Names for JK (ISBT 009) Blood Group Alleles

General Description:	The Kidd blood group system consists of 3 antigens carried on a multipass type 3 membrane glycoprotein that functions as the primary urea transporter on RBCs. It consists of 389 amino acids and has 10 membrane-spanning domains.
Gene name:	*SLC14A1*
Number of exons:	10
Initiation codon:	Exon 3 at c.179
Stop codon:	Exon 10 at c.1348
Entrez Gene ID:	6563
LRG:	LRG 802
LRG sequence (genomi	NG_011775.4
	NM_015865.7
Reference allele:	*JK*01* (shaded)
	Acceptable: *LU*A* , or Jk^a if inferred by hemagglutination
Reference allele *JK*01* encodes:	JK1, JK3
Antithetical antigens:	[JK1 JK2]

Phenotype	Allele name	Nucleotide change	Exon	Predicted amino acid change	(Reference No.) PMID	Accession number	rs number
JK:1 or Jk(a+)	*JK*01* or *JK*A*	c.838G			(1), PMID:8647271	NG_011775.4	
JK:2 or Jk(b+)	*JK*02* or *JK*B*	c.838G>A	8	p.Asp280Asn	(1), PMID:8647271	n.a.	rs1058396
Weak *JK*01* phenotypes							
Jk(a+w)	*JK*01W.01*	c.130G>A	3	p.Glu44Lys	(2), PMID:21309779	MG601100	rs2298720
Jk(a+w)	*JK*01W.02*	c.511T>C	6	p.Trp171Arg	(3)	n.a.	rs9948825
Jk(a+w)	*JK*01W.03*	c.28G>A	3	p.Val10Met	(4)	n.a.	rs113578396
Jk(a+w)	*JK*01W.04*	c.226G>A	4	p.Val76Ile	(4)	n.a.	rs113029149
Jk(a+w)	*JK*01W.05*	c.742G>A	7	p.Ala248Thr	(5),(6)	JN410949	rs763095261
Jk(a+w)	*JK*01W.06*	c.588A>G	6	p.Pro196Pro	(7)	n.a.	rs2298718
Jk(a+w)	*JK*01W.07*	c.486T>A	6	p.Ser162Arg	(8)	n.a.	rs753809770
Jk(a+w)	*JK*01W.08*	c.814C>T	8	p.Leu272Phe	(9)	n.a.	rs757895930
Jk(a+w)	*JK*01W.09*	c.134T>C	3	p.Leu45Pro	(10)	n.a.	rs537028614
Jk(a+w)	*JK*01W.10*	c.350T>C	5	p.Ile117Thr	(10)	n.a.	rs374022751
Jk(a+)	*JK*01W.11*	c.28G>A c.226G>A	3 4	p.Val10Met p.Val76Ile	(11)	n.a.	rs113578396 rs113029149
Weak *JK*02* phenotypes							
Jk(b+w)	*JK*02W.01*	c.548C>T	6	p.Ala183Val	(3)	n.a.	rs367901541
Jk(b+w)	*JK*02W.02*	c.718T>A	7	p.Trp240Arg	(12)	n.a.	rs760579000
Jk(b+w)	*JK*02W.03*	c.588A>G	6	p.Pro196Pro	(2), PMID:9734652 (13),PMID:23225053	n.a.	rs2298718
Jk(b+w)	*JK*02W.04*	c.130G>A	3	p.Glu44Lys	(14)	n.a.	rs2298720
Jk(b+w)	*JK*02W.05*	c.277G>A	4	p.Ala93Thr	(15)	MF588960	n.a.

