053374	*1025T*	often linked to *RHD*DIVa*
	RHCE*01.02.02 ***RHCE*ce.02.02***	c.48G>C c.150C>T c.178C>A c.201A>G c.203A>G c.307C>T c.1025C>T	1 2 7	p.Trp16Cys silent p.Leu60Ile silent p.Asn68Ser p.Pro103Ser p.Thr342Ile	Asian: none Black: some Caucasian: none		25857637	LN680105 Ba, A.	rs586178 rs200955066 rs181860403 rs1053343 rs1053344 rs676785 rs1053374	*RHCE*ce48C, ex2 D, 1025T*	*RHCE*ceTI (Dex2)* *reported with RHD*DIVa*
partial e	***RHCE*01.03*** ***RHCE*ce.03***	c.1025C>T	7	p.Thr342Ile			20088832		rs1053374	*RHCE*ce1025 T*	reported with DIIIa
RH:10,–20 (V+^{w}VS–) RH:–19 (hrS–) partial e partial c	***RHCE*01.04.01*** ***RHCE*ce.04.01***	c.48G>C c.712A>G c.733C>G c.787A>G c.800T>A c.916A>G	1 5 6	p.Trp16Cys p.Met238Val p.Leu245Val p.Arg263Gly p.Met267Lys p.Ile306Val		Transfusion reaction reported DAT+ to Mild HDFN	10590079		rs586178 rs144163296 rs1053361 rs1132763 rs1132764 rs1132765	*RHCE*ce48C, 712G, 733G, 787G, 800A, 916G*	***RHCE*ceAR*** often linked to *RHD*DAR*
partial e	***RHCE*01.04.02*** ***RHCE*ce.04.02***	c.48G>C c.697C>G c.712A>G c.733C>G c.787A>G c.800T>A c.916A>G	1 5 6	p.Trp16Cys p.Gln233Glu p.Met238Val p.Leu245Val p.Arg263Gly p.Met267Lys p.Ile306Val			Vege et al. 2010 (Transfusion, abstract)	KY369958 Vege, S	rs586178 rs142246017 rs144163296 rs1053361 rs1132763 rs1132764 rs1132765	*RHCE*ce48C, 697G, 712G, 733G, 787G, 800A, 916G*	***RHCE*ceAR+ 697G***
	RHCE*01.04.03 ***RHCE*ce.04.03***	c.48G>C c.455C>A c.712A>G c.733C>G c.787A>G c.800T>A c.916A>G	1 3 5 6	p.Trp16Cys p.Thr152Asn p.Met238Val p.Leu245Val p.Arg263Gly p.Met267Lys p.Ile306Val			Vege et al. 2010 (Transfusion, abstract)	KY369957 Vege, S	rs586178 rs35109888 rs144163296 rs1053361 rs1132763 rs1132764 rs1132765	*RHCE*ce48C 455A ,712G,733G, 787G, 800A, 916G*	***RHCE*ceAR+ 455A***
RH:–19 (hrS–) partial e partial c	***RHCE*01.05.01*** ***RHCE*ce.05.01***	c.48G>C c.712A>G c.787A>G c.800T>A	1 5	p.Trp16Cys p.Met238Val p.Arg263Gly p.Met267Lys	Asian: unknown Black: some Caucasian: none	Transfusion reaction reported DAT+ to Mild HDFN	12393640	KU556685 Flegel, W.A. AF510065 Noizat-	rs586178 rs144163296 rs1132763 rs1132764	*RHCE*ce48C, 712G, 787G,800A*	***RHCE*ceEK*** *often linked to RHD*DAR*

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
								Pirenne, F			
	RHCE*01.05.02 ***RHCE*ce.05.02***	c.712A>G c.787A>G c.800T>A	5	p.Met238Val p.Arg263Gly p.Met267Lys					rs144163296 rs1132763 rs1132764	*RHCE*ce712 G, 787G,800A*	***RHCE*ceEK*** *without 48C*
RH:–59 (CEAG–) RH:–31 (hrB–) partial e	***RHCE*01.06.01*** ***RHCE*ce.06.01***	c.254C>G	2	p.Ala85Gly	Asian: unknown Black: some Caucasian: none		26173592	GU810838 Westhoff, C.M.	rs57992529	*RHCE*ce254 G*	***RHCE*ceAG***
Not tested V and VS not informative	***RHCE*01.06.02*** ***RHCE*ce.06.02***	c.254C>G c.733C>G	2 5	p.Ala85Gly p.Leu245Val			25695437		rs57992529 rs1053361	*RHCE*ce254 G, 733G*	***RHDE*ceAG.02*** *733C>G also in trans*
Not tested	***RHCE*01.06.03*** ***RHCE*ce.06.03***	c.254C>G c.733C>G c.941T>C	2 5 7	p.Ala85Gly p.Leu245Val p.Val314Ala			26173592	KY243887 Vege, S	rs57992529 rs1053361 rs79321360	*RHCE*ce254 G, 733G, 941C*	***RHCE*ceAG.03***
	RHCE*01.06.04 ***RHCE*ce.06.04***	c.254C>G c.697C>G	2 5	p.Ala85Gly p.Gln233Glu			26173592	KY243888 Vege, S	rs57992529 rs142246017	*RHCE*ce254 G, 697G*	***RHCE*ceAG.04***
RH:2 (partial C+) e+	***RHCE*01.06.05*** ***RHCE*ce.06.05***	c.254C>G c.307C>T	2	p.Ala85Gly p.Pro103Ser			26173592	KY369954 Vege, S	rs57992529 rs676785	*RHCE*ce 254G, 307T*	***RHCE*ceAG.05*** ***C+ robust*** ***Linked to RHD psuedogene*** ***African American***
RH:–19 (hrS–) RH:–31 (hrB–) RH: –61 (CEVF–)	***RHCE*01.07.01*** ***RHCE*ce.07.01***	c.48G>C c.667G>T	1 5	p.Trp16Cys p.Val223Phe	Asian: unknown Black: some Caucasian: some				rs586178 rs147357308	*RHCE*ce48C, 667T*	***RHCE*ceMO*** often linked to *RHD*DAU0*

