

**International Blood Group  
Reference Laboratory**

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<b>Antigen</b>	Glycophorin C (extracellular domain) / CD 236R
<b>Clone</b>	BRIC 4
<b>Product Code</b>	9417
<b>Immunoglobulin Class</b>	Mouse IgG1, kappa light chain

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and Production Unit**

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## Antigen Description and Distribution

Glycophorin C (GPC, sialoglycoprotein  $\beta$ , glycoconnectin) and glycophorin D (GPD, sialoglycoprotein  $\sigma$ ) are closely related erythrocyte transmembrane glycoproteins, which are products of the same glycophorin C gene<sup>1</sup>. The GPC (Mr 40K) amino acid sequence consists of 128 amino acids which traverses the bilayer once. GPC has three domains: (i) a glycosylated N-terminal extracellular domain (residues 1-57) containing about 12 O-glycans and 1 N-glycan; (ii) a hydrophobic intramembranous domain (58-81) which spans the lipid bi-layer; and (iii) a C-terminal cytoplasmic domain (82-128). GPD is identical to GPC but lacks the first 21 NH<sub>2</sub>-terminal amino acid residues<sup>2,3</sup>. GPC is coded on chromosome 2q14-q21. The functional role of GPC and GPD is in the regulation of shape and membrane mechanical properties of the red cell through the interaction of their cytoplasmic domains with membrane protein 4.1 within the cytoskeleton network<sup>2</sup>. GPC carries the Gerbich blood group antigens<sup>2</sup>. GPC is deficient in erythrocytes of the Leach type of Gerbich negative. The other types of Gerbich negative, Gerbich type and Yus type, have altered forms of GPC. Rare individuals of the Leach phenotype lacking GPC and GPD have elliptocytic red cells<sup>2</sup>. GPC expression is not confined to erythroid cells<sup>3</sup> as GPC has a fairly broad distribution in both erythroid and non-erythroid tissues<sup>4,5</sup>. Previously 50-100,000 copies of GPC per red cell were estimated. By the use of Fab fragments of monoclonal antibodies, the number of molecules per red cell has been estimated at 143,000<sup>6</sup>.

## Clone

BRIC 4 was made in response to immunisation with intact red cells<sup>7</sup>. It reacts with an epitope located around residues 2-21 of GPC, and sialic acid attached to O-glycans is important in antigen expression<sup>8</sup>. It is reactive by indirect haemagglutination with normal erythrocytes and Tn erythrocytes but not normal erythrocytes pretreated with neuraminidase, trypsin, Pronase or papain<sup>9</sup>. BRIC 4 reacts with Ge-Yus- and Ge-Yus+ phenotype erythrocytes<sup>9</sup>. BRIC 4 also reacts by indirect immunofluorescence, immunoblotting and immunocytochemical techniques. BRIC 4 has a binding affinity<sup>6</sup> to erythrocytes of  $1.4 \pm 0.7 \times 10^8 \text{ molL}^{-1}$ . BRIC 4 has been used to elucidate protein distribution during human erythroblast enucleation<sup>10</sup>. BRIC 4 has been used to investigate the key membrane protein changes during *in vitro* erythropoiesis of Protein 4.2 cells<sup>11</sup>.

## References

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