

## Product Information

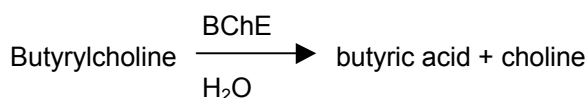
### Butyrylcholinesterase from equine serum

Catalog Number **C7512**  
Storage Temperature  $-20\text{ }^{\circ}\text{C}$

CAS RN 9001-08-5  
EC 3.1.1.8  
Synonyms: BChE; Acylcholine acylhydrolase;  
Pseudocholinesterase; Non-specific 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>1,2</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>3,4</sup>

BChE is a tetrameric glycoprotein with four equal subunits (110 kDa).<sup>4</sup>

Molecular weight:<sup>5</sup> 440 kDa (tetramer)

Carbohydrate content (residues/monomer):<sup>6</sup>

Glucosamine	22
Hexoses	17
N-Acetylneuraminic acid	6

Extinction coefficient:<sup>6</sup>  $E^{1\%} = 13.6$  (280 nm)

pH Optimum:<sup>7</sup> 6.0–8.0

Activators:<sup>2</sup>  $\text{Ca}^{+2}$  and  $\text{Mg}^{+2}$

Substrates (relative reaction rate):<sup>6</sup>

Butyrylcholine	1.0
Acetylcholine	0.4
Butyrylthiocholine	0.5
Acetylthiocholine	0.4

Also: propionylcholine, succinylcholine, benzoylcholine, propionylthiocholine

Inhibitors:<sup>7</sup> Betaine, nicotine, organophosphates, carbamates

Selective inhibition of BChE activity can be used in the detection of organophosphates.<sup>8</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>4</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>3</sup>

This product (C7512) is prepared from equine serum using ammonium sulfate fractionation. It is supplied as a lyophilized powder.

Protein: ~70% (biuret)  
balance primarily phosphate buffer salts

Specific activity:  $\geq 10$  units/mg protein

Unit definition: One unit will hydrolyze 1.0 micromole of butyrylcholine to choline and butyrate per minute at pH 8 at  $37\text{ }^{\circ}\text{C}$ .

BChE is assayed titrimetrically in a 50.4 ml reaction mixture containing 4 mM butyrylcholine, 1600 mM  $\text{MgCl}_2$ , 100 mM NaCl, and 30–60 units BChE at pH 8 and  $37\text{ }^{\circ}\text{C}$ .

### 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.

### Preparation Instructions

BChE is soluble in cold water (60 units/ml).

### Storage/Stability

Store the product at  $-20\text{ }^{\circ}\text{C}$ . When stored at  $-20\text{ }^{\circ}\text{C}$  representative lots of BChE have remained within specifications for seven years.

### References

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3. 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).
4. Blong, R.M., *et al.*, Tetramerization domain of human butyrylcholinesterase is at the C-terminus. *Biochem. J.*, **327**, 747-57 (1997).
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