Names for XG (ISBT 012) Blood Group Alleles

Intro

General description: The XG blood group system consists of 2 antigens carried on 2 single-pass glycoproteins, encoded by the genes *XG* and *CD99,* located in pseudoautosomal region 1 (PAR1) of the sex chromosomes. The Xg glycoprotein is encoded by the X chromosome only, while the CD99 glycoprotein is encoded by both X and Y chromosomes. On Y, only exons 1-3 of *XG* exist. Both genes encode single pass glycoproteins of 180 and 185 amino acids, respectively.

Gene name: *XG*

Number of exons: 10
Initiation codon: Within exon 1
Stop codon: Within exon 10

Entrez Gene ID: 7499

LRG: LRG_805
LRG sequence: NG_011627.1 (genomic)
NM_175569.2 (transcript)

Reference allele: *XG*01* (shaded)

Reference allele *XG*01* encodes: Xg^a

Antithetical antigens: n.a.

Additional information

Gene name: *CD99*

Number of exons: 10
Initiation codon: Within exon 1
Stop codon: Within exon 10

Entrez Gene ID: 4267

LRG: LRG_1023
LRG sequence: NG_009174.1 (genomic)
NM_002414.3 (transcript)

Reference allele: *CD99*01* (shaded)

Reference allele *CD99*01* encodes: CD99

Antithetical antigens: n.a.

Additional information

Phenotype	Allele name	Nucleotide change	Exon	Predicted amino acid change	(Reference No.) PMID	Accession number	rs number
Xg[a]	*XG*01*						
Null phenotypes							
Xg(a-)	*XG*01N.01*	NC_000023.11: g.2748343G>C	5' UTR	p.0	(1) PMID: 29748255 (2) PMID: 30061310	n.a.	rs311103
Xg(a-)	*XG*01N.02*	NC_000023.11: 2,776,388_2,808,824del	intron 3	p.0	(3) PMID: 30938838	n.a.	esv2662319

CD99	*CD99*01*						
Null phenotypes							
CD99-	*CD99*01N.01*	c.(100 + 1_101-1)_(361 + 1_362-1)del	exons 3–7	p.0	(4) Abstract	n.a.	n.a.
CD99-	*CD99*01N.02*	c.(148 + 1_149-1)_(475 + 1_476-1)del	exons 4–8	p.0	(4) Abstract	n.a.	n.a.
CD99-	*CD99*01N.03*	c.(67 + 1_68-1)_(475 + 1_476-1)del	exons 2–8	p.0	(4) Abstract	n.a.	n.a.

References

1. PMID: 29748255 Möller M, Lee YQ, Vidovic K, Kjellström S, Björkman L, Storry JR, Olsson ML. Disruption of a GATA1-binding motif upstream of XG/PBDX abolishes Xga expression and resolves the Xg blood group system. Blood. 2018 Jul 19;132(3):334-338.

2. PMID: 30061310 Yeh CC, Chang CJ, Twu YC, Chu CC, Liu BS, Huang JT, Hung ST, Chan YS, Tsai YJ, Lin SW, Lin M, Yu LC. The molecular genetic background leading to the formation of the human erythroid-specific Xg^a/CD99 blood groups. Blood Adv. 2018 Aug 14;2(15):1854-1864. doi: 10.1182/bloodadvances.2018018879. PMID: 30061310; PMCID: PMC6093725.

3. PMID: 30938838 Lee YQ, Storry JR, Karamatic Crew V, Halverson GR, Thornton N, Olsson ML. A large deletion spanning XG and GYG2 constitutes a genetic basis of the Xgnull phenotype, underlying anti-Xg^a production. Transfusion. 2019 May;59(5):1843-1849.

4. Abstract Thornton NM, Karamatic Crew V, Muniz-Diaz E, Garcıa- Arroba J, Nogues N, Lee E, Jones C, Schistal E, Jungbauer C, Allhoff W, Bullock T, Marais I, Daniels G. Four examples of anti-CD99 and discovery of the molecular bases of the rare CD99−phenotype. Vox Sang 2015;109(Suppl 1):50-1.

Track of changes		**from v2.0 160630**	**to v3.0 30-OCT-2020**
	created:	Geoff Daniels	Jill Storry
	reviewed:		
General			
Intro	Text changed		Changed and expanded: The XG blood group system consists of 2 antigens carried on 2 single-pass glycoproteins, encoded by the genes XG and CD99, located in pseudoautosomal region 1 (PAR1) of the sex chromosomes. The Xg glycoprotein is encoded by the X chromosome only, while the CD99 glycoprotein is encoded by both X and Y chromosomes. On Y, only exons 1-3 of XG exist. Both genes encode single pass glycoproteins of 180 and 185 amino acids, respectively.
Intro	LRG ID line added:		LRG_802
Allele Table			Inserted
References			References found for all alleles and collated
End of changes		**from v2.0 160630**	**to v3.0 30-OCT-2020**