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
partial e partial c											
RH:–19 (hrS–) RH:–31 (hrB–) RH: –61 (CEVF–) partial e partial c	***RHCE*01.07.02*** ***RHCE*ce.07.02***	c.667G>T	5	p.Val223Phe	Asian: unknown Black: rare Caucasian: none		11380457		rs147357308	*RHCE*ce667T*	***RHCE*ceMO.02*** without 16Cys less often seen than ceMO.01 but also often with *RHD*DAU0*
RH:–19 (hrS–) RH:49 (STEM+) e+/–	***RHCE*01.08*** ***RHCE*ce.08***	c.48G>C c.712A>G c.818C>T c.1132C>G	1 5 6 8	p.Trp16Cys p.Met238Val p.Ala273Val p.Leu378Val	Asian: unknown Black: some Caucasian: unknown		12393640	AF510066 Noizat-Pirenne, F	rs586178 rs144163296 rs147094099 rs138917454	*RHCE*ce48C, 712G, 818T, 1132G*	***RHCE*ceBI*** often linked to *RHD*DOL*
RH:–19 (hrS–) Rh:49+^{w} (STEM+^{w}) e+/–	***RHCE*01.09*** ***RHCE*ce.09***	c.48G>C c.712A>G c.818C>T	1 5 6	p.Trp16Cys p.Met238Val p.Ala273Val	Asian: unknown Black: some Caucasian: unknown		22738288	GU474431 Halter Hipsky, C.P	rs586178 rs144163296 rs147094099	*RHCE*ce48C, 712G, 818T*	***RHCE*ceSM***
e+^{w} weak reactivity with some anti-D monoclonal	***RHCE*01.10.01*** ***RHCE*ce.10.01***	c.48G>C c.365C>T	1 3	p.Trp16Cys p.Ser122Leu	Asian: none Black: none Caucasian: rare		16686844	AM072960 Chen, Q	rs586178 rs201407774	*RHCE*ce48C, 365T*	***RHCE*ceSL*** some alleles have a silent 105C>T change
e+^{w}	***RHCE*01.10.02*** ***RHCE*ce.10.02***	c.365C>T	3	p.Ser122Leu	Asian: unknown Black: unknown Caucasian: rare		16686844		rs201407774	*RHCE*ce365T*	***RHCE*ceSL.02***
e+^{w}	***RHCE*01.11*** ***RHCE*ce.11***	c.461G>C	3	p.Arg154Thr	Asian: rare Black: unknown Caucasian: rare		12919427	AM072961 Wagner, F.F	rs747471048	*RHCE*ce461C*	***RHCE*ceRT***
e+^{w}	***RHCE*01.12*** ***RHCE*ce.12***	c.48G>C c.538G>C	1 4	p.Trp16Cys p.Gly180Arg	Asian: rare Black: unknown Caucasian: unknown		16836572		rs586178 not found	*RHCE*ce48C, 538C*	***RHCE*ceRA***
e+^{w},	***RHCE*01.13***	c.685_687del	5	p.Arg229del	Asian: rare		14996197		not found	*RHCE*ce(685*	***RHCE*ceBP***

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
RH:58 (CELO+^{w})	***RHCE*ce.13***	AGA			Black: unknown Caucasian: unknown					*_687del)*	
e+^{w}, c+^{w} RH:36 (Be(a+))	***RHCE*01.14*** ***RHCE*ce.14***	c.662C>G	5	p.Pro221Arg	Asian: rare Black: unknown Caucasian: unknown		19453979; 19951310	AM295500 Döscher, A	rs141398055	*RHCE*ce662 G*	***RHCE*ceBE***
c+^{w},e+^{w} RH:55 (LOCR+) RH:-26	***RHCE*01.15*** ***RHCE*ce.15***	c.286G>A	2	p.Gly96Ser	Asian: unknown Black: unknown Caucasian: rare		9426634; 17002624		rs144348222	*RHCE*ce286 A*	***RHCE*ceLOC R***
e+	***RHCE*01.16*** ***RHCE*ce.16***	c.48G>C c.1170C>T c.1193T>A	1 9	p.Trp16Cys silent p.Val398Glu			27113036	KU234778 Lavoie, J	rs586178 rs630931 rs630612	*RHCE*ce48C-D(9)-ce*	***With pseudogene***
partial e partial c RH:10,20 (V+VS+) RH:31 weak to neg (hrB+^{vw}/–)	***RHCE*01.20.01*** ***RHCE*ce.20.01*** ***RHCE*ceVS.01***	c.733C>G	5	p.Leu245Val	Asian: none Black: common Caucasian: none	Numerous patients have received e+ blood without adverse effects	8759908; 9256293; 9024488		rs1053361	*RHCE*ce733 G*	Often linked to conventional *RHD*
partial e partial c RH:10,20 (V+VS+) RH:–31 (hrB–)	***RHCE*01.20.02*** ***RHCE*ce.20.02*** ***RHCE*ceVS.02***	c.48G>C c.733C>G	1 5	p.Trp16Cys p.Leu245Val	Asian: none Black: common Caucasian: none	Numerous patients have received e+ blood without adverse effects	9024488		rs586178 rs1053361	*RHCE*ce48C, 733G*	Often linked to *RHD*DIIIa or to weak partial D 4.0*
partial e partial c RH:–10,20 (V–VS+) RH:–31 (hrB–)	***RHCE*01.20.03*** ***RHCE*ce.20.03*** ***RHCE*ceVS.03***	c.48G>C c.733C>G c.1006G>T	1 5 7	p.Trp16Cys p.Leu245Val p.Gly336Cys	Asian: none Black: common Caucasian: none	not known When linked with hybrid D-CE-D the C antigen is partial	9767746		rs586178 rs1053361 rs116261244	*RHCE*ce48C, 733G, 1006T*	***RHCE*ceS*** Often linked to *RHD*DIIIa* or to hybrid *RHDIII-CE-D* as part of r'S type 1 or *RHD-CE-D* as part of type 2 haplotype
partial e	***RHCE*01.20.04.***	c.48G>C	1	p.Trp16Cys	Asian: none		20088832	KY652757	rs586178	*RHCE*ce48C,*	ceTI type 2

