

Product Information

Cyclooxygenase 1 from sheep

Catalog Number **C0733**

Storage Temperature $-70\text{ }^{\circ}\text{C}$

EC 1.14.99.1

Synonyms: COX-1, Constitutive Cyclooxygenase, Prostaglandin Endoperoxide Synthase 1, Prostaglandin H2 Synthase 1

Product Description

Cyclooxygenase 1 (COX-1) catalyzes the conversion of arachidonic acid to prostaglandin H₂ (the first step in the biosynthesis of prostaglandins, thromboxanes, and prostacyclins).¹⁻³ The apparent K_M for arachidonic acid is 8.3 μM.

Prostaglandin H₂ is converted by other enzymes into inflammatory mediators such as prostaglandin (PG) D₂, PGE₂, PGF_{2α}, PGI₂, and thromboxane A₂. Thus, COX is a key enzyme in the production of inflammatory agents and is the target of intense research and drug discovery activities.

COX consists of two isoforms, COX-1 (599 amino acid residues) and COX-2 (604 amino acid residues). The COX enzymes, membrane-associated heme proteins that have cyclooxygenase and peroxidase activities, are targets of NSAID (non-steroidal anti-inflammatory drugs) such as aspirin.⁴

COX-1 may play an important role in regulating or promoting cell proliferation in some normal and neoplastically transformed cells. It is involved in the regulation of homeostatic functions throughout the body, such as vascular hemostasis, renal blood flow, and maintenance of glomerular function.⁵⁻⁷ Cox-1 is constitutively expressed in almost all animal tissues with high expression levels in gastrointestinal tissues.

This COX-1 product is supplied as a solution in 80 mM Tris-HCl, pH 8, with 0.1% TWEEN® 20 and 300 μM diethyldithiocarbamate (DDC) as a preservative. Note: DDC can be removed by standard desalting procedures, but the enzyme is unstable in its absence and should be used within one hour.

(COX-1) isolated from ram seminal vesicles is a homodimer (70 kDa/subunit).

Specific Activity: $\geq 30,000$ units/mg

Unit Definition: One unit of enzyme consumes one nanomole of oxygen per minute at 37 °C in 0.1 M Tris-HCl buffer, pH 8, containing 100 μM arachidonate, 5 mM EDTA, 2 mM phenol, and 1 μM hematin.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

COX-1 contains Fe³⁺-protoporphyrin IX as a cofactor, which may dissociate from the protein during its purification, resulting in a mixture of apo- and holo-enzymes. Therefore, add hematin to the reaction mixture (1 μM final concentration) in order to obtain maximal enzyme activity.

Storage/Stability

The enzyme should be stored at $-70\text{ }^{\circ}\text{C}$. After initial defrost, it is recommended the product be aliquoted into tubes and re-frozen at $-70\text{ }^{\circ}\text{C}$ to avoid repeated freeze-thaw cycles. Do not store in a frost-free freezer.

COX-1 is relatively unstable at room temperature; to prevent loss of activity during experiments, keep the enzyme on ice (2–8 °C) at all times.

References

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3. Johnson, J.L. et al., Purification and characterization of prostaglandin H synthase-2 from sheep placental cotyledons. *Arch. Biochem. Biophys.*, **324**, 26-34 (1995).
4. O'Neill, G.P. et al., Overexpression of human prostaglandin G/H synthase-1 and -2 by recombinant vaccinia virus: inhibition by nonsteroidal anti-inflammatory drugs and biosynthesis of 15-hydroxyeicosatetraenoic acid. *Mol. Pharm.*, **45**, 245-254 (1994).
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