

## Datasheet: MCA709GA

<b>Description:</b>	RAT ANTI HUMAN CD28
<b>Specificity:</b>	CD28
<b>Format:</b>	Purified
<b>Product Type:</b>	Monoclonal Antibody
<b>Clone:</b>	YTH913.12
<b>Isotype:</b>	IgG2b
<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
Flow Cytometry	▪			1/25 - 1/50
Immunohistology - Frozen	▪			
Immunohistology - Paraffin			▪	
ELISA			▪	
Immunoprecipitation			▪	
Western Blotting			▪	

Where this antibody 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 antibody for use in their own system using appropriate negative/positive controls.

<b>Target Species</b>	Human
<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 1.0 mg/ml
<b>Immunogen</b>	Human peripheral blood T-cells
<b>External Database Links</b>	<p><b>UniProt:</b>  <a href="#">P10747</a>    <a href="#">Related reagents</a></p> <p><b>Entrez Gene:</b>  <a href="#">940</a> CD28    <a href="#">Related reagents</a></p>
<b>RRID</b>	AB_931696
<b>Fusion Partners</b>	Spleen cells from an immunised DA rat were fused with cells of the Y3/Ag 1.2.3 rat myeloma cell line
<b>Specificity</b>	<p><b>Rat anti Human CD28 antibody, clone YTH913.12</b> recognizes human CD28, a ~44 kDa single pass type 1 trans-membrane protein expressed as a homodimer on a major subset of human T-cells (<a href="#">Thompson et al. 1989</a>), responsible for activation of these cells via interaction with the TCR. CD28 is involved in the tuning of the T-cell for activation via TCR, lowering the threshold for activation from around 8000 triggered TCRs to approximately 1500 (<a href="#">Viola et al.1996</a>).</p> <p>CD28 along with CD152, also known as CTLA-4 acts as a co-receptor for the co-stimulatory molecules CD80 and CD86 (<a href="#">Azuma et al. 1993</a>). CD28 offers a positive stimulatory role on ligation of CD80 and CD86 while CTLA-4 offers a negative feedback signal preventing CD28 mediated T-cell activation of CD86 (<a href="#">Krummel et al. 1995</a>).</p> <p>Rat anti human CD28, clone YTH913.12 has been reported to recognize an epitope of CD28 expressed by NK cells, which is not recognized by other anti human CD28 clones such as 9.3 and CD28.2 (<a href="#">Galea-Lauri et al 1999</a>.) Other reports however have failed to demonstrate CD28 staining on peripheral blood derived NK cells using clone YTH913.12 (<a href="#">Wilson et al. 1999</a>).</p>
<b>Flow Cytometry</b>	Use 10ul of the suggested working dilution to label 10 <sup>6</sup> cells or 100ul whole blood.
<b>References</b>	<ol style="list-style-type: none"> <li>Reiter, C. (1989) Cluster Report: CD28 in Leucocyte Typing IV: White Cell Differentiation Antigens. Edited by Knapp, W., Dorken, B., Gilks, W.R., Rieber, E.P., Schmidt, R.E., Stein, H. and von dem Borne, A.E.G.Kr. Oxford University Press. pp 352-3.</li> <li>Galea-Lauri, J. et al. (1999) Expression of a variant of CD28 on a subpopulation of human NK cells: implications for B7-mediated stimulation of NK cells. <a href="#">J Immunol. 163 (1): 62-70.</a></li> <li>Gabdoulkhakova, A. et al. (2007) High rate of mutation reporter gene inactivation during human T cell proliferation. <a href="#">Immunogenetics. 59: 135-43.</a></li> <li>Pridgeon, C. et al. (2011) Regulation of IL-17 in chronic inflammation in the human lung. <a href="#">Clin Sci (Lond). 120: 515-24.</a></li> <li>Blanco, B. et al. (2003) Induction of human T lymphocyte cytotoxicity and inhibition of</li> </ol>

- tumor growth by tumor-specific diabody-based molecules secreted from gene-modified bystander cells. [J Immunol. 171: 1070-7.](#)
6. Costa, C. *et al.* (2002) Human NK cell-mediated cytotoxicity triggered by CD86 and Gal alpha 1,3-Gal is inhibited in genetically modified porcine cells. [J Immunol. 168: 3808-16.](#)
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8. Goodier, M.R. and Londei, M. (2004) CD28 is not directly involved in the response of human CD3- CD56+ natural killer cells to lipopolysaccharide: a role for T cells. [Immunology. 111: 384-90.](#)
9. Wilson, J.L. *et al.* (1999) NK cell triggering by the human costimulatory molecules CD80 and CD86. [J Immunol. 163: 4207-12.](#)
10. Kropf, P. *et al.* (2007) Arginase activity mediates reversible T cell hyporesponsiveness in human pregnancy. [Eur J Immunol. 37: 935-45.](#)
11. Ponchel, F. *et al.* (2002) Dysregulated lymphocyte proliferation and differentiation in patients with rheumatoid arthritis. [Blood. 100: 4550-6.](#)
12. McLeod, J.D. *et al.* (1998) Activation of human T cells with superantigen (staphylococcal enterotoxin B) and CD28 confers resistance to apoptosis via CD95. [J Immunol. 160: 2072-9.](#)
13. Svensson-Arvelund, J. *et al.* (2015) The human fetal placenta promotes tolerance against the semiallogeneic fetus by inducing regulatory T cells and homeostatic M2 macrophages. [J Immunol. 194 \(4\): 1534-44.](#)
14. Hasib, L. *et al.* (2016) Functional and homeostatic defects of regulatory T cells in patients with coronary artery disease. [J Intern Med. 279 \(1\): 63-77.](#)
15. Siska, E.K. *et al.* (2017) Generation of an immortalized mesenchymal stem cell line producing a secreted biosensor protein for glucose monitoring. [PLoS One. 12 \(9\): e0185498.](#)

<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.  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 #10040 available at: 10040: <a href="https://www.bio-rad-antibodies.com/uploads/MSDS/10040.pdf">https://www.bio-rad-antibodies.com/uploads/MSDS/10040.pdf</a>
<b>Regulatory</b>	For research purposes only

## Related Products

### Recommended Secondary Antibodies

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

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

Goat Anti Rat IgG (STAR72...) [HRP](#)

Rabbit Anti Rat IgG (STAR21...) [HRP](#)

Rabbit Anti Rat IgG (STAR17...) [FITC](#)

Goat Anti Rat IgG (STAR131...) [Alk. Phos.](#), [Biotin](#)

### **Recommended Negative Controls**

[RAT IgG2b NEGATIVE CONTROL \(MCA6006GA\)](#)

**North & South** Tel: +1 800 265 7376

**America** Fax: +1 919 878 3751

Email: [antibody\\_sales\\_us@bio-rad.com](mailto:antibody_sales_us@bio-rad.com)

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Tel: +44 (0)1865 852 700

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To find a batch/lot specific datasheet for this product, please use our online search tool at: [bio-rad-antibodies.com/datasheets](https://bio-rad-antibodies.com/datasheets)

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