

## Datasheet: MCA1957T

**BATCH NUMBER 153583**

<b>Description:</b>	RAT ANTI MOUSE CD68
<b>Specificity:</b>	CD68
<b>Other names:</b>	MACROSIALIN
<b>Format:</b>	Purified
<b>Product Type:</b>	Monoclonal Antibody
<b>Clone:</b>	FA-11
<b>Isotype:</b>	IgG2a
<b>Quantity:</b>	25 µg

## 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
Flow Cytometry (1)	▪			1/50 - 1/100
Immunohistology - Frozen	▪			
Immunohistology - Paraffin (2)	▪			
ELISA			▪	
Immunoprecipitation	▪			
Western Blotting (3)	▪			
Immunofluorescence	▪			
In vitro Assay			▪	

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 appropriate negative/positive controls.

(1) **Membrane permeabilisation is required for this application. Bio-Rad recommends the use of Leucoperm™ (Product Code [BUF09](#)) for this purpose.**

(2) **This product may require antigen retrieval using heat treatment prior to staining of paraffin sections. Either sodium citrate buffer or Tris/EDTA buffer may be used for this purpose. See [Martin-Manso](#) for details. Staining has also been achieved without antigen retrieval, see [Lu](#) for details.**

(3) **Non-reducing conditions recommended.**

<b>Target Species</b>	Mouse
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<b>Product Form</b>	Purified IgG - liquid
<b>Preparation</b>	Purified IgG prepared by affinity chromatography on Protein G from tissue culture supernatant
<b>Buffer Solution</b>	Phosphate buffered saline
<b>Preservative Stabilisers</b>	0.09% Sodium Azide
<b>Carrier Free</b>	Yes
<b>Approx. Protein Concentrations</b>	IgG concentration 1.0mg/ml
<b>Immunogen</b>	Purified Concanavalin A acceptor glycoprotein from P815 cell line.
<b>External Database Links</b>	<p><b>UniProt:</b>  <a href="#">P31996</a>    <a href="#">Related reagents</a></p> <p><b>Entrez Gene:</b>  <a href="#">12514</a> Cd68    <a href="#">Related reagents</a></p>
<b>RRID</b>	AB_2074849
<b>Specificity</b>	<p><b>Rat anti Mouse CD68 antibody, clone FA-11</b> recognizes mouse macrosialin, a heavily glycosylated transmembrane protein and murine homolog of human CD68, which is classified as a unique scavenger receptor (ScR) family member, due to the presence of a lysosome associated membrane protein (LAMP)-like domain.</p> <p>CD68 is considered a pan macrophage marker, predominantly expressed on the intracellular lysosomes of tissue macrophages/monocytes, including Kupffer cells, microglia, histiocytes and osteoclasts, and is expressed to a lesser extent by dendritic cells and peripheral blood granulocytes.</p> <p>CD68 is expressed by many tumor types including some B cell lymphomas, blastic NK lymphomas, melanomas, granulocytic (myeloid) sarcomas, hairy cell leukemias, and renal, urinary and pancreatic tumors, and can be used in cancer studies to demonstrate the presence/localization of macrophages.</p> <p>Rat anti mouse CD68 antibody, clone FA-11, has been used in many mouse models for the identification of CD68 in immunohistochemical studies, using both frozen and paraffin-embedded tissues (<a href="#">Masaki et al. 2003</a>) and (<a href="#">Devey et al. 2009</a>).</p> <p>Rat anti mouse CD68 antibody, clone FA-11 can be used in flow cytometry to detect intracellular CD68, following permeabilization, and can detect surface macrosialin at low levels in resident mouse peritoneal macrophages which can be enhanced with thioglycollate stimulation.</p>