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
RH:10,20 (V+VS+) Probable RH:–31 (hrB–)	***01*** ***RHCE*ce.20.04.01*** ***RHCE*ceVS.04.01***	c.733C>G c.1025C>T	5 7	p.Leu245Val p.Thr342Ile	Black: some Caucasian: none			Vege, S	rs1053361 rs1053374	*733G, 1025T*	
	RHCE*01.20.04.02 ***RHCE*ce.20.04.02*** ***RHCE*ceVS.04.02***	c.48G>C c.105C>T c.733C>G c.744C>T c.1025C>T	1 5 7	p.Trp16Cys silent p.Leu245Val silent p.Thr342Ile					rs586178 rs1053361 rs1053374	*RHCE*ce48C, 105T, 733G,744T, 1025T*	*RHCE*ceTI type 2-like*
partial e RH:–10,20 (V–VS+) RH: –31	***RHCE*01.20.05*** ***RHCE*ce.20.05*** ***RHCE*ceVS.05***	c.733C>G c.1006G>T	5 7	p.Leu245Val p.Gly336Cys	Asian: none Black: rare Caucasian: none		9767746		rs1053361 rs116261244	*RHCE*ce733G,1006T*	
partial c partial e RH:43 (Crawford+) RH:20 (VS+) RH:-19,-31 RH:–58 (CELO–) moderate to strongly reactive with some monoclonal anti-D	***RHCE*01.20.06*** ***RHCE*ce.20.06*** ***RHCE*ceVS.06***	c.48G>C c.697C>G c.733C>G	1 5	p.Trp16Cys p.Gln233Glu p.Leu245Val	Asian: none Black: some Caucasian: none	Anti-CELO DAT+, no HDFN	16934069	DQ178642 Westhoff, C.M	rs586178 rs142246017 rs1053361	*RHCE*ce48C, 697G, 733G*	***RHCE*ceCF***
partial e partial c RH:48,(JAL+) RH:–57 (CEST–) RH:20(V/VS+^{w})	***RHCE*01.20.07*** ***RHCE*ce.20.07*** ***RHCE*ceVS.07***	c.340C>T c.733C>G	3 5	p.Arg114Trp p.Leu245Val	Asian: none Black: some Caucasian: none	anti-c possibly involved in transfusion reaction	12393640; 19207167; 19170983	AF510067 Noizat-Pirenne, F	rs148487630 rs1053361	*RHCE*ce340T, 733G*	***RHCE*ceJAL***

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
RH:19(hrS+$^{w/-}$) RH:31(hrB+$^{w/-}$)											
e+^{w} RH:10,20 (V+VS+) Probable RH:–31 (hrB−)	***RHCE*01.20.08*** ***RHCE*ce.20.08*** ***RHCE*ceVS.08***	c.48G>C c.733C>G c.748G>A	1 5	p.Trp16Cys p.Leu245Val p.Val250Met	Asian: none Black: rare Caucasian: none		12393640	AF510068 Noizat-Pirenne, F	rs586178 rs1053361 not found	*RHCE*ce48C, 733G, 748A*	
e+^{w} RH:-10,20 (V–VS+) RH:31 (hrB+^{w})	***RHCE*01.20.09*** ***RHCE*ce.20.09*** ***RHCE*ceVS.09***	c.48G>C c.733C>G c.941T>C	1 5 7	p.Trp16Cys p.Leu245Val p.Val314Ala	Asian: none Black: rare Caucasian: none		20576012 allele reported with 1006G>T (possible error)	KX279465 Vrignaud, C.	rs586178 rs1053361 rs79321360	*RHCE*ce48C, 733G, 941C*	
probable partial e and partial c	***RHCE*01.20.10*** ***RHCE*ce.20.10*** ***RHCE*ceVS.10***	c.48G>C c.712A>G c.733C>G	1 5	p.Trp16Cys p.Met238Val p.Leu245Val			Vege et al. 2010 (Transfusion, abstract)	KY369955 Vege, S	rs586178 rs144163296 rs1053361	*RHCE*ce48C, 712G, 733G*	
	RHCE*01.20.11 ***RHCE*ce.20.11*** ***RHCE*ceVS.11***	c.48G>C exons 2-3 D c.186G>T c.410C>T c.455A>C c.733C>G c.1006G>T	1 2 3 5 7	p.Trp16Cys p.Leu62Phe p.Ala137Val p.Asn152Thr p.Leu245Val p.Gly336Cys			Aeschlimann et al. 2017 (Transfusion, abstract)	KY926711 Vege, S	rs586178 rs199509194 rs113982491 rs17418085rs1053361 rs116261244	*ceS-DIIIa(2-3)-ce*	Across from conventional Ce
e+^{w} RH:48 (JAL+)	***RHCE*01.21.01*** ***RHCE*ce.21.01***	c.341G>A	3	p.Arg114Gln	Asian: one Black: unknown Caucasian: one		19207167	AJ548432 Flegel, W. A	not found	*RHCE*ce341A*	
e+^{w} RH:48 (JAL+)	***RHCE*01.21.02*** ***RHCE*ce.21.02***	c.48G>C c.187G>C c.341G>A	1 2 3	p.Trp16Cys p.Gly63Arg p.Arg114Gln			19453979	AM295498 Döscher, A	rs586178 not found not found	*RHCE*ce48C, 187C, 341A,*	

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
e+^{w} strongly D+ with some monoclonal anti-D RH:33(DHAR+) RH:50 (FPPT+)	***RHCE*01.22*** ***RHCE*ce.22***	c.667G>T c.697C>G c.712A>G c.733C>G c.744T>C c.787A>G c.800T>A	5	p.Val223Phe p.Gln233Glu p.Met238Val p.Leu245Val silent p.Arg263Gly p.Met267Lys	Asian: none Black: none Caucasian: some		8616049		rs147357308 rs142246017 rs144163296 rs1053361 rs149352457 rs1132763 rs1132764	*RHCE*ce-D(5)-ce*	***DHAR*** ***RHCE*ceHAR***
e+^{w}	***RHCE*01.23*** ***RHCE*ce.23***	c.649T>C	5	p.Trp217Arg	Asian: unknown Black: unknown Caucasian: rare		19453980	FJ486162 Bugert, P	not found	*RHCE*ce649C*	
e+^{w}	***RHCE*01.24*** ***RHCE*ce.24***	c.512A>G	4	p.His171Arg	Asian: unknown Black: unknown Caucasian: rare		19453979	AM182448 Döscher, A	rs781037009	*RHCE*ce512A*	
e+^{w}	***RHCE*01.25*** ***RHCE*ce.25***	c.730G>A	5	p.Ala244Thr	Asian: unknown Black: unknown Caucasian: rare		19453979	AM260938 Döscher, A	not found	*RHCE*ce730A*	
e+^{w}	***RHCE*01.26*** ***RHCE*ce.26***	c.872C>T	6	p.Pro291Leu	Asian: unknown Black: unknown Caucasian: rare		19453979	AM183927 Döscher, A	rs374399829	*RHCE*ce872T*	
e+^{w}	***RHCE*01.27*** ***RHCE*ce.27***	c.1154G>C	9	p.Gly385Ala			19453979	AM295499 Döscher, A.	not found	*RHCE*ce1154C*	
c+^{w}	***RHCE*01.28*** ***RHCE*ce.28***	c.1254A>C	10	p.Ter418Tyr			19453979	AM295503 Döscher, A.	not found	*RHCE*ce1254C*	
c+e–	***RHCE*01.29*** ***RHCE*ce.29***	*RHD* exons 4-9	4-9				7994050			*RHCE*ce-D(4-9)-ce*	***RHCE*ceBOL*** haplotype(Dc-Bol)
e+^{W}	***RHCE*01.30*** ***RHCE*ce30***	c.526G>A	4	p.Ala176Thr			21166680		rs753965768	*RHCE*ce526A*	
	RHCE*01.31 ***RHCE*ce31***	c.695T>C	5	p.Ile232Thr			21166680		not found	*RHCE*ce695C*	
	RHCE*01.32 ***RHCE*ce32***	c.827C>A	6	p.Ala276Gln			21166680		not found	*RHCE*ce827A*	

