

Name:	C3b Protein (Rabbit)
Catalog Number:	Rb114
Sizes Available:	50 µg/vial
Concentration:	0.5 mg/mL (see Certificate of Analysis for actual concentration)
Form:	Frozen liquid
Purity:	≥ 85% by SDS PAGE
Buffer:	10 mM sodium phosphate, 145 mM NaCl, pH 7.2
Extinction Coeff.	$A_{280\text{ nm}} = 10.0$ at 1.0 mg/ml for pure C3
Molecular weight:	~175,000 Da (2 chains)
Preservative:	None, 0.22 µm filtered.
Storage:	-70°C or below. Avoid freeze/thaw.
Source:	Normal rabbit serum from healthy animals of mixed gender
Precautions:	Use normal precautions for handling animal blood products.
Origin:	Manufactured in the USA.

General Description

Rabbit C3b is derived from purified rabbit C3 (CompTech #Rb113) upon cleavage and release of C3a with the alternative pathway C3 convertase. C3 is central to the activation of all three pathways of complement activation (Law, S.K.A. and Reid, K.B.M. (1995)). Initiation of each pathway generates proteolytic enzyme complexes (C3 convertases) which are bound to the target surface. These enzymes cleave a peptide bond in C3 releasing the anaphylatoxin C3a and activating C3b. For a brief time (~60 µs) this nascent C3b is capable of reacting with and covalently coupling to hydroxyl groups on the target surface. Carbohydrates are the favored target, but protein hydroxyls and amino groups also react. This process of tagging the target surface with C3b is called opsonization. The reactive site in nascent C3b is a thioester (Tack B.J., et al. (1980); Pangburn M.K. and MüllerEberhard H.J. (1980)) and C3b is linked to the target through a covalent ester bond (an amide bond is formed if C3b is attached to amino groups). Most of the C3 activated during complement activation never attaches to the surface because its thioester reacts with water forming fluid phase C3b which is rapidly inactivated by factors H and I forming iC3b. Surface-bound C3b is necessary in all three pathways for efficient activation of C5 and formation of C5b-9 complexes that lyse the target cell membrane. Surface-bound C3b and its breakdown products iC3b and C3d are recognized by numerous receptors on lymphoid and phagocytic cells which use the C3b ligand to stimulate antigen presentation to cells of the adaptive immune system. The end result is an expansion of target-specific B-cell and T-cell populations.

Physical Characteristics & Structure

Rabbit C3b is composed of two disulfide-linked chains. Analysis of purified rabbit C3b by SDS/polyacrylamide gel electrophoresis (Invitrogen) under non-reduced conditions shows a single peptide like human C3b (176,000 daltons). Under reduced conditions, rabbit C3b exhibits two peptides like the alpha prime chain (101,000 daltons) and beta chain 75,000 daltons) of human C3b. To determine the concentration of purified rabbit C3b (Cat# Rb114) the extinction coefficient ($E_{1\%}^{1\text{cm}}/280\text{nm}$) was assumed to be 10.0 as the amino acid sequence only for the alpha but not the beta chain of rabbit C3 is available.

Function

The biological functions of C3 are described above in the General Description section.

Precautions/Toxicity/Hazards

This protein is purified from animal plasma/serum and therefore precautions appropriate for handling any animal blood-derived product must be used.

References

Law, S.K.A. and Reid, K.B.M. (1995) Complement 2nd Edition (ISBN 0199633568) Oxford University Press, Oxford.

Tack BF, Harrison RA, Janatova J, Thomas ML, Prah J. (1980) Evidence for presence of an internal thioester bond in third component of human complement. Proc Natl Acad Sci U S A. 77:5764-8.

Pangburn M.K. and Müller-Eberhard H.J. (1980) Relation of putative thioester bond in C3 to activation of the alternative pathway and the binding of C3b to biological targets of complement. J Exp Med. 152:1102-14.

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