## References

1. Ramprasad, M.P. *et al.* (1996) Cell surface expression of mouse macrosialin and human CD68 and their role as macrophage receptors for oxidized low density lipoprotein. [Proc Natl Acad Sci U S A. 93 \(25\): 14833-8.](#)
2. Rabinowitz, S.S. & Gordon, S. (1991) Macrosialin, a macrophage-restricted membrane sialoprotein differentially glycosylated in response to inflammatory stimuli. [J Exp Med. 174 \(4\): 827-36.](#)
3. da Silva, R.P. & Gordon, S. (1999) Phagocytosis stimulates alternative glycosylation of macrosialin (mouse CD68), a macrophage-specific endosomal protein. [Biochem J. 338 \( Pt 3\): 687-94.](#)
4. Schleicher, U. *et al.* (2005) Minute numbers of contaminant CD8+ T cells or CD11b+CD11c+ NK cells are the source of IFN- $\gamma$  in IL-12/IL-18-stimulated mouse macrophage populations. [Blood 105: 1319-1328.](#)
5. Choi, E.J. *et al.* (2014) Novel brain arteriovenous malformation mouse models for type 1 hereditary hemorrhagic telangiectasia. [PLoS One. 9\(2\): e88511.](#)
6. Kassim, S. *et al.* (2010) Gene therapy in a humanized mouse model of familial hypercholesterolemia leads to marked regression of atherosclerosis. [PloS ONE 5: e13424.](#)
7. Rahaman, S.O. *et al.* (2011) Vav family Rho guanine nucleotide exchange factors regulate CD36-mediated macrophage foam cell formation. [J Biol Chem. 286: 7010-7.](#)
8. Frossard, J.L. *et al.* (2011) Role of CCL-2, CCR-2 and CCR-4 in cerulein-induced acute pancreatitis and pancreatitis-associated lung injury. [J Clin Pathol. 64: 387-93](#)
9. West, E.L. *et al.* (2010) Long-term survival of photoreceptors transplanted into the adult murine neural retina requires immune modulation. [Stem Cells. 28: 1997-2007.](#)
10. Lopez, M.E. *et al.* (2011) Anatomically defined neuron-based rescue of neurodegenerative niemann-pick type C disorder. [J Neurosci. 31: 4367-78.](#)
11. Jayagopal, A. *et al.* (2009) Quantum dot mediated imaging of atherosclerosis. [Nanotechnology. 20: 165102.](#)
12. Leung, V.W. *et al.* (2009) Decay-accelerating factor suppresses complement C3 activation and retards atherosclerosis in low-density lipoprotein receptor-deficient mice. [Am J Pathol. 175: 1757-67.](#)
13. Devey, L. *et al.* (2009) Tissue-resident macrophages protect the liver from ischemia reperfusion injury via a heme oxygenase-1-dependent mechanism. [Mol Ther. 17: 65-72.](#)
14. Lu, W. *et al.* (2010) Photoacoustic imaging of living mouse brain vasculature using hollow gold nanospheres. [Biomaterials. 31: 2617-26.](#)
15. de Beer, M.C. *et al.* (2003) Lack of a direct role for macrosialin in oxidized LDL metabolism. [J Lipid Res. 44: 674-85.](#)
16. Song, L. *et al.* (2011) Deletion of the murine scavenger receptor CD68. [J Lipid Res. 52: 1542-50.](#)
17. Daldrup-Link, H.E. *et al.* (2011) MR Imaging of Tumor Associated Macrophages with Clinically-Applicable Iron Oxide Nanoparticles. [Clin Cancer Res. 17: 5695-704.](#)
18. Macauley, S.L. *et al.* (2011) The Role of Attenuated Astrocyte Activation in Infantile Neuronal Ceroid Lipofuscinosis [J. Neurosci 31: 15575-85.](#)
19. Martin-Manso, G. *et al.* (2008) Thrombospondin 1 promotes tumor macrophage recruitment and enhances tumor cell cytotoxicity of differentiated U937 cells. [Cancer Res. 68: 7090-9.](#)

