



NHS Blood & Transplant

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Antigen	Blood Group Kell related / CD238
Clone	BRIC 107
Product Code	9457
Immunoglobulin Class	Mouse IgG1, kappa light chain

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Antigen Description and Distribution

The Kp^a, Kp^b, and Kp^c antigens are part of the Kell (CD 238) blood group system¹. The antigens of the Kell system are carried on an erythrocyte membrane glycoprotein of 93 kDa, which is firmly bound to the cytoskeleton². The Kell antigen was designated CD 238 at the 7th human leucocyte differentiation antigen workshop. There are approximately 8-18 x 10³ copies of Kell antigen/red cell. The protein has been cloned and a full protein sequence deduced from the nucleotide sequence. The Kell cDNA sequence encodes a protein of 731 amino acids with a single membrane spanning domain of 20 residues and an intracellular N-terminal domain that is thought to comprise 46 residues. The predicted extracellular domain (665 amino acids) has 15 cysteine residues, some of which are likely to form disulphide bonds, and five potential N-glycosylation sites. It has homology with neutral endopeptidases and the CALLA antigen³. The antigen is found on human erythrocytes, liver sinusoidal cells⁴ and testis with weaker expression in a large number of other tissues such as brain and lymphoid tissues. Immunohistochemistry reveals human Kell protein is localized to the Sertoli cells of the testis and the follicular dendritic cells of the spleen and tonsil. On erythrocytes, Kell is linked by a single disulfide bond to XK. The absence of XK, as occurs in the McLeod phenotype, is associated with a set of clinical symptoms that include nerve and muscle disorders and red cell acanthocytosis. The Molecular Weight of Kell is 120 kDa.

Clone

BRIC 107 was made in response to intact human erythrocytes. In indirect haemagglutination tests, BRIC 107 agglutinates normal erythrocytes of the Kell blood group phenotype but fails to agglutinate erythrocytes expressing the K₀ or McLeod phenotype. BRIC 107 gives a markedly lower titration score with K+k- erythrocytes compared to K-k+ control. BRIC 107 fails to agglutinate erythrocytes treated with 6% aminoethylisothiuronium bromide or pronase. BRIC 107 agglutinates erythrocytes treated with either trypsin or chymotrypsin but fails to agglutinate erythrocytes treated sequentially with trypsin followed by chymotrypsin^{5,6}. BRIC 107 has anti-k (K2)-like specificity and identifies an M_r 95 600 erythrocyte membrane protein by immunoprecipitation from radio-iodinated erythrocytes. In competitive binding assays the four epitopes defined by the four BRIC monoclonal antibodies (BRIC 18, BRIC 68, BRIC 107 and BRIC 203) fall into two non-overlapping groups. The first group comprises BRIC 18, BRIC 68, BRIC 203 and an antibody (6-22) with anti-K14 specificity. The second group contains BRIC 107 and two further anti-k-like monoclonal antibodies (BS45 and OSK5). The results suggest that the polymorphisms encoded at the K/k and Kp^a/Kp^b/Kp^c loci may be located in two spatially distinct regions of the Kell glycoprotein(s)⁶.

References

1. Marsh WL & Redman CM (1990) Transfusion **30** 158-167 (review).
2. Redman CM *et al* (1984) Transfusion **24** 176-178.
3. Lee S *et al* (1991) Proc. Natl. Acad. Sci. USA **88** 6353-6357.
4. Anstee DJ *et al* (1992) In protein blood group antigens of the human red cell, chapter 8 170-181. ed. Agre P & Cartron JP. Johns Hopkins University Press.
5. Parsons SF *et al* (1991) Transf. Med. **1** suppl.2 48 (abstract).
6. Parsons SF *et al*. (1993) Transf. Med., **3**: 137-142.
7. Lee S. *et al*. (1995) Blood **85**: 1364-1370.
8. Camara-Clayette *et al*. (2001) Biochem. J. **356**: 171-180.
9. Yu L.C. *et al*. (2001) J. Biol. Chem. **276**: 10247-10252.
10. Lee S. *et al*. (2001) J. Biol. Chem. **276**: 27281-27289.
11. Wagner T. *et al*. (2002) Kell expression on myeloid progenitor cells. Leuk. Lymphoma **43**: 479-485.