Phenotype	Allele name	Nucleotide change	Exon	Predicted amino acid change	(Reference No.) PMID	Accession number	rs number
Jk(b+w)	*JK*02W.06*	c.998T>A c.1095T>C	10	p.VAl333Asp p.Ser365Ser	(16)	LK391765	rs774982134 rs28898897
Null phenotypes, *JK*01 alleles*							
JK:–3 or Jk(a–b–)	*JK*01N.01*	c.1_341del	3 - 4	p.0	(17, PMID:11807016	AF328892	n.a.
JK:–3 or Jk(a–b–)	*JK*01N.02*	c.202C>T	4	p.Gln68Ter	(18), PMID:18028269	EF571316	rs142529927
JK:–3 or Jk(a–b–)	*JK*01N.03*	c.582C>G	6	p.Tyr194Ter	19(7), PMID:11841450	AF328890	rs34756616
JK:–3 or Jk(a–b–)	*JK*01N.04*	c.956C>T	9	p.Thr319Met	(18), PMID:18028269	EF571318	rs565898944
JK:–3 or Jk(a–b–)	*JK*01N.05*	c.561C>A	6	p.Tyr187Ter	(20), PMID:22023394	JN104323	rs778172038
JK:–3 or Jk(a–b–)	*JK*01N.06*	c.342-1G>A	Intron 4	p.Arg114Ter	(21), PMID:10924622	n.a.	rs78937798
JK:–3 or Jk(a–b–)	*JK*01N.07*	c.723delA	7	p.Gly243Alafs*20	(22)	n.a.	rs759505281
JK:–3 or Jk(a–b–)	*JK*01N.08*	c.866A>G	8	p.Asn289Ser	(23)	n.a.	n.a.
JK:–3 or Jk(a–b–)	*JK*01N.09*	c.27_50del	3	p.Val10_Arg17del	(24)	n.a.	n.a.
JK:–3 or Jk(a–b–)	*JK*01N.10*	c.811+5G>A	Intron 7	p.Leu272Glufs*29	(25), PMID:22738189	HQ709264	rs1414947682
JK:–3 or Jk(a–b–)	*JK*01N.11*	c.130G>A c.1068insA	3 10	p.Glu44Lys p.Asp356Lysfs*11	(24)	n.a.	rs2298720 n.a.
JK:–3 or Jk(a–b–)	*JK*01N.12*	c.516_530del	6	pVal175_Pro179	(16)	n.a.	rs772726215
JK:–3 or Jk(a–b–)	*JK*01N.13*	c.327delG	4	p.Leu109Phefs*8	(26), PMID:24877238	AB845711	n.a.
JK:–3 or Jk(a–b–)	*JK*01N.14*	c.432G>A	5	p.Gly298Glu	(26), PMID:24877238	AB845712	n.a.
JK:–3 or Jk(a–b–)	*JK*01N.15*	c.757_759delTCC	7	p.Ser253del	(26), PMID:24877238	AB845716	n.a.
JK:–3 or Jk(a–b–)	*JK*01N.16*	c.893G>A	8	p.Gly298Glu	(26), PMID:24877238	AB845717	n.a.
JK:–3 or Jk(a–b–)	*JK*01N.17*	c.118G>A c.499A>G	3 6	p.Gly40Ser p.Met167Val	(27)	n.a.	rs145283450 rs2298719
JK:–3 or Jk(a–b–)	*JK*01N.18*	c.190C>T	4	p.Arg64Trp	(22)	n.a.	rs552191196