20. Lazarini, F. *et al.* (2012) Early Activation of Microglia Triggers Long-Lasting Impairment of Adult Neurogenesis in the Olfactory Bulb [J Neurosci 32: 3652-64](#)
21. Hemmi, H. *et al.* (2009) A new triggering receptor expressed on myeloid cells (Trem) family member, Trem-like 4, binds to dead cells and is a DNAX activation protein 12-linked marker for subsets of mouse macrophages and dendritic cells. [J Immunol. 182: 1278-86.](#)
22. Akbarshahi, H. *et al.* (2012) Enrichment of Murine CD68(+)CCR2(+) and CD68(+)CD206(+) Lung Macrophages in Acute Pancreatitis-Associated Acute Lung Injury. [PLoS One. 7: e42654.](#)
23. Xiang, X. *et al.* (2016) TREM2 deficiency reduces the efficacy of immunotherapeutic amyloid clearance. [EMBO Mol Med. 8 \(9\): 992-1004.](#)
24. Masaki, T. *et al.* (2003) Heterogeneity of antigen expression explains controversy over glomerular macrophage accumulation in mouse glomerulonephritis. [Nephrol. Dial. Transplant 18:178-81.](#)
25. Dormishian, M. *et al.* (2013) Prokineticin receptor-1 is a new regulator of endothelial insulin uptake and capillary formation to control insulin sensitivity and cardiovascular and kidney functions. [J Am Heart Assoc. 2 \(5\): e000411.](#)
26. von Bargen, K. *et al.* (2014) Cervical Lymph Nodes as a Selective Niche for Brucella during Oral Infections. [PLoS One. 10 \(4\): e0121790.](#)
27. Hamour, S. *et al.* (2015) Local IL-17 Production Exerts a Protective Role in Murine Experimental Glomerulonephritis. [PLoS One. 10 \(8\): e0136238.](#)
28. Wang L *et al.* (2016) Bone Fracture Pre-Ischemic Stroke Exacerbates Ischemic Cerebral Injury in Mice. [PLoS One. 11 \(4\): e0153835.](#)
29. Nguyen, T.V. *et al.* (2016) Multiplex immunoassay characterization and species comparison of inflammation in acute and non-acute ischemic infarcts in human and mouse brain tissue. [Acta Neuropathol Commun. 4 \(1\): 100.](#)
30. Pena-Philippides, J.C. *et al.* (2016) *In vivo* inhibition of miR-155 significantly alters post-stroke inflammatory response. [J Neuroinflammation. 13 \(1\): 287.](#)
31. Paiva, A. A. *et al.* (2017) Apolipoprotein CIII Overexpression-Induced Hypertriglyceridemia Increases Nonalcoholic Fatty Liver Disease in Association with Inflammation and Cell Death. [Oxidative Med Cellular Longev. 2017: 1-18.](#)
32. Giraldo, J.A. *et al.* (2016) The impact of cell surface PEGylation and short-course immunotherapy on islet graft survival in an allogeneic murine model. [Acta Biomater. pii: S1742-7061\(16\)30656-0. \[Epub ahead of print\]](#)
33. Masuda, T. *et al.* (2017) Growth Factor Midkine Promotes Nuclear Factor of Activated T Cells-Regulated T-Cell-Activation and Th1 Cell Differentiation in Lupus Nephritis. [Am J Pathol. Feb 6. pii: S0002-9440\(17\)30029-9. \[Epub ahead of print\]](#)
34. Garofalo, S. *et al.* (2017) The glycoside oleandrin reduces glioma growth with direct and indirect effects on tumor cells. [J Neurosci. Mar 14. pii: 2296-16. \[Epub ahead of print\]](#)
35. Maeda, K. *et al.* (2017) Inhibition of H3K9 methyltransferase G9a ameliorates methylglyoxal-induced peritoneal fibrosis. [PLoS One. 12 \(3\): e0173706.](#)
36. Nishikawa, K. *et al.* (2015) Resveratrol increases CD68<sup>+</sup> Kupffer cells colocalized with adipose differentiation-related protein and ameliorates high-fat-diet-induced fatty liver in mice. [Mol Nutr Food Res. 59 \(6\): 1155-70.](#)
37. Nagy, B. *et al.* (2017) Different patterns of neuronal activity trigger distinct responses of oligodendrocyte precursor cells in the corpus callosum. [PLoS Biol. 15 \(8\): e2001993.](#)
38. Koh, A.J. *et al.* (2017) The skeletal impact of the chemotherapeutic agent etoposide. [Osteoporos Int. 28 \(8\): 2321-33.](#)

