

## Product Information

# Acetylcholinesterase, Human

Recombinant, expressed in HEK 293 cells

## C1682

Storage Temperature: -20 °C

CAS RN 9000-81-1

EC 3.1.1.7

Synonyms: AChE, HGNC, Acetylcholine acetylhydrolase

UniProt: P22303-1

## Product Description

Acetylcholinesterase (AChE) is a serine hydrolase mainly found at neuromuscular junctions and cholinergic brain synapses.<sup>1</sup> AChE hydrolyzes choline esters. Its principal biological role is termination of impulse transmission at cholinergic synapses, by rapid hydrolysis of the neurotransmitter acetylcholine (ACh) to acetate and choline.<sup>1</sup>

Organophosphorus poisons form covalent bonds with a serine residue at the active site of AChE, and are thus potent irreversible inhibitors of AChE.<sup>2</sup> AChE inhibitors are used in treatment of various neuromuscular disorders,<sup>3</sup> and have provided the first generation of drugs for the treatment of Alzheimer's disease.<sup>4</sup> AChE inhibitors prevent cholinesterase from breaking down ACh, increasing both the level and duration of the neurotransmitter action.<sup>5</sup> According to the mode of action, AChE inhibitors can be divided into two groups, irreversible and reversible. Reversible inhibitors, competitive or noncompetitive, mostly have therapeutic applications. Toxic effects are associated with irreversible AChE activity modulators.<sup>5</sup>

This recombinant human acetylcholinesterase (AChE) is expressed in human HEK 293 cells as a 583 amino acids glycoprotein with a calculated molecular mass of 64.6 kDa. The DTT-reduced protein migrates as a ~70 kDa polypeptide on SDS-PAGE due to glycosylation.

This product is supplied as a powder lyophilized from 0.22 µm filtered solution in PBS, pH 7.4. It is produced in human cells, without the use of serum. The human cells expression system allows human-like glycosylation and folding and often supports higher specific activity of the protein.

## Specific activity

≥1,000 units/mg protein

## Unit definition

One unit is defined as the amount of enzyme that will hydrolyze 1.0 micromole of acetylcholine to choline and acetate per minute at pH 8.0 at 37 °C.

## 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

Briefly centrifuge the vial before opening. Reconstitute in water to a concentration of 0.1 mg/mL. Do not vortex. This solution can be stored at 2–8 °C for up to 1 week. For extended storage, it is recommended to store in working aliquots at -20 °C.

## Storage/Stability

Store the lyophilized product at -20 °C.

## References

1. Barnard, E. A. (1974). Neuromuscular transmission—enzymatic destruction of acetylcholine. In *The peripheral nervous system* (pp. 201-224). Boston, MA: Springer US.
2. Quinn, D. M. (1987). Acetylcholinesterase: enzyme structure, reaction dynamics, and virtual transition states. *Chemical reviews*, 87(5), 955-979.
3. Taylor, P., "Anticholinesterase agents", from Goodman & Gilman's *The Pharmacological Basis of Therapeutics*, 11th ed. (Brunton, L.L., et al., eds.). McGraw-Hill (New York, NY:2006), pp. 201-216.
4. Greenblatt, H. M., Dvir, H., Silman, I., & Sussman, J. L. (2003). Acetylcholinesterase: a multifaceted target for structure-based drug design of anticholinesterase agents for the treatment of Alzheimer's disease. *Journal of Molecular Neuroscience*, 20(3), 369-383.
5. Čolović, M. B., Krstic, D. Z., Lazarevic-Pasti, T. D., Bondzic, A. M., & Vasic, V. M. (2013). Acetylcholinesterase inhibitors: pharmacology and toxicology. *Current neuropharmacology*, 11(3), 315-335.

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