

Datasheet: 2222-8004

**BATCH NUMBER 158992**

<b>Description:</b>	MOUSE ANTI HUMAN C4d
<b>Specificity:</b>	C4d
<b>Other names:</b>	COMPLEMENT COMPONENT 4d
<b>Format:</b>	Purified
<b>Product Type:</b>	Monoclonal Antibody
<b>Clone:</b>	10-11
<b>Isotype:</b>	IgG1
<b>Quantity:</b>	0.1 mg

## Product Details

### Applications

This product has been reported to work in the following applications. This information is derived from testing within our laboratories, peer-reviewed publications or personal communications from the originators. Please refer to references indicated for further information. For general protocol recommendations, please visit [www.bio-rad-antibodies.com/protocols](http://www.bio-rad-antibodies.com/protocols).

	Yes	No	Not Determined	Suggested Dilution
Immunohistology - Frozen	▪			1/100 - 1/750
Immunohistology - Paraffin (1)	▪			
ELISA	▪			1/5000 - 1/20000
Western Blotting	▪			
Immunofluorescence	▪			1/250 - 1/600

Where this product has not been tested for use in a particular technique this does not necessarily exclude its use in such procedures. Suggested working dilutions are given as a guide only. It is recommended that the user titrates the product for use in their own system using the appropriate negative/positive controls.

**(1)It has been reported that this antibody works very well on acetone-fixed, frozen renal biopsies. Strong staining is observed in the glomeruli and in some cases the peritubular capillaries.**

**Clone 10-11 has given variable results on formalin-fixed, paraffin-embedded sections. It has been observed that pre-treatment with 88% formic acid for 20 minutes at room temperature is beneficial (6).**

<b>Target Species</b>	Human
<b>Species Cross</b>	Does not react with:Mouse, Dog, Bovine, Cat, Rabbit, Rat, Guinea Pig, Sheep

## Reactivity

Product Form	Purified IgG - liquid
Preparation	Purified IgG prepared by Fast protein liquid chromatography (FPLC)
Buffer Solution	Borate buffered saline
Preservative Stabilisers	0.09% Sodium Azide (NaN <sub>3</sub> )
Approx. Protein Concentrations	IgG concentration 1.0 mg/ml
Immunogen	Native, from human plasma

## External Database Links

### UniProt:

[P0C0L4](#)     [Related reagents](#)

[P0C0L5](#)     [Related reagents](#)

### Entrez Gene:

[720](#)   C4A   [Related reagents](#)

[721](#)   C4B   [Related reagents](#)

Synonyms	CO4, CPAMD2, CPAMD3
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RRID	AB_620117
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Specificity	<p><b>Mouse anti Human C4d antibody, clone 10-11</b> recognizes the secreted protein complement component 4d (C4d). The presence of C4d in renal peritubular capillaries is a key indicator for acute antibody-mediated rejection [AMR] (<a href="#">Collins et al. 1999.</a>).</p>
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C4d was accepted in 2003 into the Banff classification for identification of acute AMR ([Racusen et al. 2003](#)). Mouse anti Human C4d antibody, clone 10-11 is specific for C4d, a marker that can be used in the detection of acute AMR for kidney, heart, pancreas and lung allografts. C4d is regarded as a key marker of antibody-mediated cell injury and humoral rejection ([Sacks and Chowdhury 2002](#)).

Complement 1 complex cleaves complement 4 (C4) to form C4b and C4a. C4b levels are strictly regulated. Single site cleavage of the C4b's alpha chain by Factor I forms iC4b and blocks C3 convertase, inhibiting opsonization and activation of the classical pathway. This requires C4 binding protein or CR1 as a cofactor. iC4b is further degraded into C4d and C4c. C4b's short half life means that C4d is present in serum at high enough concentrations to make it a useful marker for classical complement activation ([Collins et al. 1999](#)).

Mouse anti Human C4d antibody, clone 10-11 is used to detect the biomarker C4d which has been described as a "footprint" of antibody mediated tissue rejection ([Sacks and](#)

[Chowdhury 2002](#)). The internal thioester of C4b becomes exposed during cleavage to C4d and forms a covalent bond with the cell surface. The longer half-life of covalently bound C4d makes it a footprint of complement activation long after weakly bound antibodies have been cleared by the blood stream ([Sacks and Chowdhury 2002](#)).

C4 has also been linked to susceptibility to systemic lupus erythematosus ([Yang et al. 2004](#)) and rheumatoid arthritis ([Makinde et al. 1989](#)).

