

Datasheet: 2222-8004

**BATCH NUMBER 164505**

|                      |                         |
|----------------------|-------------------------|
| <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) from ascites |
| Buffer Solution                | Borate buffered saline                                                          |
| Preservative Stabilisers       | <0.1% 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

**RRID**            AB\_620117

**Specificity**      **Mouse anti Human C4d antibody, clone 10-11** 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] ([Collins \*et al.\* 1999.](#)).

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. 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.](#)
2. 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.](#)
3. 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.](#)
4. 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.](#)
5. Troxell, M.L. *et al.* (2010) Pancreas allograft rejection: analysis of concurrent renal allograft biopsies and posttherapy follow-up biopsies. [Transplantation. 90: 75-84.](#)
6. Rowe, P. *et al.* (2013) Increased complement activation in human type 1 diabetes pancreata. [Diabetes Care. 36 \(11\): 3815-7.](#)
7. 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.](#)
8. 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.](#)
9. Vergheze, P. *et al.* (2013) The impact of C4d and microvascular inflammation before we knew them. [Clin Transplant. 27 \(3\): 388-96.](#)
10. 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.](#)
11. 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.](#)
12. Sánchez-escuredo, A. *et al.* (2016) Borderline rejection in ABO-incompatible kidney transplantation. [Clin Transplant. 30 \(8\): 872-9.](#)
13. 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.](#)
14. Vergheze, P.S. *et al.* (2018) The clinical implications of the unique glomerular complement deposition pattern in transplant glomerulopathy. [J Nephrol. 31 \(1\): 157-64.](#)

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## Further Reading

1. Makinde, V.A. *et al.* (1989) Reflection of disease activity in rheumatoid arthritis by indices of activation of the classical complement pathway. [Ann Rheum Dis. 48 \(4\): 302-6.](#)
2. Stoltzner, S.E. *et al.* (2000) Temporal accrual of complement proteins in amyloid plaques in Down's syndrome with Alzheimer's disease. [Am J Pathol. 156 \(2\): 489-99.](#)
3. Sacks, S.H. & Chowdhury, P. (2002) Footprints of humoral rejection. [Curr Opin Nephrol Hypertens. 11 \(6\): 627-8.](#)

4. Racusen, L.C. *et al.* (2003) Antibody-mediated rejection criteria - an addition to the Banff 97 classification of renal allograft rejection. [Am J Transplant. 3 \(6\): 708-14.](#)
5. Yang, Y. *et al.* (2004) The intricate role of complement component C4 in human systemic lupus erythematosus. [Curr Dir Autoimmun. 7: 98-132.](#)
6. 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.](#)

**Storage** 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.

Avoid repeated freezing and thawing as this may denature the antibody. Storage in frost-free freezers is not recommended.

**Guarantee** 12 months from date of despatch

**Health And Safety Information** Material Safety Datasheet documentation #10077 available at: <https://www.bio-rad-antibodies.com/SDS/2222-8004>  
10077

**Regulatory** 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> ,<br><a href="#">DyLight®650</a> , <a href="#">DyLight®680</a> , <a href="#">DyLight®800</a> ,<br><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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