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
partial e e+$^{w/-}$ RH:-31 (hrB–)	***RHCE*01.33*** ***RHCE*ce33***	c.506T>C	4	p.Leu169Pro			Vege et al. 2010 (Transfusion, abstract)	KX714949 Vege, S	not found	*RHCE*ce506C*	
partial c+e–	***RHCE*01.34*** ***RHCE*ce34***	RHD exons 4-7	4-7			Haplotype Dc− made antibody to high	Lomas-Francis et al. 2014 (Transfusion, abstract)	KY652756 Vege, S		*RHCE*ce-D(4-7)-ce*	
c+ e+	***RHCE*01.35*** ***RHCE*ce35***	c.202A>G	2	p.Asn68Asp			26435076	KP136911 Hyland, C	rs772058645	*RHCE*ce202G*	(ce in trans)
C+ c–	***RHCE*01.36*** ***RHCE*ce36***	c.307C>T	2	p.PRo103Ser			26435076	KP136912 Cemborain, A	rs676785	*RHCE*ce307T*	
c+ e+ weakly reactive with anti-D in absence of *RHD*	***RHCE*01.37*** ***RHCE*ce37***	c.697C>G c.712A>G c.733C>G c.744T>C	5	p.Gln233Glu p.Met238Val p.Leu245Val p.Ser248Ser			26435076	KP136915 Garcia, F	rs142246017 rs144163296 rs1053361 rs149352457	*RHCE*ce697G, 712G, 733G, 744C*	
weakened e	***RHCE*01.38*** ***RHCE*ce38***	c.1-10C>T	5'UTR	promoter region			19453979	FM866412 Döscher, A.	rs369957834	*RHCE*ce1-10T*	
C+^{w} c-	***RHCE*01.39*** ***RHCE*ce39***	c.308C>T	2	p.Pro103Leu			27338008	KU319432 Ji, Y	rs747882675	*RHCE*ce308T*	
c+^{w}	***RHCE*01.40*** ***RHCE*ce40***	c.340C>T	3	p.Arg114Trp			Vrignaud et al. 2014 (Vox Sanguinis, abstract)	KR060081 Vrignaud, C.	rs148487630	*RHCE*ce340T*	
Rh:-51, C^{W}- and weakly reactive with three examples of anti-C^{X}	***RHCE*01.41*** ***RHCE*ce41***	c.114A>C	2	p.Leu38Phe		antibody to a high frequency antigen	Poole et al. 2012 (Transfusion Medicine, abstract)		not found	*RHCE*ce114C*	***RHCE*ceWA***
c+e+ reactive with anti-D	***RHCE*01.42*** ***RHCE*ce42***	c.508A>G	4	p.Arg170Gly			Vrignaud et al. 2018 (Transfusion,	KX236061 Vrignaud, C	not found	*RHCE*ce508G*	***RHCE*ceRG***

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
(MS-26, HM10, ESD1, HM16) in absence of *RHD*							abstract)				
Nulls											
c–e–	***RHCE*01N.01*** ***RHCE*ceN.01***	c.80_84delTCTTC	1	p.Tyr29Phefs*5		no to severe HDFN	10827273		not found	*RHCE*ce(del80_84)*	
c–e–	***RHCE*01N.02*** ***RHCE*ceN.02***	c.963delG	7	p.Iso322Phefs*37			16271106		not found	*RHCE*ce963delG*	
c–e–	***RHCE*01N.03*** ***RHCE*ceN.03***	c.634+1G>T	Intron 4	Splice site			9657766		not found	*RHCE*ce634+1T*	
c–e–	***RHCE*01N.04*** ***RHCE*ceN.04***	c.676delG	5	p.Ala226Leufs*3			30284287	KY652755 Vege, S	rs609320	*RHCE*ce676delG*	
c–e–	***RHCE*01N.05*** ***RHCE*ceN.05***	c.335+3A>T	Intron 2	Splice site			30284287	KX714951 Vege, S	not found	*RHCE*ce335+3T*	
c–e–	***RHCE*01N.06*** ***RHCE*ceN.06***	c.679_683delCTGCT	5	p.Leu227Glufs*89			23252593		not found	*RHCE*679_683delCTGCT*	
c–e–	***RHCE*01N.07*** ***RHCE*ceN.07***	c.1074-2A>G	Intron 7	Splice site			23252593		not found	*RHCE*ce1074-2G*	
c–e–	***RHCE*01N.08*** ***RHCE*ceN.08***	c.801+1G>A	Intron 5	Splice site			28470789	KY229720 Fichou, Y	not found	*RHCE*ce801+1A*	
c–e–	***RHCE*01N.09*** ***RHCE*ceN.09***	c.1044_1050dupGCT	7	p.Thr351Alafs*52			25413218		not found	*RHCE*ce1044_1050dup*	
c–e–	***RHCE*01N893.10*** ***RHCE*ceN.10***	c.807T>A	6	p.Tyr269Ter			Thonier et al. 2017 (VoxSanguinis abstract)		rs780267740	*RHCE*ce807A*	
Ce RH:2 or C RH:5 or e RH:7 or rh_i(Ce)	***RHCE*02* or ***RHCE*Ce*** *RHCE*C* *RHCE*e*	**Reference nucleotides** c.48G>C c.150C>T c.178C>A c.201A>G	1 2	p.Trp16Cys silent p.Leu60Ile silent			8220426	BC075081 Strausberg, R. L			

