

Product Information

β-Glucuronidase

Type VII-A

from *Escherichia coli*

Product Number **G 7646**

Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS# 9001-45-0

EC 3.2.1.31

Synonyms: β-D-Glucuronide glucuronosohydrolase;
GUS

Product Description

Glucuronidation, conjugation with glucuronic acid, by the human UDP-glucuronosyltransferase (UGT) family of enzymes plays an important role in the metabolic fate of many drugs and other xenobiotics. This biosynthetic reaction also has a role in the conjugation and excretion of endogenous substrates, such as steroids, bilirubin, and bile acids.¹ UGT activity results in the conjugation of glucuronic acid to substrates containing sulfhydryl, hydroxyl, aromatic amino, or carboxylic acid moieties. The glucuronides formed are more polar (water soluble) than the parent organic substrate and are generally excreted through the kidney.

β-glucuronidase catalyzes the reaction:

β-D-glucuronoside + H₂O ↔ an alcohol + D-glucuronate

β-Glucuronidase from *E. coli* has been used for the enzymatic hydrolysis of β-glucuronides in urine and other fluids.^{2,3} It has also been used to characterize the adhesion of fungal cells via cell surface glycoproteins.⁴ It does not hydrolyze α-glucuronides or β-glucosides.⁵ The enzyme from *E. coli* has a high rate of hydrolytic activity and it retains this activity during hydrolysis better than similar enzymes that are more sensitive to changes in the concentration of β-glucuronide conjugates.

β-Glucuronidase Type VII-A from *E. coli* is supplied as a white to tan powder lyophilized from 0.1 M sucrose plus 1 mg sucrose per mg protein. Trace amounts of potassium phosphate, potassium citrate, and magnesium citrate are also present at <1 mM each.

Molecular Weight: ~290 kDa (tetramer)⁶
68,259 Da (monomer)⁷

Optimal pH^{6,8}: 6-7

Isoelectric point (pI)⁶: 4.8

Inhibitors⁹: D-glucuronic acid (K_i = 1.5 mM)
(Product No. G 5269)
D-galacturonic acid (K_i = 4.3 mM)
D-glucaro-1,4-lactone (K_i = 170 nM)

Substrates:

5-Bromo-6-chloro-3-indolyl β-D-glucuronide	B 4532
6-Bromo-2-naphthyl β-D-glucuronide	B 6519
5-Bromo-4-chloro-3-indolyl β-D-glucuronide sodium salt tablet	B 8174
8-Hydroxyquinoline glucuronide	H 1254
4-Methylumbelliferyl β-D-glucuronide	M 5664
4-Nitrophenyl β-D-glucopyranoside	N 7006

Glucuronidase Activity:

5,000,000 - 20,000,000 units/gm protein

Unit Definition: One Sigma or modified Fishman unit will liberate 1.0 μg of phenolphthalein from phenolphthalein glucuronide per hour at 37 °C at pH 6.8 (30 minute assay).

Unlike the enzyme preparation from snail (*Helix pomatia*) that naturally contains β-glucuronidase and sulfatase activities in almost equal amounts, the preparation of β-glucuronidase from *E. coli* is essentially free of sulfatase activity.

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.

Solubility

When reconstituted to 1 mg/ml in deionized water, a clear to slightly hazy solution results.

Storage/Stability

The product, as supplied, should be stored at –20 °C.

A solution in water (≥ 1 mg/ml) may be stored at –20 °C for several months.

References

1. Tephly, T.R., *et al.*, *Adv. Pharmacol.*, **42**, 343-346 (1998).
2. Felgines, C., *et al.*, *Am. J. Physiol. Gastrointest. Liver Physiol.*, **279**, G1148-G1154 (2000).
3. Malfatti, M.A., and Felton, J.S., *Carcinogenesis*, **22**, 1087-1093 (2001).
4. Buck, J.W., and Andrews, J.H., *Appl. Environ. Microbiol.*, **65**, 465-471 (1999).
5. *Methods of Enzymatic Analysis*, vol. 2, Hans Ulrich Bergmeyer, Ed., Academic Press, NY, 460-461, 929-943 (1974).
6. Kim, D-H, *et al.*, *Biol. Pharm. Bull.*, **18**, 1184-1188 (1995).
7. Jefferson, R.A., *et al.*, *Proc. Natl. Acad. Sci.*, **83**, 8447-8451 (1986).
8. Zenser, T.V., *et al.*, *Drug Met. Disp.*, **27**, 1064-1067 (1999).
9. *Handbook of Enzyme Inhibitors*, 2nd Ed., Part A, Helmward Zollner, Ed., VCH, p 232 (1993).

ALC,MAM 01/05-1

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