39. Menzies, R.I. *et al.* (2017) Hyperglycemia-induced Renal P2X7 Receptor Activation Enhances Diabetes-related Injury. [EBioMedicine. 19: 73-83.](#)
40. Takane, K. *et al.* (2017) Detrimental Effects of Centrally Administered Angiotensin II are Enhanced in a Mouse Model of Alzheimer Disease Independently of Blood Pressure. [J Am Heart Assoc. 6 \(4\)Apr 20 \[Epub ahead of print\].](#)
41. Xuan, H. *et al.* (2017) Inhibition or deletion of angiotensin II type 1 receptor suppresses elastase-induced experimental abdominal aortic aneurysms. [J Vasc Surg. Apr 20 \[Epub ahead of print\].](#)
42. Metghalchi, S. *et al.* (2018) Indoleamine 2 3-dioxygenase knockout limits angiotensin II-induced aneurysm in low density lipoprotein receptor-deficient mice fed with high fat diet. [PLoS One. 13 \(3\): e0193737.](#)
43. Hill, N.R. *et al.* (2018) RIPK3-deficient mice were not protected from nephrotoxic nephritis. [BMC Nephrol. 19 \(1\): 61.](#)
44. Fumagalli, S. *et al.* (2019) The phagocytic state of brain myeloid cells after ischemia revealed by superresolution structured illumination microscopy. [J Neuroinflammation. 16 \(1\): 9.](#)
45. Gratuze, M. *et al.* (2020) Impact of TREM2R47H variant on tau pathology-induced gliosis and neurodegeneration [J Clin Invest130\(9\):4954-68.](#)
46. Garrett, M.C. *et al.* (2020) Injectable diblock copolypeptide hydrogel provides platform to deliver effective concentrations of paclitaxel to an intracranial xenograft model of glioblastoma. [PLoS One. 15 \(7\): e0219632.](#)
47. Rahman, K. *et al.* (2017) Inflammatory Ly6Chi monocytes and their conversion to M2 macrophages drive atherosclerosis regression. [J Clin Invest. 127 \(8\): 2904-15.](#)
48. Santiago-Raber, M.L. *et al.* (2020) Atherosclerotic plaque vulnerability is increased in mouse model of lupus. [Sci Rep. 10 \(1\): 18324.](#)
49. Zhang, X. *et al.* (2020) Targeted suppression of microRNA-33 in lesional macrophages using pH low-insertion peptides (pHLIP) improves atherosclerotic plaque regression [Oct 28. \[Epub ahead of print\].](#)
50. Hada, Y. *et al.* (2020) Inhibition of interleukin-6 signaling attenuates aortitis, left ventricular hypertrophy and arthritis in interleukin-1 receptor antagonist deficient mice. [Clin Sci \(Lond\). 134 \(20\): 2771-87.](#)
51. Souza, C.L.S.E. *et al.* (2020) Ovarian hormones influence immune response to *Staphylococcus aureus* infection. [Braz J Infect Dis. Nov 10 \[Epub ahead of print\].](#)
52. Grundmann, S.M. *et al.* (2020) High-phosphorus diets reduce aortic lesions and cardiomyocyte size and modify lipid metabolism in Ldl receptor knockout mice. [Sci Rep. 10 \(1\): 20748.](#)
53. Mia, M.M. *et al.* (2020) YAP/TAZ deficiency reprograms macrophage phenotype and improves infarct healing and cardiac function after myocardial infarction. [PLoS Biol. 18 \(12\): e3000941.](#)
54. Zaghoul, N. *et al.* (2020) Prophylactic inhibition of NF-κB expression in microglia leads to attenuation of hypoxic ischemic injury of the immature brain. [J Neuroinflammation. 17 \(1\): 365.](#)
55. Huang, J. *et al.* (2020) Bone Fracture Enhanced Blood-Brain Barrier Breakdown in the Hippocampus and White Matter Damage of Stroke Mice. [Int J Mol Sci. 21 \(22\)Nov 11 \[Epub ahead of print\].](#)
56. Lowe, P.P. *et al.* (2020) Chronic alcohol-induced neuroinflammation involves CCR2/5-dependent peripheral macrophage infiltration and microglia alterations. [J](#)