Phenotype	Allele name	Nucleotide change	Exon	Predicted amino acid change	(Reference No.) PMID	Accession number	rs number
JK:–3 or Jk(a–b–)	*JK*01N.19*	c.810G>A	7	p.Ala270Ala	(28)	n.a.	rs17675299
JK:–3 or Jk(a–b–)	*JK*01N.20*	c.28G>A c.226G>A c.303G>A c.588A>G	3 4 4 6	p.Val10Met p.Val76Ile pVal101Val p.Pro196Pro	(29)	n.a.	rs113578396 rs113029149 rs28994287 rs2298718
JK:–3 or Jk(a–b–)	*JK*01N.21*	c.130G>A c.220A>G	3 4	p.Glu44Lys p.Asn74Asp	(30)	n.a.	rs2298720 n.a.
Null phenotypes, *JK*02 alleles*							
JK:–3 or Jk(a–b–)	*JK*02N.01*	c.342-1G>A	Intron 4	p.Arg114Ter	(31), PMID:9582331 (32), PMID:10644814	n.a.	rs78937798
JK:–3 or Jk(a–b–)	*JK*02N.02*	c.342-1G>C	Intron 4	p.Arg114Ter	(33), PMID:16483143	n.a.	rs78937798
JK:–3 or Jk(a–b–)	*JK*02N.03*	c.222C>A	4	p.Asn74Lys	(7), PMID:18980618 (13), PMID:23225053	HQ834248	rs749037771
JK:–3 or Jk(a–b–)	*JK*02N.04*	c.663+1G>T	Intron 6	p.Leu222Valfs*46	unknown	n.a.	rs77744921
JK:–3 or Jk(a–b–)	*JK*02N.05*	c.723delA	7	p.Gly243Alafs*20	(18), PMID:18028269	EF571317	rs759505281
JK:–3 or Jk(a–b–)	*JK*02N.06*	c.871T>C	8	p.Ser291Pro	(34), PMID:10942407	n.a.	rs78242949
JK:–3 or Jk(a–b–)	*JK*02N.07*	c.896G>A	8	p.Gly299Glu	(7), PMID:18980618 (13), PMID:23225053	HQ729920	rs538368217
JK:–3 or Jk(a–b–)	*JK*02N.08*	c.956C>T	9	p.Thr319Met	(18), PMID:18028269	EF571318	rs565898944
JK:–3 or Jk(a–b–)	*JK*02N.09*	c.191G>A	4	p.Arg64Gln	(35), PMID:24689685	JN104324	rs114362217
JK:–3 or Jk(a–b–)	*JK*02N.10*	c.194G>A	4	p.Gly65Asp	(36), PMID:23710545		rs778150490
JK:–3 or Jk(a–b–)	*JK*02N.11*	c.499A>G c.512G>A	6 6	p.Met167Val p.Trp171*	(25), PMID:22738189	HQ729921	rs2298719 n.a.
JK:–3 or Jk(a–b–)	*JK*02N.12*	c.437T>C c.499A>G	5 6	p.Leu146Pro p.Met167Val	(25), PMID:22738189	HQ834246	n.a. rs2298719
JK:–3 or Jk(a–b–)	*JK*02N.13*	c.499A>G c.536C>G	6 6	p.Met167Val p.Pro179Arg	(25), PMID:22738189	HQ834247	rs2298719 rs201612170

Phenotype	Allele name	Nucleotide change	Exon	Predicted amino acid change	(Reference No.) PMID	Accession number	rs number
JK:–3 or Jk(a–b–)	*JK*02N.14*	c.1038delG	10	p.Leu347Tyrfs*6	(37), PMID:27834480	n.a.	rs746265611
JK:–3 or Jk(a–b–)	*JK*02N.15*	c.160insC	4	p.Val54Argfs*7	(24)	n.a.	rs377124382
JK:–3 or Jk(a–b–)	*JK*02N.16*	c.856delT	8	p.Trp286Glyfs*67	(15)	n.a.	rs1444093504
JK:–3 or Jk(a–b–)	*JK*02N.17*	c.810G>A	7	p.Ala270Ala	(16)	n.a.	rs17675299
JK:–3 or Jk(a–b–)	*JK*02N.18*	c.561C>A	6	p.Tyr187Ter	(26), PMID:24877238	AB845713	rs778172038
JK:–3 or Jk(a–b–)	*JK*02N.20*	c.647_648delAC	6	p.Asp216Alafs*21	(26), PMID:24877238	AB845714	rs1223735153
JK:–3 or Jk(a–b–)	*JK*02N.19*	c.719G>A	7	p.Trp240Ter	(26), PMID:24877238	AB845715	n.a.
JK:–3 or Jk(a–b–)	*JK*02N.20*	c.118G>A	3	p.Gly40Ser	(11)	n.a.	rs145283450