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
		c.203A>G c.307C>T c.676G	5	p.Asn68Ser p.Pro103Ser p.Ala226							
C+$^{w/-}$ e+^{w} RH:48(JAL+)	***RHCE*02.01*** ***RHCE*Ce.01***	c.340C>T	3	p.Arg114Trp	Asian: unknown Black: unknown Caucasian: rare		12084172	AJ548431 Wagner, F. F AM183925 Döscher, A	rs148487630	*RHCE*Ce340T*	***RHCE*CeMA*** ***RHCE*CeJAL***
C+e+	***RHCE*02.02*** ***RHCE*Ce.02***	c.667G>T c.697C>G c.712A>G	5	p.Val223Phe p.Gln233Glu p.Met238Val	Asian: unknown Black: unknown Caucasian: rare		19453980	AJ867777 Döscher, A	rs147357308 rs142246017 rs144163296	*RHCE*Ce667T, 697G, 712G*	***RHCE*CeFV***
C+^{w}e+^{w} RH:53(JAHK+) rG	***RHCE*02.03*** ***RHCE*Ce.03***	c.365C>T	3	p.Ser122Leu	Asian: unknown Black: unknown Caucasian: rare		16078918	AM999773 Döscher, A	rs201407774	*RHCE*Ce365T*	***RHCE*CeJAHK***
partial C+	***RHCE*02.04*** ***RHCE*Ce.04***	c.667G>T c.697C>G c.712A>G c.733C>G c.744T>C c.787A>G c.800T>A	5	p.Val223Phe p.Gln233Glu p.Mer238Val p.Leu245Val silent p.Arg263Gly p.Met267Lys	Asian: unknown Black: unknown Caucasian: rare		12084172		rs147357308 rs142246017 rs144163296 rs1053361 rs149352457 rs1132763 rs1132764	*RHCE*CE-D(5)-CE*	***RHCE*CeVA***
C+^{w}e+^{w}	***RHCE*02.04.01*** ***RHCE*Ce.04.01***	c.667G>T c.697C>G c.712A>G c.733C>G c.744T>C c.787A>G	5	p.Val223Phe p.Gln233Glu p.Mer238Val p.Leu245Val silent p.Arg263Gly			19453979	AM999774 Döscher, A	rs147357308 rs142246017 rs144163296 rs1053361 rs149352457 rs1132763	*RHCE*Ce667T, 697G, 712G, 733G, 744C, 787G*	
RH:60 (PARG+)	***RHCE*02.05*** ***RHCE*Ce.05***	c.501G>A	4	p.Met167Ile			28144953		not found	*RHCE*Ce501A*	***RHCE*CePARG***
partial C+ partial e+ RH:8 (Cw+) RH:–51 (MAR–)	***RHCE*02.08.01*** ***RHCE*Ce.08.01***	c.122A>G	1	p.Gln41Arg	Asian: unknown Black: unknown Caucasian: some		7620172		rs138268848	*RHCE*Ce122G*	***RHCE*CeCW***
RH:8 (Cw+)	***RHCE*02.08.02***	c.122A>G	1	p.Gln41Arg	Asian: unknown		15225246		rs138268848	*RHCE* Ce-*	***RHCE*CeNR***

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
RH:–56 (CENR–)	***RHCE*Ce.08.02***	& RHD exon 6-10	6-10		Black: one Caucasian: unknown					*D(6-10)*	
partial C+ RH:9 (C^X+) RH:–51 (MAR–)	***RHCE*02.09*** ***RHCE*Ce.09***	c.106G>A	1	p.Ala36Thr	Asian: unknown Black: unknown Caucasian: uncommon		7620172		rs145034271	*RHCE*Ce106A*	***RHCE*CeCX***
$C+^{w/-}$partial $e+^{w}$ RH:32 (RN) RH:54 (DAK+) RH:–46 (Sec–)	***RHCE*02.10.01*** ***RHCE*Ce.10.01***	c.505C>A c.509G>T c.514T>A c.544A>T c.577A>G c.594T>A c.602G>C	4	p.Leu169Met p.Arg170Met p.Phe172Ile p.Thr182Ser p.Lys193Glu p.Asn198Lys p.Arg201Thr	Asian: none Black: some Caucasian: none	Anti-Rh46 and anti-C are clinically significant. No to severe HDFN	8639859		rs1132761 rs1132762 rs1053349 rs1053350 not found rs1053354 rs141398055	*RHCE*Ce-D(4)-ce*	***RHCE*CeRN***
$C+^{w/-}$ partial $e+^{w}$ RH:32 (RN) RH:54 (DAK+) RH:–46 (Sec–)	***RHCE*02.10.02*** ***RHCE*Ce.10.02***	c.455C>A c.505C>A c.509G>T c.514T>A c.544A>T c.577A>G c.594T>A c.602G>C	3 4	p.Thr152Asn p.Leu169Met p.Arg170Met p.Phe172Ile p.Thr182Ser p.Lys193Glu p.Asn198Lys p.Arg201Thr	Asian: none Black: some Caucasian: none	Anti-Rh46 and anti-C are clinically significant. No to severe HDFN	8639859		*rs35109888* rs1132761 rs1132762 rs1053349 rs1053350 not found rs1053354 rs141398055	*RHCE*Ce-D(4)-ce + 455A*	***RHCE*CeRN.02 exists?***
$C+^{w}$	***RHCE*02.11*** ***RHCE*Ce.11***	c.286G>A	2	p.Gly96Ser	Asian: unknown Black: unknown Caucasian: rare		19453979	AM295502 Döscher, A	rs144348222	*RHCE*Ce286A*	
$C+^{w}$	***RHCE*02.12*** ***RHCE*Ce.12***	c.344T>G	3	p.Leu115Arg	Asian: unknown Black: unknown Caucasian: rare		19453979	AJ867774 Döscher, A	not found	*RHCE*Ce344G*	
$e+^{w}$	***RHCE*02.13*** ***RHCE*Ce.13***	c.364T>C	3	p.Ser122Pro	Asian: unknown Black: unknown Caucasian: rare		19453979	FJ486157 Bugert, P	not found	*RHCE*Ce364C*	
$C+^{w}$	***RHCE*02.14*** ***RHCE*Ce.14***	c.497A>T	4	p.His166Leu	Asian: unknown Black: unknown Caucasian: rare		19453980	FJ486159 Bugert, P	not found	*RHCE*Ce497T*	
$e+^{w}$	***RHCE*02.15*** ***RHCE*Ce.15***	c.689G>C	5	p.Ser230Thr	Asian: unknown Black: unknown Caucasian: rare		19453979	AM182449 Döscher, A	not found	*RHCE*Ce689C*	
$C+^{w}$ $e+^{w}$	***RHCE*02.16***	c.728A>G	5	p.Tyr243Cys	Asian: unknown		19453979	FM165579	rs555090649	*RHCE*Ce728*	

