

Cya A (9D4): sc-13581

BACKGROUND

Bordetella pertussis, the causative agent of whooping cough, secretes several toxins implicated in this disease. One of these putative virulence factors is the adenylate cyclase toxin (Cya A or ACT), which elevates intracellular cAMP in eukaryotic cells to cytotoxic levels upon activation by endogenous calmodulin. The *Bordetella pertussis* Cya toxin-encoding locus (Cya) is composed of five genes. The Cya A gene encodes a virulence factor, Cya A, exhibiting adenylate cyclase, hemolytic and invasive activities. Cya A is related to the RTX (repeats in toxin) family of pore-forming toxins. Like all RTX toxins, Cya A is synthesized as a protoxin (proCya A) encoded by the *cyaA* gene. Activation to the mature cell-invasive toxin involves palmitoylation of Lysine 983 and is dependent on co-expression of Cya C. The Cya B, D and E gene products are necessary for Cya A transport, and the Cya C gene product is required to activate Cya A. Additionally, Cya A uses the α M β 2 Integrin (CD11b/CD18) as a cell receptor. Thus, the cellular distribution of CD11b, mostly on neutrophils, macrophages, and dendritic and natural killer cells, supports a role for Cya A in disrupting the early, innate antibacterial immune response.

REFERENCES

- Sebo, P., et al. 1991. High-level synthesis of active adenylate cyclase toxin of *Bordetella pertussis* in a reconstructed *Escherichia coli* system. *Gene* 104: 19-24.
- Gross, M.K., et al. 1992. Targeted mutations that ablate either the adenylate cyclase or hemolysin function of the bifunctional Cya A toxin of *Bordetella pertussis* abolish virulence. *Proc. Natl. Acad. Sci. USA* 89: 4898-4902.
- Ehrmann, I.E., et al. 1992. Enzymatic activity of adenylate cyclase toxin from *Bordetella pertussis* is not required for hemolysis. *FEBS Lett.* 304: 51-56.
- Westrop, G.D., et al. 1996. *Bordetella pertussis* adenylate cyclase toxin: proCya A and Cya C proteins synthesised separately in *Escherichia coli* produce active toxin *in vitro*. *Gene* 180: 91-99.

SOURCE

Cya A (9D4) is a mouse monoclonal antibody raised against amino acids 1156-1489 of *Bordetella pertussis* adenylate cyclase toxin origin.

PRODUCT

Each vial contains 200 μ g IgG_{2a} kappa light chain in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

Cya A (9D4) is available conjugated to agarose (sc-13581 AC), 500 μ g/0.25 ml agarose in 1 ml, for IP; to HRP (sc-13581 HRP), 200 μ g/ml, for WB, IHC(P) and ELISA; to either phycoerythrin (sc-13581 PE), fluorescein (sc-13581 FITC), Alexa Fluor[®] 488 (sc-13581 AF488), Alexa Fluor[®] 546 (sc-13581 AF546), Alexa Fluor[®] 594 (sc-13581 AF594) or Alexa Fluor[®] 647 (sc-13581 AF647), 200 μ g/ml, for WB (RGB), IF, IHC(P) and FCM; and to either Alexa Fluor[®] 680 (sc-13581 AF680) or Alexa Fluor[®] 790 (sc-13581 AF790), 200 μ g/ml, for Near-Infrared (NIR) WB, IF and FCM.

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APPLICATIONS

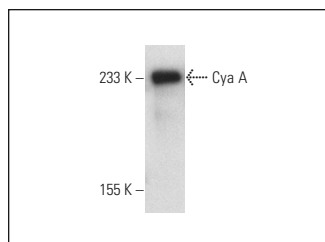
Cya A (9D4) is recommended for detection of Cya A of *B. pertussis* origin by Western Blotting (starting dilution 1:200, dilution range 1:100-1:1000) and immunoprecipitation [1-2 μ g per 100-500 μ g of total protein (1 ml of cell lysate)].

Molecular Weight of Cya A: 233 kDa.

RECOMMENDED SUPPORT REAGENTS

To ensure optimal results, the following support reagents are recommended: 1) Western Blotting: use m-IgG κ BP-HRP: sc-516102 or m-IgG κ BP-HRP (Cruz Marker): sc-516102-CM (dilution range: 1:1000-1:10000), Cruz Marker[™] Molecular Weight Standards: sc-2035, UltraCruz[®] Blocking Reagent: sc-516214 and Western Blotting Luminol Reagent: sc-2048. 2) Immunoprecipitation: use Protein A/G PLUS-Agarose: sc-2003 (0.5 ml agarose/2.0 ml).

DATA



Cya A (9D4): sc-13581. Western blot analysis of authentic adenylate cyclase toxin.

SELECT PRODUCT CITATIONS

- Rogers, M.T., et al. 2009. Histone-like nucleoid-structuring protein represses transcription of the *ehx* operon carried by locus of enterocyte effacement-negative Shiga toxin-expressing *Escherichia coli*. *Microb. Pathog.* 47: 202-211.
- Uribe, K.B., et al. 2013. Calpain-mediated processing of adenylate cyclase toxin generates a cytosolic soluble catalytically active N-terminal domain. *PLoS ONE* 8: e67648.
- Martín, C., et al. 2015. Adenylate cyclase toxin promotes bacterial internalisation into non phagocytic cells. *Sci. Rep.* 5: 13774.
- Lepesheva, A., et al. 2021. Different roles of conserved tyrosine residues of the acylated domains in folding and activity of RTX toxins. *Sci. Rep.* 11: 19814.

STORAGE

Store at 4° C, **DO NOT FREEZE**. Stable for one year from the date of shipment. Non-hazardous. No MSDS required.

RESEARCH USE

For research use only, not for use in diagnostic procedures.