An ubiquitous isoform of glycophorin C is produced by alternative splicing

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Glycophorin C (GPC) is a human erythrocyte integral membrane glycoprotein that plays an important role in regulating the mechanical stability of red cells (1). We have previously demonstrated that the GPC gene is expressed in a large number of cells and tissues, but its level of transcription is much higher in erythroid cells (2). In order to compare the primary structure of GPC in erythroid (3) and non erythroid cells, we have performed PCR amplifications of the GPC coding sequence using total RNAs from different cell lines and tissues. Two bands were detected on Southern blots by hybridization of the amplified cDNAs with GPC oligonucleotide probes (Fig. 1). The major signal identified had the expected size for GPC. However, the minor signal was shorter in length and did not hybridize with the exon-2 specific probe. Sequencing of the PCR amplification products revealed that the predominent cDNA encodes an intact GPC molecule of 128 residues in all cell lines and tissues examined, whereas the minor cDNA encodes a shortened GPC molecule of 109 residues lacking amino acids 17 to 35 encoded by exon 2 (Fig. 2). These findings, therefore, demonstrate that an ubiquitous shortened isoform of GPC (isoGPC) is produced by alternative splicing of the primary GPC gene transcript. Interestingly, the deduced primary structure of this isoform of GPC is identical to that of the glycoprotein that accumulates in some variant erythrocytes as a result of a partial GPC gene deletion (4).

REFERENCES

1. Reid *et al.* (1987) *Blood* **69**, 1068–1072.
2. Le Van Kim *et al.* (1989) *J. Biol. Chem.* **264**, 20407–20414.
3. Colin *et al.* (1986) *J. Biol. Chem.* **261**, 229–233.
4. Colin *et al.* (1989) *J. Biol. Chem.* **264**, 3773–3780.

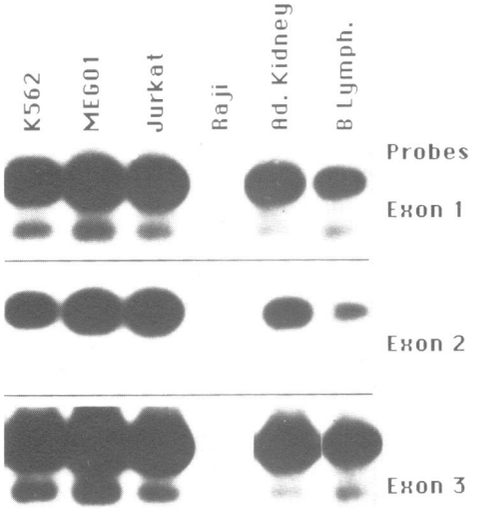

Figure 1. The amplified cDNAs obtained with RNAs from K562 (erythroleukemic), MEG01 (megakaryoblastic), Jurkat (T lymphoid), Raji (Burkitt B lymphoid) cell lines, and from adult kidney and B lymphocytes were hybridized with oligonucleotide probes specific for exon 1, exon 2 and exon 3 of the GPC gene. The upper and lower bands correspond respectively to the amplified intact GPC and shortened GPC coding sequences.

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 M   W   S   T   R   S   P   N   S   T   A   W   P   L
ATG TGG TCG ACG AGA AGC CCC AAC AGC ACG GCG TGG CCT CTC
 S   L   E   P   D   P   G   M   S   G   W   P   D   G
AGC CTC GAG CCT GAT CCA GGG ATG TCT GGA TGG CCG GAT GGC
 R   M   E   T   S   T   P   T   I   M   D   I   V   V
AGA ATG GAG ACC TCC ACC CCC ACC ATA ATG GAC ATT GTC GTC
 I   A   G   V   I   A   A   V   A   I   V   L   V   S
ATT GCA GGT GTG ATT GCT GCT GTG GCC ATC GTC CTA GTC TCC
 L   L   F   V   M   L   R   Y   M   Y   R   H   K   G
CTC CTC TTC GTC ATG CTG CGC TAC ATG TAC CGG CAC AAG GGC
 T   Y   H   T   N   E   A   K   G   T   E   F   A   E
ACG TAC CAC ACC AAT GAG GCC AAG GGC ACG GAG TTT GCT GAG
 S   A   D   A   A   L   Q   G   D   P   A   L   Q   D
AGT GCA GAT GCA GCC CTG CAG GGA GAC CCT GCC CTC CAA GAT
 A   G   D   S   S   R   K   E   Y   F   I  end
GCT GGT GAT AGC AGC AGA AAG GAG TAC TTT ATT TGA
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Figure 2. Nucleotide sequence and deduced amino acid sequence of isoGPC cDNA.