[Neuroinflammation. 17 \(1\): 296.](#)

57. Stroobants, S. *et al.* (2020) Aged Tmem106b knockout mice display gait deficits in coincidence with Purkinje cell loss and only limited signs of non-motor dysfunction. [Brain Pathol. : e12903.](#)
58. Alberti, S. *et al.* (2020) The antiplatelet agent revacept prevents the increase of systemic thromboxane A<sub>2</sub> biosynthesis and neointima hyperplasia. [Sci Rep. 10 \(1\): 21420.](#)
59. Härdtner, C. *et al.* (2020) Inhibition of macrophage proliferation dominates plaque regression in response to cholesterol lowering. [Basic Res Cardiol. 115 \(6\): 78.](#)
60. Ribeiro, P.C. *et al.* (2020) Therapeutic potential of human induced pluripotent stem cells and renal progenitor cells in experimental chronic kidney disease. [Stem Cell Res Ther. 11 \(1\): 530.](#)
61. Miró, L. *et al.* (2020) Dietary Supplementation with Spray-Dried Porcine Plasma Attenuates Colon Inflammation in a Genetic Mouse Model of Inflammatory Bowel Disease. [Int J Mol Sci. 21\(18\): 6760.](#)
62. Zhou, F. *et al.* (2020)  $\beta$ -Carotene conversion to vitamin A delays atherosclerosis progression by decreasing hepatic lipid secretion in mice. [J Lipid Res. 61 \(11\): 1491-1503.](#)
63. Nelvagal, H.R. *et al.* (2020) Comparative proteomic profiling reveals mechanisms for early spinal cord vulnerability in CLN1 disease. [Sci Rep. 10 \(1\): 15157.](#)
64. Grubišić, V. *et al.* (2020) Enteric Glia Modulate Macrophage Phenotype and Visceral Sensitivity following Inflammation. [Cell Rep. 32 \(10\): 108100.](#)
65. Riedl, K.A. *et al.* (2020) Wall shear stress analysis using 17.6 Tesla MRI: A longitudinal study in ApoE<sup>-/-</sup> mice with histological analysis. [PLoS One. 15 \(8\): e0238112.](#)
66. Rojanathammanee, L. *et al.* (2013) Pomegranate polyphenols and extract inhibit nuclear factor of activated T-cell activity and microglial activation *in vitro* and in a transgenic mouse model of Alzheimer disease. [J Nutr. 143 \(5\): 597-605.](#)
67. Shahraz, A. *et al.* (2021) Phagocytosis-related NADPH oxidase 2 subunit gp91phox contributes to neurodegeneration after repeated systemic challenge with lipopolysaccharides. [Glia. 69 \(1\): 137-50.](#)
68. Shi, Q. *et al.* (2021) Ultrasound-mediated blood-brain barrier disruption improves anti-pyroglutamate3 A $\beta$  antibody efficacy and enhances phagocyte infiltration into brain in aged Alzheimer's disease-like mice [bioRxiv preprint: Jan 17 \[Epub ahead of print\].](#)
69. Alam, M.M. *et al.* (2021) Deficiency of microglial autophagy increases the density of oligodendrocytes and susceptibility to severe forms of seizures. [eNeuro. Jan 14 \[Epub ahead of print\].](#)
70. Langin, L. *et al.* (2020) A tailored Cln3<sup>Q352X</sup> mouse model for testing therapeutic interventions in CLN3 Batten disease. [Sci Rep. 10 \(1\): 10591.](#)
71. Allen, B.D. *et al.* (2020) Mitigation of helium irradiation-induced brain injury by microglia depletion. [J Neuroinflammation. 17 \(1\): 159.](#)
72. Drost, N. *et al.* (2020) The Amyloid-beta rich CNS environment alters myeloid cell functionality independent of their origin. [Sci Rep. 10 \(1\): 7152.](#)
73. Vandestienne, M. *et al.* (2021) TREM-1 orchestrates angiotensin II-induced monocyte trafficking and promotes experimental abdominal aortic aneurysm. [J Clin Invest. 131 \(2\): e142468.](#)
74. Apodaca, L.A. *et al.* (2021) Human neural stem cell-derived extracellular vesicles mitigate hallmarks of Alzheimer's disease. [Alzheimers Res Ther. 13 \(1\): 57.](#)
75. Colombo, A. *et al.* (2021) Loss of NPC1 enhances phagocytic uptake and impairs lipid trafficking in microglia. [Nat Commun. 12 \(1\): 1158.](#)

