Name:	**C1q Protein (Rat)**
Catalog Number:	**R099**
Sizes Available:	100 µg/vial
Concentration:	1.0 mg/mL (see Certificate of Analysis for actual concentration)
Form:	Frozen liquid
Purity:	≥ 85% by SDS PAGE
Buffer:	10 mM HEPES, 300 mM NaCl, pH 7.2
Extinction Coeff.	$A_{280\ nm}$ = 0.631 at 1.0 mg/ml for pure C1q
Molecular weight:	400,000 Da (18 chains)
Preservative:	None, 0.22 µm filtered.
Storage:	-70°C or below. Avoid freeze/thaw.
Source:	Normal rat serum from healthy animals of mixed gender
Precautions:	Use normal precautions for handling animal blood products.
Origin:	Manufactured in the USA.

General Description

Rat C1q is purified from pooled normal rat serum. C1q is part of the C1 complex, which is the first complement component in the classical pathway of complement. The C1 complex is a non-covalent assembly of three different proteins (C1q, C1r, and C1s) bound together in a calcium-dependent complex. C1q has six extended arms with domains at the end of each arm that bind to the Fc domains of immunoglobulins such as IgG or IgM. When antibodies bind to antigens, forming immune complexes, they cluster allowing two or more of the six C1q arms to bind to the Fc domains of antibodies. Rat IgG2 is very efficient when compared to IgG1 in activating complement (Medgyesi, G.A et., al., 1981). This is in contrast to the human system in which IgG1 activates complement but not IgG2 (Redpath, S. et. al., 1998). The binding of multiple arms of C1q to immune complexes causes the two C1r proteins in the complex (protease zymogens) to auto-activate. The activated C1r proteases cleave and activate the two C1s protease zymogens in the complex. The activated C1s cleaves complement component C4 releasing C4a and initiating covalent attachment of C4b to the activating surface. Activated C1s also cleaves C2 and the larger fragment of C2 binds to the surface-attached C4b forming C4b,C2a, the C3/C5 convertase of the classical pathway.
Rat IgG1 cannot activate complement whereas rat IgG2 does.

Physical Characteristics & Structure

The apparent molecular weight of rat C1q as determined by gel filtration has been reported to be 400,000 by Veerhuis, R. et al., (1985) and is calculated to be 420,000 based on its amino acid sequence. Rat C1q is a high molecular weight complex of 18 polypeptide chains. Each of the six arms of rat C1q contains three chains, an A chain (~30,000 daltons), a B chain (~28,000 daltons) and a C chain (~26,000 daltons) as determined by SDS/polyacrylamide gel electrophoresis (Wing, M.G. et al., (1993)).

Function

The biological functions of C1q are described above in the General Description and Physical Characteristics sections.

Applications

Rat C1q can be used to coat ELISA plates to capture and quantitate immune complexes in samples from rat models used for studying immune complex related diseases and conditions.

Genetics

NCBI Gene ID numbers for rat C1q are: C1q A chain (298566**)**, C1q B chain (29687), and C1q C chain (362634). The genes for C1q chains A, B and C are all located on chromosome 5. The UniprotKB primary accession numbers for rat C1q are: C1q A chain (P31720**)**, C1q B chain (P31721), and C1q C chain (P31722).

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

Medgyesi, G.A et., Miklos, K., Kulics, J., Fust, G., and Gergely, J. Bazin, H. (1981). Classes and subclasses of rat antibodies: reaction with the antigen and interaction of the complex with the complement system. Immunology **43**, 171-176.

Redpath, S., Michaelsen, T., Sandlie, I. and Clark, M. R. (1998). Activation of complement by human IgG1 and human IgG3 antibodies against the human leucocyte antigen CD52. Immunology **93**, 595–600.

Veerhuis, R., Van Es, L.A. and Daha, M.R. (1985). *In vivo* degradation of rat C1q induced by intravenous injection of soluble IgG aggregates. Immunology **54**, 801-810.

Wing, M.G., Seilly, D. J., Bridgman, D.J. and Harrison, R.A. (1993). Rapid isolation and biochemical characterization of rat C1 and C1q. Molecular Immunology **30**, 433-440.

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