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## References

1. Mauiyyedi, S. *et al.* (2002) Acute humoral rejection in kidney transplantation: II. Morphology, immunopathology, and pathologic classification. [J Am Soc Nephrol. 13 \(3\): 779-87.](#)
2. Collins, A.B. *et al.* (1999) Complement activation in acute humoral renal allograft rejection: diagnostic significance of C4d deposits in peritubular capillaries. [J Am Soc Nephrol. 10 \(10\): 2208-14.](#)
3. Knechtle, S.J. *et al.* (2003) Campath-1H induction plus rapamycin monotherapy for renal transplantation: results of a pilot study. [Am J Transplant. 3 \(6\): 722-30.](#)
4. Mauiyyedi, S. *et al.* (2001) Chronic humoral rejection: identification of antibody-mediated chronic renal allograft rejection by C4d deposits in peritubular capillaries. [J Am Soc Nephrol. 12 \(3\): 574-82.](#)
5. Rogers, J. *et al.* (1992) Complement activation by beta-amyloid in Alzheimer disease. [Proc Natl Acad Sci U S A. 89 \(21\): 10016-20.](#)
6. Troxell, M.L. *et al.* (2010) Pancreas allograft rejection: analysis of concurrent renal allograft biopsies and posttherapy follow-up biopsies. [Transplantation. 90: 75-84.](#)
7. Rowe, P. *et al.* (2013) Increased complement activation in human type 1 diabetes pancreata. [Diabetes Care. 36 \(11\): 3815-7.](#)
8. Johnson, R.K. *et al.* (2013) Acute tubular injury is an important component in type I acute antibody-mediated rejection. [Transplant Proc. 45: 3262-8.](#)
9. Roden, A.C. *et al.* (2016) Transbronchial Cryobiopsies in the Evaluation of Lung Allografts: Do the Benefits Outweigh the Risks? [Arch Pathol Lab Med. 140 \(4\): 303-11.](#)
10. Verghese, P.S. *et al.* (2016) The clinical implications of the unique glomerular complement deposition pattern in transplant glomerulopathy. [J Nephrol. Nov 15. \[Epub ahead of print\]](#)
11. Troxell, M.L. & Lanciault, C. (2016) Practical Applications in Immunohistochemistry: Evaluation of Rejection and Infection in Organ Transplantation. [Arch Pathol Lab Med. 140 \(9\): 910-25.](#)
12. Jain, D. *et al.* (2017) Detection of T and B cells specific complement-fixing alloantibodies using flow cytometry: A diagnostic approach for a resource limited laboratory. [Asian J Transfus Sci. 11 \(2\): 171-9.](#)
13. Dugum, M. *et al.* (2014) Re-examination of sinusoidal deposition of complement 4d in liver allografts: experience from a single institution. [Int J Clin Exp Pathol. 7 \(2\): 784-91.](#)
14. Sánchez-escuredo, A. *et al.* (2016) Borderline rejection in ABO-incompatible kidney transplantation. [Clin Transplant. 30 \(8\): 872-9.](#)
15. Lattenist, L. *et al.* (2013) Renal and urinary levels of endothelial protein C receptor correlate with acute renal allograft rejection. [PLoS One. 8 \(5\): e64994.](#)
16. Verghese, P. *et al.* (2013) The impact of C4d and microvascular inflammation before we knew them. [Clin Transplant. 27 \(3\): 388-96.](#)

<b>Further Reading</b>	<ol style="list-style-type: none"> <li>1. Stoltzner, S.E. <i>et al.</i> (2000) Temporal accrual of complement proteins in amyloid plaques in Down's syndrome with Alzheimer's disease. <a href="#">Am J Pathol. 156 (2): 489-99.</a></li> <li>2. Sacks, S.H. &amp; Chowdhury, P. (2002) Footprints of humoral rejection. <a href="#">Curr Opin Nephrol Hypertens. 11 (6): 627-8.</a></li> <li>3. Racusen, L.C. <i>et al.</i> (2003) Antibody-mediated rejection criteria - an addition to the Banff 97 classification of renal allograft rejection. <a href="#">Am J Transplant. 3 (6): 708-14.</a></li> <li>4. Yang, Y. <i>et al.</i> (2004) The intricate role of complement component C4 in human systemic lupus erythematosus. <a href="#">Curr Dir Autoimmun. 7: 98-132.</a></li> <li>5. Makinde, V.A. <i>et al.</i> (1989) Reflection of disease activity in rheumatoid arthritis by indices of activation of the classical complement pathway. <a href="#">Ann Rheum Dis. 48 (4): 302-6.</a></li> </ol>
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<b>Storage</b>	This product is shipped at ambient temperature. It is recommended to aliquot and store at -20°C on receipt. When thawed, aliquot the sample as needed. Keep aliquots at 2-8°C for short term use (up to 4 weeks) and store the remaining aliquots at -20°C.
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Avoid repeated freezing and thawing as this may denature the antibody. Storage in frost-free freezers is not recommended.

<b>Guarantee</b>	12 months from date of despatch
<b>Health And Safety Information</b>	Material Safety Datasheet documentation #10077 available at: <a href="https://www.bio-rad-antibodies.com/SDS/2222-8004">https://www.bio-rad-antibodies.com/SDS/2222-8004</a> 10077
<b>Regulatory</b>	For research purposes only

## Related Products

### Recommended Secondary Antibodies

Rabbit Anti Mouse IgG (STAR12...)	<a href="#">RPE</a>
Goat Anti Mouse IgG IgA IgM (STAR87...)	<a href="#">HRP</a>
Goat Anti Mouse IgG (STAR76...)	<a href="#">RPE</a>
Goat Anti Mouse IgG (STAR70...)	<a href="#">FITC</a>
Goat Anti Mouse IgG (H/L) (STAR117...)	<a href="#">Alk. Phos.</a> , <a href="#">DyLight®488</a> , <a href="#">DyLight®550</a> , <a href="#">DyLight®650</a> , <a href="#">DyLight®680</a> , <a href="#">DyLight®800</a> , <a href="#">FITC</a> , <a href="#">HRP</a>
Rabbit Anti Mouse IgG (STAR13...)	<a href="#">HRP</a>
Goat Anti Mouse IgG (Fc) (STAR120...)	<a href="#">FITC</a> , <a href="#">HRP</a>
Rabbit Anti Mouse IgG (STAR9...)	<a href="#">FITC</a>
Goat Anti Mouse IgG (STAR77...)	<a href="#">HRP</a>

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