76. Galle-Treger, L. *et al.* (2020) Targeted invalidation of SR-B1 in macrophages reduces macrophage apoptosis and accelerates atherosclerosis. [Cardiovasc Res. 116 \(3\): 554-565.](#)
77. Sun, Y. *et al.* (2008) Temporal gene expression profiling reveals CEBPD as a candidate regulator of brain disease in prosaposin deficient mice. [BMC Neurosci. 9: 76.](#)
78. Miteva, K. *et al.* (2020) Cardiotrophin-1 Deficiency Abrogates Atherosclerosis Progression. [Sci Rep. 10 \(1\): 5791.](#)
79. El Gaamouch, F. *et al.* (2020) VGF-derived peptide TLQP-21 modulates microglial function through C3aR1 signaling pathways and reduces neuropathology in 5xFAD mice. [Mol Neurodegener. 15 \(1\): 4.](#)
80. Chen, Y. *et al.* (2018) Progranulin associates with hexosaminidase A and ameliorates GM2 ganglioside accumulation and lysosomal storage in Tay-Sachs disease. [J Mol Med \(Berl\). 96 \(12\): 1359-73.](#)
81. Gökbüget, D. *et al.* (2018) The miRNA biogenesis pathway prevents inappropriate expression of injury response genes in developing and adult Schwann cells. [Glia. 66 \(12\): 2632-2644.](#)
82. Papanephytou, C.P. *et al.* (2018) Regulatory role of oligodendrocyte gap junctions in inflammatory demyelination. [Glia. 66 \(12\): 2589-603.](#)
83. Lim, S.L. *et al.* (2020) Genetic Ablation of Hematopoietic Cell Kinase Accelerates Alzheimer's Disease-Like Neuropathology in Tg2576 Mice. [Mol Neurobiol. 57 \(5\): 2447-60.](#)

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**Storage**

Store at +4°C or at -20°C if preferred.

This product should be stored undiluted.

Storage in frost free freezers is not recommended. Avoid repeated freezing and thawing as this may denature the antibody. Should this product contain a precipitate we recommend microcentrifugation before use.

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**Guarantee**

12 months from date of despatch

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**Health And Safety Information**

Material Safety Datasheet documentation #10040 available at: <https://www.bio-rad-antibodies.com/SDS/MCA1957T>  
10040

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**Regulatory**

For research purposes only

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## Related Products

### Recommended Secondary Antibodies

Rabbit Anti Rat IgG (STAR16...)	<a href="#">DyLight®800</a>
Rabbit Anti Rat IgG (STAR17...)	<a href="#">FITC</a>
Goat Anti Rat IgG (STAR72...)	<a href="#">HRP</a>
Goat Anti Rat IgG (STAR69...)	<a href="#">FITC</a>
Goat Anti Rat IgG (STAR73...)	<a href="#">RPE</a>
Rabbit Anti Rat IgG (STAR21...)	<a href="#">HRP</a>

Goat Anti Rat IgG (MOUSE ADSORBED) (STAR71...) [DyLight®550](#), [DyLight®650](#), [DyLight®800](#)

Goat Anti Rat IgG (STAR131...)

[Alk. Phos.](#), [Biotin](#)

## Recommended Negative Controls

[RAT IgG2a NEGATIVE CONTROL \(MCA1212\)](#)

## Recommended Useful Reagents

[ANTIGEN RETRIEVAL BUFFER, pH8.0 \(BUF025A\)](#)

[LEUCOPERM \(BUF09\)](#)

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