PRODUCT DATA SHEET

Product Name	**Heparinase III**
Synonyms	Heparan sulphate lyase, Heparin sulphate eliminase, Heparitin lyase, Heparitinase I
Source	*Flavobacterium heparinum* (ATCC 13125) (recombinant)
Product Code	Hep III
EC Number	4.2.2.8
CAS Number	37290-86-1
Catalyzed Reaction	Heparinase III specifically cleaves Heparan Sulphate but not low MW heparin or unfractionated heparin. The enzyme cleaves sulphated polysaccharides containing (1-4) linkages between glucuronic acid and hexosamine residues. The elimination reaction yields oligosaccharides (mostly disaccharides) containing unsaturated uronic acids, detectable by UV spectroscopy (232 nm). The enzyme is active only towards heparan sulfate and does not cleave heparin or low molecular weight heparins.
Substrates	Heparan Sulphate (degrades regions of low and intermediate levels of sulphation).
Properties	▪ Molecular weight: 73 KDa ▪ Optimal testing temperature: 25 °C
Storage	Optimal storage temperature: - 15 °C to -80°C. Avoid repeated freeze- thawing.
Purity	≥ 97 % by SDS PAGE.
Description	The enzyme is formulated with glycerol, 0.22 µm sterile-filtered and dispensed into sterile vials. The enzyme solution is supplied world-wide as frozen solution shipped on dry ice. Expiration is established at 4 years after manufacturing.
Unit Definition	One Unit of Heparinase III is defined as the amount of enzyme required to form one µmole of unsaturated uronic acid per minute at 25° C and pH 7.0 using heparan sulphate as substrate.
Application	▪ Use for USP Chemical Tests /⟨207⟩1,6-Anhydro Derivative for Enoxaparin Sodium and for depolymerization of heparin, LMW heparin and heparan sulphate. ▪ As a research reagent (glycosaminoglycan degradation). ▪ For the preparation of disaccharides of heparan sulfate and the preparation of oligosaccharide libraries.
Safety Information	We are not aware of any toxicity associated with this product. In common with good laboratory practice the material should only be handled by qualified personnel trained in

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	laboratory procedures and familiar with potential hazards. For in vitro research use only. Not for human or drug use.
References	▪ Linhardt, R.J., et al., Examination of the substrate specificity of heparin and heparan sulphate lyases. Biochem., 29 (10), 2611-2617 (1990). ▪ Izraeli, S., et al., Detection of gene expression by PCR amplification of RNA derived from frozen heparinized whole blood. Nuc. Acids Res., 19 (21), 6051 (1991). ▪ Turnbull, J.E. and Gallagher, J.T., Distribution of iduronate 2-sulphate residues in heparan sulphate. Evidence for an ordered polymeric structure. Biochem. J., 273, 553-559 (1991). ▪ Gallagher, J.T., Multiprotein signalling complexes: regional assembly on heparan sulphate. Biochem. Soc. Trans., 34, 438-441 (2006). ▪ Turnbull, J.E. and Gallagher, J.T., Molecular organization of heparan sulphate from human skin fibroblasts. Biochem. J., 265, 715-724 (1990). ▪ Nader, H.B., et al., Purification and substrate specificity of Heparitinase I and Heparinitase II from Flavobacterium heparinum. Analyses of the heparin and heparin sulphate degradation products by 13C NMR spectroscopy. J. Biol. Chem., 265 (28), 16807-16813 (1990). ▪ Desai, U.R., et al., Specificity studies on the heparin lyases from Flavobacterium heparinum. Biochemistry, 32 (32), 8140–8145 (1993). ▪ Wei, Z., et al., Distinct substrate specificities of bacterial heparinases against N-unsubstituted glucosamine residues in heparan sulphate. J. Biol. Chem., 280, 15742–15748 (2005). ▪ Ernst, S., et al., Enzymatic Degradation of Glycosaminoglycans. Crit. Rev. Biochem. Mol. Biol., 30 (5), 387-444 (1995). ▪ Lohse, D.L., and Linhardt, R.J., Purification and characterization of heparin lyases from Flavobacterium heparinum. J. Biol. Chem., 267, 24347 (1992). ▪ Raman, K. and Kuberan, B., Differential effects of Heparitinase I and Heparitinase III on endothelial tube formation in vitro. Biochem. Biophys. Res. Comm., 398(2), 191-193 (2010) ▪ V.C. Yang, et al., Purification and Characterization of Heparinase from Flavobacterium heparinum. Biol. Chem 260(3): 1849-1857 (1985). ▪ HongSheng Su., et al., Isolation and Expression in Escherichia coli of hepB and hepC, Genes Coding for the Glycosaminoglycan-Degrading Enzymes Heparinase II and Heparinase III, Respectively, from Flavobacterium heparinum. Applied and Environmental Microbiology: 2723-2734 (1996). ▪ R. Godavarti, et al., Heparinase III from Flavobacterium heparinum: Cloning and Recombinant Expression in Escherichia coli. Biochemical and Biophysical Research Communications 225: 751-758 (1996). ▪ I. Vlodavsky, et al., Involvement of heparan sulfate and related molecules in sequestration and growth promoting activity of fibroblast growth factor. Cancer and Metastasis Reviews 15(2): 177-186 (1996). ▪ I. Vlodavsky, et al., Control of Cell Proliferation by Heparan Sulfate and Heparin-Binding Growth Factors. Thrombosis and Haemostasis 74(1): 534-540 (1995).

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- R. Hayward, et al., Heparinase III Exerts Endothelial and Cardioprotective Effects in Feline Myocardial Ischemia-Reperfusion Injury. Pharmacology and Experimental Therapeutics 283: 1032-1038 (1997).
- P. Silver, et al., A novel enzyme for the management of reperfusion injury-related vascular damage, restenosis and wound healing. Exp. Opin. Invest. Drugs 7(6): 1003-1014 (1998).
- R.Hayward , et al., Cellular mechanisms of heparinase III protection in rat traumatic shock. Heart Circ. Physiol. 44: H23-H30. (1998)

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