

**Names for RHAG (ISBT 030) Blood Group Alleles**

General description: The RHAG blood group system consists of three antigens carried on a multipass membrane glycoprotein called RhAG (Rh-associated glycoprotein; aka CD241). It consists of 409 amino acids and both amino and carboxyl termini are predicted to be intracellular.

Gene name: *RHAG*  
 Number of exons: 10  
 Initiation codon: Beginning of exon 1  
 Stop codon: End of exon 10  
 Entrez Gene ID: 6005  
 LRG Sequence: NG\_011704.1 (genomic)  
 NM\_000324.2 (transcript)  
 Reference allele: *RHAG\*01* (shaded)

Reference allele <i>RHAG*01</i> encodes RHAG1, RHAG3				
Phenotype	Allele name	Nucleotide change	Exon	Predicted amino acid change
RHAG:1 or Duclos+	<i>RHAG*01</i>			
RHAG:-1 or Duclos-	<i>RHAG*-01</i>	c.316C>G	2	p.Gln106Glu
RHAG:2 or OI(a+)	<i>RHAG*02</i>	c.680C>T	5	p.Ser227Leu
RHAG:-3 or DSLK-	<i>RHAG*-03</i>	c.490A>C	3	p.Lys164Gln
RHAG:4	<i>RHAG*04</i>	c.808G>A	6	p.Val270Ile
Null phenotypes				
Rh <sub>null</sub>	<i>RHAG*01N.01</i>	c.154_157delinsGA	2	p.Pro52Aspfs*57
Rh <sub>null</sub>	<i>RHAG*01N.02</i>	c.1086delA	8	p.Ala363Leufs*15
Rh <sub>null</sub>	<i>RHAG*01N.03</i>	c.157+1G>A	Intron 1	Alternative splicing
Rh <sub>null</sub>	<i>RHAG*01N.04</i>	c.945+1G>A	Intron 6	Alternative splicing [1]
Rh <sub>null</sub>	<i>RHAG*01N.05</i>	c.946-1G>A	Intron 6	Alternative splicing
Rh <sub>null</sub>	<i>RHAG*01N.06</i>	c.946-1G>T	Intron 6	Alternative splicing
Rh <sub>null</sub>	<i>RHAG*01N.07</i>	c.1067+1G>A	Intron 7	Alternative splicing
Rh <sub>null</sub>	<i>RHAG*01N.08</i>	c.808G>A; c.838G>A	6	p.Val270Ile; p.Gly280Arg
Rh <sub>null</sub>	<i>RHAG*01N.09</i>	c.836G>A	6	p.Gly279Glu
Rh <sub>null</sub>	<i>RHAG*01N.10</i>	c.1094T>G	8	p.Leu365Arg [1]

Names for *RHAG* (ISBT 030) blood group alleles v5.0 170514

Rh <sub>null</sub>	<i>RHAG*01N.11</i>	c.1139G>T	9	p.Gly380Val; Alternative splicing
Rh <sub>null</sub>	<i>RHAG*01N.12</i>	c.353C>T	3	p.Ala118Glu [5]
Rh <sub>null</sub>	<i>RHAG*01N.13</i>	c.1003G>A	7	p.Gly335Ser
Rh <sub>null</sub>	<i>RHAG*01N.14</i>	c.946-2A>G	Intron 6	Alternative splicing [7]
Rh <sub>null</sub>	<i>RHAG*01N.15</i>	c.(?-62)_(*638_?)del Gene deletion	1-10	p.0 [8]
Rh <sub>null</sub>	<i>RHAG*01N.16</i>	c.310C>T	2	p.Gln104Ter [9]
Rh <sub>null</sub>	<i>RHAG*01N.17</i>	c.640+3del14	Intron 4	Alternative splicing [10]
Rh <sub>null</sub>	<i>RHAG*01N.18</i>	c.790C>T	5	p.Arg263X [11]
Mod phenotypes				
Rh <sub>mod</sub>	<i>RHAG*01M.01</i>	c.1183delA	9	p.Asn395Thrfs*68
Rh <sub>mod</sub>	<i>RHAG*01M.02</i>	c.3G>T	1	p.Arg2_Met8del
Rh <sub>mod</sub>	<i>RHAG*01M.03</i>	c.236G>A	2	p.Ser79Asn
Rh <sub>mod</sub>	<i>RHAG*01M.04</i>	c.269G>T	2	p.Gly90Val [2]
Rh <sub>mod</sub>	<i>RHAG*01M.05</i>	c.398T>C	3	p.Leu133Pro [3]
Rh <sub>mod</sub>	<i>RHAG*01M.06</i>	c.560G>A	4	p.Gly187Asp [2]
Rh <sub>mod</sub>	<i>RHAG*01M.07</i>	c.1195G>T	9	p.Asp399Tyr
Rh <sub>mod</sub>	<i>RHAG*01M.08</i>	c.182T>G	2	p.Ile61Arg
Rh <sub>mod</sub>	<i>RHAG*01M.09</i>	c.194T>C	2	p.Phe65Ser
Rh <sub>mod</sub>	<i>RHAG*01M.10</i>	c.572G>A	4	p.Arg191Gln [6]
Rh <sub>mod</sub>	<i>RHAG*01M.11</i>	c.241G>C	2	p.Gly81Arg [10]

RHAG3 assigned provisionally.

Assignment of null (*N*) and mod (*M*) alleles has been made according to the phenotypic expression of RhD and RhCE antigens.

1. Tsuneyama H, et al. Transfusion 2005;45(suppl):130A (abstract).
2. Scharberg A, et al. Vox Sang 2006;91(suppl 3):129 (abstract).
3. Tsuneyama H, et al. Transfusion 2008;48(suppl):194A-195A (abstract).
4. Poole J, et al. A novel RHAG blood group antigen associated with severe HDFN. Vox Sang 2011;101(Suppl. 1):70 (abstract).
5. Grimsley S, et al. Novel mutations in RHAG causing two new examples of the regulator type of Rhnull. Transfus Med 2012;22(Suppl.1):21 (abstract).
6. Tsuneyama H, et al. Identification of a mutation in the *RHAG* gene of Japanese with weak D phenotype. Transfusion 2014;53(Suppl.):167A (abstract).
7. Arsenovic MG, et al. Vox Sang 2014;107(suppl.1):192 (abstract).
8. Gómez-Torreiro, et al. Transfusion 2015;55:197-8.
9. Arnoni CP, et al. Transfusion 2015;55:2521-2..

Names for *RHAG* (ISBT 030) blood group alleles v5.0 170514

10. Polin H, et al. *Transfusion* 2016;56:950-5.
11. Tanaka M, et al. *ISBT Sci Ser* 2016;11:51-7.