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
	RHCE*Ce.16				Black: unknown Caucasian: rare			Döscher, A		*G*	
e+^{w}	***RHCE*02.17*** ***RHCE*Ce.17***	c.800T>A	5	p.Met267Lys	Asian: unknown Black: unknown Caucasian: rare		19453980	FJ486164 Bugert, P	rs1132764	*RHCE*Ce800A*	
C+^{w} e+^{w}	***RHCE*02.18*** ***RHCE*Ce.18***	c.890T>C	6	p.Leu297Pro	Asian: unknown Black: unknown Caucasian: rare		19453979	AM295501 Döscher, A	rs763017817	*RHCE*Ce890C*	
e+^{w}	***RHCE*02.19*** ***RHCE*Ce.19***	c.464T>G c.1118C>T	3 8	p.Met155Arg p.Ala373Val	Asian: unknown Black: unknown Caucasian: rare		19453979	AM295506 Döscher, A	not found not found	*RHCE*Ce464G, 1118T*	
C+^{w} e+^{w}	***RHCE*02.20*** ***RHCE*Ce.20***	c.79_81delCTC	1	p.Leu27del	Asian: unknown Black: unknown Caucasian: rare		19453979	AM410878 Döscher, A	not found	*RHCE*Ce(79_81del)*	
C+^{w}	***RHCE*02.21*** ***RHCE*Ce.21***	c.527C>T	4	p.Ala176Val	Asian: unknown Black: unknown Caucasian: rare		21166680	KM975479 Vrignaud, C	not found	*RHCE*Ce527T*	
Partial e+^{w} C+^{w}	***RHCE*02.22*** ***RHCE*Ce.22***	c.667G>T	5	p.Val223Phe	Asian: unknown Black: unknown Caucasian: rare		21166680		rs147357308	*RHCE*Ce667T*	
C+^{w}	***RHCE*02.23*** ***RHCE*Ce.23***	c.941T>C	7	p.Val314Ala	Asian: unknown Black: unknown Caucasian: rare		21166680		rs79321360	*RHCE*Ce941C*	
C+^{w} e+^{w}	***RHCE*02.24*** ***RHCE*Ce.24***	c.1007G>A	7	p.Gly336Asp	Asian: unknown Black: unknown Caucasian: rare		21166680		rs760319839	*RHCE*Ce1007A*	
C+^{w}	***RHCE*02.25*** ***RHCE*Ce.25***	c.1007G>T	7	p.Gly336Val	Asian: unknown Black: unknown Caucasian: rare		21166680		rs760319839	*RHCE*Ce1007T*	
C+^{w} e+^{w}	***RHCE*02.26*** ***RHCE*Ce.26***	c.460A>G	3	p.Arg154Gly			27282785		rs755299894	*RHCE*Ce460G*	
C+^{w} e+^{w}	***RHCE*02.27*** ***RHCE*Ce.27***	c.375C>G	3	p.Ile125Met			Vrignaud et al. 2014 (Vox Sanguinis, abstract)	KM078027 Vrignaud, C	rs143715642	*RHCE*Ce375G*	
C+ e+ RH:9	***RHCE*02.28*** ***RHCE*Ce.28***	c.919G>A	6	p.Gly307Arg		Made antibody to high in Rh	Vege et al. 2010 (Transfusion, abstract)	KY190222 Vege, S	rs200950594	*RHCE*Ce919A*	(Surprisingly C^{x}+ in absence of c.106A- needs

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
											confirmation
C+ e+ E+/–	***RHCE*02.29*** ***RHCE*Ce.29***	c.674C>G	5	p.Ser225Cys			Vege et al. 2012 (Transfusion, abstract)	KY190223 Vege, S	rs200087488	*RHCE*Ce674G*	E: 0-4+ depending on reagent in absence of c.676C
C+ e+ V+VS+	***RHCE*02.30*** ***RHCE*Ce.30***	c.733C>G	5	p.Leu245Val			26435076	KP136918 Kalvelage, M	rs1053361	*RHCE*Ce733G*	
C^{w+} e^{w+}	***RHCE*02.31*** ***RHCE*Ce.31***	c.487-5T>G	Intron 3	Splice site			19453979	FM866415 Döscher, A	rs776819527	*RHCE*Ce487-5G*	
C^{w+}	***RHCE*02.32*** ***RHCE*Ce.32***	c.1228-2A>G	Intron 9	Splice site			19453979	FM866417 Döscher, A	not found	*RHCE*Ce1228-2G*	
C^{w+}	***RHCE*02.33*** ***RHCE*Ce.33***	c.98A>C	1	p.His33Pro			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		not found	*RHCE*Ce98C*	
C^{w+} e^{w+}	***RHCE*02.34*** ***RHCE*Ce.34***	c.473G>A	3	p.Ser158Asn			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		rs758173067	*RHCE*Ce473A*	
C^{w+}	***RHCE*02.35*** ***RHCE*Ce.35***	c.491A>G	4	p.Asp164Gly			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		rs548044758	*RHCE*Ce491G*	
C^{w+}	***RHCE*02.36*** ***RHCE*Ce.36***	c.494A>C	4	p.Tyr165Ser			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		rs746303049	*RHCE*Ce494C*	
C+	***RHCE*02.37*** ***RHCE*Ce.37***	Lacking the 109bp insert	Intron 2				Vege et al. 2018 (Transfusion, abstract)		not found		
Nulls											
C–e–	***RHCE*02N.01*** ***RHCE*CeN.01***	c.966_968delinsC	7	p.His323Phefs*77			9657766; 9657769			*RHCE*Ce966delT, 968delA*	

