Name:	Fragment C2b (smaller fragment of complement protein C2) *
Catalog Number:	A171
Sizes Available:	30 µg/vial
Concentration:	1.0 mg/ml (see Certificate of Analysis for actual concentration)
Molecular weight:	34,000 Da (single chain)
Extinction Coeff.	$A_{280\ nm}$ = 1.401 at 1.0 mg/ml
Form:	Frozen Liquid
Purity:	>95% by SDS-PAGE (see Certificate of Analysis).
Buffer:	10 mM Sodium phosphate, 145 mM NaCl, pH 7.3
Preservative:	None, 0.22 µm filtered.
Storage:	-70ºC or below. Avoid repeated freeze/thaw.
Source:	Normal human serum (shown by certified tests to be negative for HBsAg and for antibodies to HCV, HIV-1 and HIV-II).
Precautions:	Use normal precautions for handling human blood products.
Origin:	Manufactured in the USA.

* Complement scientists have decided to designate the smaller of all C fragments with an 'a', and the larger with a 'b' and hence more recent literature may refer the larger C2 fragment as C2b. Complement Technology, Inc. uses the current Uniprot names which follow the original naming practice.

General Description

The smaller fragment of complement protein C2 is C2b that results from the activation of the classical and lectin pathways. CompTech prepares the C2b fragment from complement protein C2 which was purified from normal human serum. Initiation of classical and lectin pathway generates proteolytic enzyme complexes which are bound to the target surface (C1q/C1r/C1s in the classical pathway and MBL/ Ficolin/ MASPs in the lectin pathway). C1s and MASP in these complexes activate both C4 and C2. They cleave a peptide bond in C4 depositing C4b on the surface. They also cleave C2 into two fragments, the larger catalytic fragment C2a (73 kDa) binds to C4b and forms the C3/C5 convertase enzyme complex C4b,C2a and the smaller fragment C2b (34 kDa) is released in the fluid phase (Rawal N. and Pangburn M.K. 2003 and Nagasawa S. & Stroud, R. M. 1977). The smaller C2b fragment comes from the N-terminal of C2 protein, and it contains three CCP domains which interact weakly with C4b (Krishnan V. et al., 2009). Although the functional role of the released C2b fragment is not clearly known, one study has suggested that the C-terminal region of the C2b fragment increases vascular permeability in humans and guinea pigs (Strang et al., 1988).

Upon cleavage of C2 by C1s or MASP two fragments are produced. The larger, C2a, with 509 amino acids forms the C3/C5 convertase of the classical and lectin pathways. C2a comes from the C-terminal of C2 while the smaller fragment, C2b, with 223 amino acids is from the N-terminal. Both contain carbohydrate. C2 has numerous allotypes (A, B, and C) and electrophoretic isoforms that can be separated by isoelectric focusing. The isoforms have pIs in the 6.0 to 6.3 pH range.

Assays

There are no assays for the C2b fragment.

Physical Characteristics & Structure
Human C2b (smaller fragment) is composed of a single polypeptide chain. Nagasawa S. & Stroud, R. M. (1977) have reported C2b to have a molecular size of 34,000 Daltons as determined by SDS/polyacrylamide gel electrophoresis gels. At CompTech, using the Novex NuPAGE gel electrophoresis system with MOPS buffer on a 4-12% Tris-Glycine gel, purified human C2b migrates as a ~30,000 Dalton band respectively under non-reduced and reduced conditions. The crystal structure of the N-terminal segment C2b of C2 at 1.8 A resolution has been published (Krishnan V. et al., 2009).

The concentration of purified human C2b is determined by using the calculated extinction coefficient based on the amino acid sequence of human C2b using ProtParam and assumes all pairs of Cys residues form cystines (i.e., a pair of cystine molecules are joined by a disulfide bond).

References
Nagasawa S. & Stroud, R. M. (1977) Cleavage of C2 by Cis into the antigenically distinct fragments C2a and C2b. PNAS 74, 2998-3001.

Rawal N. and Pangburn M.K. (2003) Formation of high affinity C5 convertase of the classical pathway of complement. J Biol Chem. 278:38476-83.

Strang, C. J., Cholin, S., Spragg, J., Davis, A. E. III, Schneeberger, E. E., Donaldson, V. H. & Rosen, F. S. (1988). J. Exp. Med. 168, 1685–1698.

Krishnan V., Xu Y., Macon K., Volanakis J. E. & Narayan V. L. (2009) The structure of C2b, a fragment of complement component C2 produced during C3 convertase formation. Acta Crystallogr D Biol Crystallogr. 65(Pt 3): 266–274.