References

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8	Abstract	Eckley C, Figueroa D, Hoffman R, et al. Autoanti-Jk3 and alloanti-Jka in a patient with a variant JK*A gene. Transfusion 2013;53(S1):49A.
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11	Abstract	Keller JA, Horn T, Mansfield P, Ramsey G, Keller MA. Two novel Kidd variants identified in a donor with a Jk^b typing discrepancy. Transfusion 2016;56(S4):156A.
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26	PMID: 24877238	Onodera T, Sasaki K, Tsuneyama H, Isa K, Ogasawara K, Satake M, Tadokoro K, Uchikawa M. JK null alleles identified from Japanese individuals with Jk(a-b-) phenotype. Vox Sang 2014;106:382-4.
27	Abstract	Wall LD, Dunn P, Griner L. Molecular characterization of the JK null phenotype in the Maori and Polynesian population in New Zealand. Vox Sang 2015;109(S1):286.
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36	PMID: 23710545	St-Louis M, Lavoie J, Caron S, Paquet M, Perreault J. A novel JK*02 allele in a French Canadian family. Transfusion 2013;53:3024.
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Track of changes		**from v5.1 190123**	**to v6.0 25-FEB-2020**
	created:	Greg Denomme, v5.1 190123	Greg Denomme February 15, 2020
	reviewed:	n.a.	Peter Ligthart, February 2020
General		Last word version publiced on ISBT website	First Excel map version. Spread-sheets "Intro", "Allele Table", "References", and "Versioning" created.
Intro	Text changed	The Kidd blood group system consists of 3 antigens carried on a multipass type 3 membrane glycoprotein that functions as the primary urea transporter on RBCs. It consists of 389 amino acids and has 10 membrane-spanning domains.	The Kidd blood group system consists of 3 antigens carried on a multipass type 3 membrane glycoprotein that functions as the primary urea transporter on RBCs. It consists of 389 amino acids and has 10 membrane-spanning domains.
Intro	LRG ID line added:	n.a.	LRG_802
Intro	Reference allele line moved from Allele Table to Intro:	n.a.	Reference allele JK*01 encodes JK1, JK3
Intro	Antithetical Antigens line created in Intro:	n.a.	Antithetical antigens: [JK1, JK2]
Allele Table			Table columns "(Reference No.) PMID", "Accession number" and "rs-number" added, content added.
Allele Table	Text change: Line moved to Intro:	n.a.	see above
Allele Table	Text change:	JK*01 made the reference allele to coincide with LRG; exons changed to match LRG	Added to Table: *JK*01W.06 - JK*01W.11; JK*02W.03 - JK*02W.06; JK*01N.11 - JK*01N.21; JK*02N.15 - JK*02N.20*

Track of changes		**from v5.1 190123**	**to v6.0 25-FEB-2020**
Reference	Renumbered References:	Original numbering: 1. Whorley T et al. Transfusion 2009;49(Suppl):48A. 2. Deal, T et al. Transfusion 011;51(Suppl):24-25A 3. St-Louis, M et al Transfusion 2012 :52(Suppl) :160-161A . 4. Crews, WS et al. Transfusion 2013;53(Suppl):164A 5. Moulds JM. Personal communication 2012-08-22	New numbering: 3. Whorley T et al. Transfusion 2009;49(Suppl):48A. 4. Deal, T et al. Transfusion 011;51(Suppl):24-25A 12. St-Louis, M et al Transfusion 2012 :52(Suppl) :160-161A . 22. Crews, WS et al. Transfusion 2013;53(Suppl):164A 23. Moulds JM. Personal communication 2012-08-22
Allele Table	Antigen/allele added:	n.a.	JK1 weak phenotypes: *JK*01W.06* to *JK*01W.11*
		n.a.	**References:** 7 - 11
Allele Table	Antigen/allele added:	n.a.	JK2 weak phenotypes: *JK*02W.03* to *JK*02W.06*
		n.a.	**References:** 2, 13 - 16
Allele Table	Antigen/allele added:	n.a.	JK1 null phenotypes: *JK*01N.11* to *JK*01N.21*
		n.a.	**References:** 16, 22, 24, 26 - 30
Allele Table	Antigen/allele added:	n.a.	JK2 null phenotypes: *JK*02N.15* to *JK*02N.20*
		n.a.	**References:** 11, 15, 16, 24, 26
	New References:	n.a.	New references added see above

End of changes	**from v5.1 90123**	**to v6.0 25-FEB-2020**