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
C–e–	***RHCE*02N.02*** ***RHCE*CeN.02***	c.659G>A	5	p.Trp220Ter			30284287	KX714950 Vege, S	not found	*RHCE*Ce659A*	
C–e–	***RHCE*02N.03*** ***RHCE*CeN.03***	c.486+1G>A	Intron 3	Splice site			30284287	KP334130 Vege, S	rs753832633	*RHCE*Ce486+1A*	
C–e–	***RHCE*02N.04*** ***RHCE*CeN.04***	c.93_94insT	1	p.Thr32Tyrfs*3			24020803		not found	*RHCE*Ce(93_94insT)*	
C–e–	***RHCE*02N.05*** ***RHCE*CeN.05***	c.377C>G	3	p.Ser126Ter			26435076	KP136914 Goldman, M	not found	*RHCE*Ce377G*	
C–e–	***RHCE*02N.06*** ***RHCE*CeN.06***	c.148+5G>A	Intron 1	Splice site			24020803		not found	*RHCE*Ce148+5A*	
C–e–	***RHCE*02N.07*** ***RHCE*CeN.07***	RHD exons 3-8	3-8				22686562; 24020803			*RHCE*Ce-D(4-8)-Ce*	
C–e–	***RHCE*02N.08*** ***RHCE*CeN.08***	RHD exons 3-9	3-9				24020803			*RHCE*Ce-D(4-9)-Ce*	
C–e–	***RHCE*02N.09*** ***RHCE*CeN.09***	c.938delC	6	p.Pro313Argfs*46			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		not found	*RHCE*Ce-D(4-9)-Ce*	
C– (ce in trans)	***RHCE*02N.10*** ***RHCE*CeN.10***	Ce482_483insT	3	p.Asn162Glnfs37Ter			Vege et al. 2019 (Transfusion, abstract)	MK090017 Aeschlimann, J	not found	*RHCE*Ce(482_483insT)*	
cE RH:4 or c RH:3 or E RH:27 (cE)	***RHCE*03* or ***RHCE*cE*** *RHCE*c* *RHCE*E*	**Reference nucleotides** c.307C c.676G>C	2 5	p.Pro103 p.Ala226Pro			8220426			*RHCE*cE*	
partial E RH:11 (E^{W+}) E type I	***RHCE*03.01*** ***RHCE*cE.01***	c.500T>A	4	p.Met167Lys	Asian: rare Black: unknown Caucasian: rare		9827916; 14996199		rs140421430	*RHCE*cE500A*	***RHCE*cEEW***
partial E $c+^{w/-}$ $E+^{w}$/- E type II	***RHCE*03.02*** ***RHCE*cE.02***	D(1-3)-cE	1-3		Asian: rare Black: unknown Caucasian: rare		9827916; 11724987	AB049753 Kashiwase, K		*RHCE*D(1-3)-cE*	***RHCE*cEKK***

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
partial E E+^{w} or E+/- E type III	***RHCE*03.03.01*** ***RHCE*cE.03.01***	c.697C>G c.712A>G	5	p.Gln233Glu p.Met238Val	Asian: rare Black: unknown Caucasian: rare		9827916; 11724987	AB018644 Kashiwase, K	rs142246017 rs144163296	*RHCE*cE697G, 712G*	***RHCE*cEFM***
partial E E+/-	***RHCE*03.03.02*** ***RHCE*cE.03.02***	c.697C>G c.712A>G c.733C>G c.744T>C	5	p.Gln233Glu p.Met238Val p.Leu245Val silent			Vege et al. 2010 (Transfusion, abstract)	KY369956 Vege, S	rs142246017 rs144163296 rs1053361 rs149352457	*RHCE*cE*697G, 712G, 733G, 744C	
partial E E− by PK7300 1+^{w} - 4+ depending on reagent	***RHCE*03.03.03*** ***RHCE*cE.03.03***	c.697C>G	5	p.Gln233Glu			Vege et al. 2018 (Transfusion, abstract)	MK934127 Aeschlimann, J	rs142246017	*RHCE*cE*697G	
partial E E+^{w} or E+/- c+^{w} E type IV	***RHCE*03.04*** ***RHCE*cE.04***	c.602G>C	4	p.Arg201Thr	Asian: unknown Black: unknown Caucasian: rare		Noizat-Pirenne et al., 1999 (Transfusion, abstract)	FJ486161 Bugert, P	rs141398055	*RHCE*cE602C*	***RHCE*cEIV***
partial E E+^{w} or E+/- c+^{w} E type V	***RHCE*03.05*** ***RHCE*cE.05***	c.461G>C	3	p.Arg154Thr	Asian: rare Black: unknown Caucasian: unknown		11724987	AB018645 Kashiwase, K	rs747471048	*RHCE*cE461C*	***RHCE*cEKH***
E+^{w} c+^{w}	***RHCE*03.06*** ***RHCE*cE.06***	c.28C>T	1	p.Arg10Trp	Asian: unknown Black: unknown Caucasian: rare		19453980	FJ486155 Bugert, P	rs749601047	*RHCE*cE28T*	
E+^{w}	***RHCE*03.07*** ***RHCE*cE.07***	c.344T>C	3	p.Leu115Pro	Asian: unknown Black: unknown Caucasian: rare		19453979; 19453980	FJ486156 Bugert, P	not found	*RHCE*cE344C*	
E+^{w}	***RHCE*03.08*** ***RHCE*cE.08***	c.356G>A	3	p.Ser119Asn	Asian: Black: Caucasian:		19453979	AM295505 Döscher, A	rs777819701	*RHCE*cE356A*	
E+^{w} c+^{w}	***RHCE*03.09*** ***RHCE*cE.09***	c.374T>A	3	p.Ile125Asn	Asian: unknown Black: unknown Caucasian: rare		19453980	FJ486158 Bugert, P	not found	*RHCE*cE374A*	
E+^{w}	***RHCE*03.10***	c.506T>A	4	p.Leu169Gln	Asian: unknown Black: unknown		19453980	FJ486160 Bugert, P	not found	*RHCE*cE506A*	

