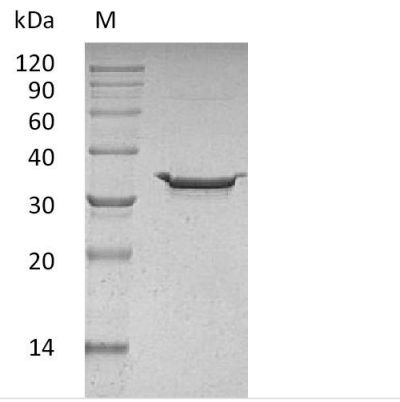
Recombinant Human Carbonic anhydrase 5B, mitochondrial (CA5B) (Active)

Product Code	CSB-AP005641HU
Abbreviation	Recombinant Human CA5B protein (Active)
Uniprot No.	Q9Y2D0
Storage Buffer	0.2 μm Filtered 20 mM Tris-HCl, 100 mM NaCl, pH 8.0
Product Type	Others
Immunogen Species	Homo sapiens (Human)
Biological Activity	The esterase activity is determined to be 233 pmol/min/μg as measured under the described conditions.
Purity	Greater than 95% as determined by SDS-PAGE.
Sequence	CSLYTCTYKTRNRALHPLWESVDLVPGGDRQSPINIRWRDSVYDPGLKPLTIS YDPATCLHVWNNGYSFLVEFEDSTDKSVIKGGPLEHNYRLKQFHFHWGAIDA WGSEHTVDSKCFPAELHLVHWNAVRFENFEDAALEENGLAVIGVFLKLGKHH KELQKLVDTLPSIKHKDALVEFGSFDPSCLMPTCPDYWTYSGSLTTPPLSESVT WIIKKQPVEVDHDQLEQFRTLLFTSEGEKEKRMVDNFRPLQPLMNRTVRSSFR HDYVLNVQAKPKPATSQATP
Research Area	Signal Transduction
Source	E.coli
Target Names	CA5B
Expression Region	34-317aa
Tag Info	C-terminal 6xHis-tagged
Mol. Weight	33.77 kDa
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 Human Carbonic anhydrase 5B, mitochondrial (CA5B) is

produced in E. coli and contains the complete mature protein sequence from amino acids 34-317. The protein carries a C-terminal 6xHis tag, which makes purification and detection more straightforward. SDS-PAGE analysis confirms purity levels exceeding 95%, while endotoxin content remains below 1.0 EU/μg as determined by the LAL method. The protein shows biological activity with esterase activity measuring 233 pmol/min/μg.

Carbonic anhydrase 5B (CA5B) functions as a mitochondrial enzyme that catalyzes the reversible hydration of carbon dioxide. This enzyme belongs to the carbonic anhydrase family, participating in several physiological processes including pH regulation and ion transport. CA5B appears to play a significant role in metabolic pathways by helping maintain acid-base homeostasis, which has made it an important target for biochemical research.

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

This recombinant CA5B protein, with its confirmed esterase activity of 233 pmol/min/μg, offers researchers a way to examine the enzymatic properties and kinetic parameters of human carbonic anhydrase 5B under controlled laboratory conditions. The high purity (>95%) and minimal endotoxin levels make it well-suited for biochemical assays aimed at screening potential inhibitors or activators of carbonic anhydrase. Scientists can create dose-response curves and calculate IC50 values for different compounds that target this particular CA isoform. The C-terminal His-tag simplifies purification and allows for immobilization in high-throughput screening setups.

2. Antibody Development and Validation

The recombinant CA5B protein works well as an antigen for creating specific antibodies against human carbonic anhydrase 5B through standard immunization procedures in laboratory animals. Since it contains the full-length mature protein (amino acids 34-317), it provides broad epitope coverage for both monoclonal and polyclonal antibody generation. Researchers can then validate these antibodies using the same recombinant protein in ELISA, Western blot, and similar immunoassays to verify specificity and measure binding strength. The His-tag makes protein capture straightforward during antibody screening and testing.

3. Protein-Protein Interaction Studies

Researchers may use the His-tagged CA5B protein in pull-down experiments to discover and study potential binding partners or regulatory proteins that interact with carbonic anhydrase 5B. The tag allows attachment to nickel-affinity

matrices, which can then capture interacting proteins from cell lysates or purified protein collections. Co-immunoprecipitation experiments and surface plasmon resonance studies can take advantage of this recombinant protein to measure binding kinetics and determine how strongly it binds to known or suspected interaction partners. Such studies might reveal important details about how CA5B is regulated and what roles it plays in cells.

4. Structural and Biophysical Characterization

This highly pure recombinant CA5B protein appears suitable for detailed structural analysis, including X-ray crystallography, NMR spectroscopy, and cryo-electron microscopy to determine the three-dimensional structure of human carbonic anhydrase 5B. Scientists can also use the protein in biophysical studies such as dynamic light scattering, differential scanning calorimetry, and circular dichroism spectroscopy to understand its folding patterns, stability, and structural changes. These structural findings may help establish structure-activity relationships and support rational design strategies for compounds that target CA5B in research settings.

5. Comparative Enzyme Activity Analysis

The recombinant CA5B with its measured esterase activity can function as a reference standard when comparing different carbonic anhydrase isoforms or mutant versions. Scientists can run parallel activity tests to understand how different isoforms vary in catalytic efficiency, substrate preferences, and optimal pH ranges. The protein enables studies of how particular amino acid residues or protein domains affect enzymatic function by allowing comparisons with site-directed mutants or shortened variants produced under similar conditions.

Endotoxin	Less than 1.0 EU/μg as determined by LAL method.
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.