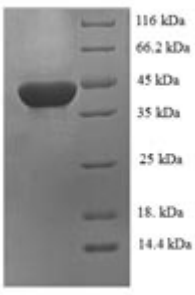
Recombinant Rat Carbonic anhydrase 1 (Ca1)

Product Code	CSB-EP004364RAa2
Relevance	Reversible hydration of carbon dioxide.Curated
Abbreviation	Recombinant Rat Ca1 protein
Storage	The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.
Uniprot No.	B0BNN3
Alias	Carbonate dehydratase I
Product Type	Recombinant Protein
Immunogen Species	Rattus norvegicus (Rat)
Purity	Greater than 90% as determined by SDS-PAGE.
Sequence	ASADWGYDSKNGPDQWSKLYPIANGNNQSPIDIKTSEAKHDSSLKPVSVSYN PATAKEIVNVGHSFHVVFDDSSNQSVLKGGPLADSYRLTQFHFHWGNSNDHG SEHTVDGAKYSGELHLVHWNSAKYSSAAEAISKADGLAIIGVLMKVGPANPNL QKVLDALSSVKTKGKRAPFTNFDPSSLLPSSLDYWTYFGSLTHPPLHESVTWV ICKESISLSPEQLAQLRGLLSSAEGEPAVPVLSNHRPPQPLKGRTVRASF
Research Area	Others
Source	E.coli
Target Names	Ca1
Expression Region	2-261aa
Notes	Repeated freezing and thawing is not recommended. Store working aliquots at 4°C for up to one week.
Tag Info	N-terminal 6xHis-SUMO-tagged
Mol. Weight	44.2kDa
Protein Length	Full Length of Mature Protein
Image	 (Tris-Glycine gel) Discontinuous SDS-PAGE (reduced) with 5% enrichment gel and 15% separation gel.
Description	

Recombinant Rat Carbonic anhydrase 1 (Ca1) gets expressed in E. coli and covers the full length of the mature protein from amino acids 2 to 261. The product comes with an N-terminal 6xHis-SUMO tag that makes purification and detection more straightforward. SDS-PAGE analysis shows a purity level greater than 90%. Research applications requiring precise protein characterization appear to be the main target for this product.

Carbonic anhydrase 1 (Ca1) catalyzes the reversible hydration of carbon dioxide to bicarbonate and protons. The enzyme seems to play a crucial role in regulating pH and ion balance in tissues. Various physiological processes likely depend on its function. Biochemical researchers find Ca1's activity and regulatory mechanisms particularly interesting since they may provide insights into metabolic pathways and potential therapeutic targets.

Potential Applications

Note: The applications listed below are based on what we know about this protein's biological functions, published research, and experience from experts in the field. However, we haven't fully tested all of these applications ourselves yet. We'd recommend running some preliminary tests first to make sure they work for your specific research goals.

1. Carbonic Anhydrase Enzyme Kinetics and Inhibitor Screening

Scientists can use this recombinant rat CA1 protein to set up in vitro enzyme assays for studying carbonic anhydrase catalytic properties and kinetic parameters. The full-length mature protein (2-261aa) expressed in E. coli offers a cost-effective source for high-throughput screening of potential carbonic anhydrase inhibitors. That N-terminal His-SUMO tag makes purification easier and helps with immobilization for automated screening platforms. Researchers can evaluate inhibitor specificity, IC50 values, and structure-activity relationships using this purified enzyme preparation.

2. Antibody Development and Validation

The high purity recombinant rat CA1 protein works well as an immunogen for generating species-specific antibodies against rat carbonic anhydrase 1. Pull-down assays and ELISA-based screening can take advantage of the His-SUMO tag to identify and characterize antibody candidates during hybridoma development. This protein may also serve as a positive control and standard for validating antibody specificity in Western blotting, immunoprecipitation, and other immunoassays targeting rat CA1.

3. Protein-Protein Interaction Studies

Biochemical assays can make use of the tagged recombinant protein to identify and characterize potential binding partners of rat carbonic anhydrase 1. The His tag allows immobilization on nickel-affinity matrices for pull-down experiments with rat tissue lysates or cell extracts. Co-immunoprecipitation studies and surface plasmon resonance analyses can determine binding kinetics and affinities of identified interaction partners, though results might vary depending

on experimental conditions.

4. Comparative Species Analysis and Evolutionary Studies

This rat CA1 protein appears to be a valuable tool for comparative biochemistry studies examining carbonic anhydrase function across different mammalian species. Researchers can perform side-by-side enzymatic comparisons with human or mouse carbonic anhydrase orthologs to understand species-specific differences in catalytic efficiency and substrate preferences. The recombinant protein creates controlled experimental conditions for studying evolutionary adaptations in carbonic anhydrase function among rodent species, though some caution is needed when extrapolating results across distantly related species.

Reconstitution	We recommend that this vial be briefly centrifuged prior to opening to bring the contents to the bottom. Please reconstitute protein in deionized sterile water to a concentration of 0.1-1.0 mg/mL.We recommend to add 5-50% of glycerol (final concentration) and aliquot for long-term storage at -20°C/-80°C. Our default final concentration of glycerol is 50%. Customers could use it as reference.
Shelf Life	The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.