

## Product Information

### Butyrylcholinesterase human, recombinant expressed in transgenic goats

Catalog Number **B7061**

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

CAS RN 9001-08-5

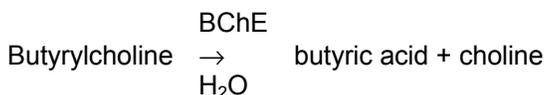
EC 3.1.1.8

Synonyms: rBChE; Acylcholine acylhydrolase;

Pseudocholinesterase; cholinesterase

#### Product Description

Butyrylcholinesterase (BChE) belongs to the same structural class of proteins, the esterase/lipase family, as acetylcholinesterase (AChE, EC 3.1.1.7). They are serine hydrolases that share substantial structural similarities, but differ in substrate specificities and inhibitor sensitivities.<sup>1</sup> BChE can, unlike AChE, efficiently hydrolyze larger esters of choline such as butyrylcholine and benzoylcholine.



Although BChE is found in the serum, hemopoietic cells, liver, lung, heart, and the central nervous system of vertebrates, it has no known physiological function.<sup>2,3</sup>

Molecular mass:<sup>4</sup> 170 kDa (dimer)

Extinction coefficient:<sup>4</sup>  $E^{1\%} = 19.8$  (280 nm)

Isoelectric point (pI):<sup>4</sup> 5.0

pH Optimal activity range:<sup>4</sup> 7.0–8.0

pH Activity range:<sup>4</sup> 6.0–10.0

Inhibitors:<sup>5</sup> Pyridostigmine, betaine, Tetraisopropyl pyrophosphoramidate, butyrylthiocholine, Diisopropyl phosphorofluoridate, donepezil, Eserine, Physostigmine, Parathion

#### Substrates:

Butyrylthiocholine<sup>5</sup>

Butyrylcholine<sup>6</sup>

Acetylcholine<sup>7</sup>

Acetylthiocholine<sup>8</sup>

Cocaine<sup>9</sup>

Selective inhibition of BChE activity can be used in the detection of organophosphates.<sup>10</sup> Its use in the treatment of organophosphate toxicity shows promise and there is a correlation between the level of BChE in human blood and degree of protection against potentially toxic nerve agents.<sup>3</sup>

There has also been interest in the roles of cholinesterases with regard to Alzheimer's disease. Investigations into selective inhibitors may provide a clearer picture of the physiological role of BChE in both healthy and diseased individuals.<sup>2</sup>

This recombinant, human product is isolated from the milk of transgenic goats. It is purified by affinity chromatography and is primarily in the dimeric form, with the remainder being monomers. The product is supplied as a solution in 10 mM sodium phosphate, pH 7.2, with 50 mM NaCl, 1 mM EDTA, and 10% glycerol.

Specific activity:  $\geq 500$  units/mg protein

Unit definition: One unit will hydrolyze 1.0  $\mu\text{mole}$  of butyrylcholine to choline and butyrate per minute at pH 8 at 37  $^{\circ}\text{C}$ . The activity obtained using butyrylcholine as a substrate is  $\sim 2.5$  times that obtained using acetylcholine.

BChE is assayed titrimetrically in a 50.4 ml reaction mixture containing 4 mM butyrylcholine, 40 mM  $\text{MgCl}_2$ , 100 mM NaCl, and 12–24 units of BChE at pH 8 and 37  $^{\circ}\text{C}$ .

### Precautions and Disclaimer

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

### Storage/Stability

Store the product at  $-70\text{ }^{\circ}\text{C}$ . When stored at  $-70\text{ }^{\circ}\text{C}$ , the enzyme retains activity for at least 2 years.<sup>4</sup>

Product loses activity at elevated temperatures, below pH 6.0.<sup>4</sup>

### References

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2. Savini, L., *et al.*, Specific targeting of acetylcholinesterase and butyrylcholinesterase recognition sites. Rational design of novel, selective, and highly potent cholinesterase inhibitors. *J. Med. Chem.*, **46**, 1-4 (2003).
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4. Supplier Data
5. Masson, P., *et al.*, *Biochim. Biophys. Acta*, **1544**, 166-176 (2001).
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9. Zhan, C.G., *et al.*, *J. Am. Chem. Soc.*, **125**, 2462-2474 (2003).
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CS,RGB,MAM 05/08-1