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
	RHCE*cE.10				Caucasian: rare						
E+^{w} c+^{w}	***RHCE*03.11*** ***RHCE*cE.11***	c.908T>A	6	p.Leu303Gln	Asian: unknown Black: unknown Caucasian: rare		19453980	FJ486165 Bugert, P	not found	*RHCE*cE908 A*	
E+^{w}	***RHCE*03.12*** ***RHCE*cE.12***	c.464T>G c.477T>G	3	p.Met155Arg p.Asn159Lys	Asian: unknown Black: unknown Caucasian: rare		19453979	AM183926 Döscher, A	not found not found	*RHCE*cE464 G, 477G*	
E+^{w} c+^{w}	***RHCE*03.13*** ***RHCE*cE.13***	c.728A>G	5	p.Tyr243Cys	Asian: unknown Black: unknown Caucasian: rare		21166680		rs555090649	*RHCE*cE728 G*	
c+^{w} E−/+^{VW}	***RHCE*03.14*** ***RHCE*cE.14***	c.734T>C	5	p.Leu245Pro	Asian: unknown Black: unknown Caucasian: rare		Silvy et al. 2010 (Vox Sanguinis, abstract); 22958092		not found	*RHCE*cE734 C*	
E+^{w}	***RHCE*03.15.01*** ***RHCE*cE.15.01***	c.380C>T c.383G>A	3	p.Ala127Val p.Gly128Asp	Asian: unknown Black: unknown Caucasian:		21166680		rs1053346 rs1053347	*RHCE*cE380 T, 383A*	***RHCE*cE BA***
E+^{w}	***RHCE*03.15.02*** ***RHCE*cE.15.02***	c.361A>T c.380C>T c.383G>A	3	p.Met121Leu p.Ala127Val p.Gly128Asp	Asian: unknown Black: unknown Caucasian: rare		21166680		rs1053345 rs1053346 rs1053347	*RHCE*cE361 T, 380T, 383A*	***RHCE*cE JU***
c+^{w}	***RHCE*03.16*** ***RHCE*cE.16***	c.94A>G	1	p.Thr32Ala			26286238	KP271157 Yassai, M. B	rs760999674	*RHCE*cE94G*	***RHCE*cE TA*** anti-c clone 951 non-reactive
partial E	***RHCE*03.17*** ***RHCE*cE.17***	c.520G>A	4	p.Val174Met			Vege et al. 2010 (Transfusion, abstract)	KY190221 Vege, S	rs146306079	*RHCE*cE520 A*	
c+ E+	***RHCE*03.18*** ***RHCE*cE.18***	c.48G>C	1	p.Trp16Cys			Vege et al. 2010 (Transfusion, abstract)	KY228976 Vege, S	rs586178	*RHE*cE48C*	
c+$^{w/-}$ E+$^{w/-}$	***RHCE*03.19*** ***RHCE*cE.19***	c.84C>A	1	p.Phe28Leu			26435076; Henny et al 2014 (Transfus Med	LN554880 Henny, C KP136913 Goldman, M	not found	*RHCE*cE84A*	c: 0 to 3+, E: 0 to 1+ depending on reagent

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
							Hemother, abstract)				
c+^{w} E$^{w+/-}$	***RHCE*03.20*** ***RHCE*cE.20***	c.149-1G>A	Intron 1	Splice site			19453979	FM866414 Döscher, A	not found	*RHCE*cE149-1A*	
E^{w}	***RHCE*03.21*** ***RHCE*cE.21***	c.527C>T	4	p.Ala176Val			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		not found	*RHCE*cE527T*	
E^{w}	***RHCE*03.22*** ***RHCE*cE.22***	c.208C>T	2	p.Arg70Trp			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		not found	*RHCE*cE208T*	
E^{w}	***RHCE*03.23*** ***RHCE*cE.23***	c.774T>A c.916A>G	5	silent p.Ile306Val			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		not found rs1132765	*RHCE*cE774A, 916G*	
E^{w}	***RHCE*03.24*** ***RHCE*cE.24***	c.1130A>T	8	p.Ala377Val			Vrignaud et al. 2014 (Vox Sanguinis, abstract)		not found	*RHCE*cE1130T*	
c-E-	***RHCE*03.25*** ***RHCE*cE.25***	c.659G>A	5	p.Trp220Ter			Paccapello et al. 2018 (Transfusion, abstract)		not found	*RHCE*cE659A*	
C+^{w} – 3+ depending on reagent E+	***RHCE*03.26*** ***RHCE*cE.26***	c.48G>C c.307C>T	1 2	p.Trp16Cys p.Pro103Ser			Vege et al. 2018 (Transfusion, abstract)	MG434498 Vege, S	rs586178 rs676785	*RHE*cE48C, 307T*	
Nulls											
c–E–	***RHCE*03N.01*** ***RHCE*cEN.01***	c.350_358delCCATGAGTG	3	p.Arg120_Ser122del	Asian: unknown Black: unknown Caucasian:		11380457		not found	*RHCE*cE(350_358del)*	***RHCE*cEMI***

Phenotype	Allele name *ce=01 *Ce=02 *cE=03 *CE=04	Nucleotide	Exon	Amino Acid	Antigen frequency	Clinical significance	Reference PubMed ID (PMID)	GenBank#	rs number#	Allele detail	Reported as: Or Linked to:
c–E–	***RHCE*03N.02*** ***RHCE*cEN.02***	c.907delC	6	p.Leu303Ter	Asian: unknown Black: unknown Hispanic: some Caucasian: unknown		21517889	GU563377 Westhoff, C.M	rs747976226	*RHCE*cE907delC*	
c–E–	***RHCE*03N.03*** ***RHCE*cEN.03***	c.554G>A	4	p.Trp185Ter			Paccapelo et al. 2016 (Transfusion, abstract)		not found	*RHCE*cE554A*	
c–E–	***RHCE*04N.04*** ***RHCE*cEN.04***	c.486+5G>A	Intron 3	Splice site		made 'anti-RH17'	23252593		not found	*RHCE*cE486+5A*	
c–E–	***RHCE*04N.05*** ***RHCE*cEN.05***	c.221G>A	2	p.Trp74Ter			24020803		rs1044945369	*RHCE*cE221A*	
CE **RH:2 or C** **RH:3 or E** **RH:22 or CE**	***RHCE*CE or RHCE*04*** *RHCE*C* *RHCE*E*	**Reference nucleotides** c.48G>C c.150C>T c.178C>A c.201A>G c.203A>G c.307C>T c.676G>C	 1 2 5	 p.Trp16Cys silent p.Leu60Ile silent p.Asn68Ser p.Pro103Ser p.Ala226Pro			8220426				
C+^{w} E+/–	***RHCE*04.01*** ***RHCE*CE.01***	c.722C>T	5	p.Thr241Ile	Asian: unknown Black: unknown Caucasian: one		19453980	FJ486163 Bugert, P	rs751751505	*RHCE*CE722T*	
C+/– (+ only by IAT and ads/elu) E+/–	***RHCE*04.02*** ***RHCE*CE.02***	c.380C>A	3	p.Ala127Glu			Vege et al. 2019 (Transfusion, abstract)	MH807721	rs1053346	*RHCE*CE380*	