

Product Information

Galectin-3 human, recombinant, expressed in *E. coli*

Product Number **G 5170**
Storage Temperature $-20\text{ }^{\circ}\text{C}$

Product Description

Galectin-3 is a member of the family of animal lectins, which selectively binds β -galactoside residues. Galectin-3 is a chimeric molecule consisting of both carbohydrate recognition and collagen-like domains, with an extra N-terminal tail consisting of 8-13 copies of a 9 amino acid repeat consensus sequence that is rich in proline, tyrosine, and glycine. It is secreted from cells by ectocytosis, which is independent of the classical secretory pathway through the endoplasmic reticulum/Golgi network.¹ Galectin-3 is present in nuclear, cytoplasmic, and extracellular sites² and is able to interact with a variety of carbohydrate and protein ligands to form pentamers with unique crosslinking abilities.³ Galectin-3 has also been shown to have an affinity for lactose and N-acetyllactosamine.¹

Galectin-3 has been associated with the inhibition of apoptosis and the progression of cancer,⁴ as well as being a mediator of inflammation.⁵ Studies have found a positive correlation between the expression of galectin-3 and tumorigenicity and metastasis in colon,⁶ liver, and thyroid⁷ cancer.¹ In a recent study, galectin-3 was found in 91% of the patients with lung adenocarcinomas.³ In prostate,^{8,9} ovarian,¹⁰ and breast cancer,^{11,12} loss or down-regulation of the nuclear expression of galectin-3 was associated with malignancy.

Galectin-3 that is overexpressed has been shown to increase resistance to apoptotic stimuli induced by the anti-Fas antibody,¹ staurosporine,¹ TNF,¹³ radiation,¹³ and nitric oxide.¹⁴ Galectin-3 has been shown to have considerable sequence similarity to Bcl-2 protein, a known suppressor of apoptosis. It is believed to play the role of a survival factor against cytotoxic, reactive nitrogen and oxygen species, due to the Bcl-2-like function.¹

Recombinant, human galectin-3 contains 250 amino acids with an amino terminal methionine residue. It has a predicted molecular mass of ~ 26 kDa.

The lyophilized product contains 200 μg of lactose as a stabilizer per 100 μg of galectin-3.

Purity: $\geq 95\%$ (SDS-PAGE)

Preparation Instructions

A stock solution may be prepared by addition of sterile PBS at $37\text{ }^{\circ}\text{C}$. For use in carbohydrate binding assays, the solution should be dialyzed to remove the lactose stabilizer.

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

The product is shipped on wet ice and should be stored at $-20\text{ }^{\circ}\text{C}$. Lyophilized samples are stable for up to 12 months at -20 to $-80\text{ }^{\circ}\text{C}$.

A sterile galectin-3 stock solution is stable for 3–4 months when stored at 4 – $8\text{ }^{\circ}\text{C}$ with a molar excess of lactose. Avoid repeated freeze-thaw cycles.

References:

1. Krzeslak, A., and Lipinska, A., Galectin-3 as a multifunctional protein (Review). *Cell. Mol. Biol. Lett.*, **9**, 305-28 (2004).
2. Patterson, R.J. *et al.*, Understanding the biochemical activities of galectin-1 and galectin-3 in the nucleus. *Glycoconj. J.*, **19**, 499–506 (2002).
3. Mathieu, A. *et al.*, Nuclear galectin-3 expression is an independent predictive factor of recurrence for adenocarcinoma and squamous cell carcinoma of the lung. *Mod. Pathol.*, Apr. 8, (2005).
4. Nakamura, M. *et al.* Involvement of galectin-3 expression in colorectal cancer progression and metastasis. *Int. J. Oncol.*, **15**, 143-148, (1999).
5. Almkvist, J., and Karlsson, A., Galectins as inflammatory mediators. *Glycoconj. J.*, **19**, 575-81 (2004).
6. Schoeppner, H. L. *et al.*, Expression of an endogenous galactose-binding lectin correlates with neoplastic progression in the colon. *Cancer*, **75**, 2818-2826 (1995).
7. Inohara, H. *et al.*, Expression of galectin-3 in fine-needle aspirates as a diagnostic marker differentiating benign from malignant thyroid neoplasms. *Cancer*, **85**, 2475-2484 (1999).
8. Van den Brule, F.A. *et al.*, Alteration of the cytoplasmic/nuclear expression pattern of galectin-3 correlates with prostate carcinoma progression. *Int. J. Cancer*, **89**, 361-367 (2000).
9. Pacis, R.A. *et al.*, Decreased galectin-3 expression in prostate cancer. *Prostate*, **44**, 118-123 (2000).
10. Van den Brule, F.A. *et al.*, Differential expression of the 67-kD laminin receptor and 31-kD human laminin-binding protein in human ovarian carcinomas. *Eur. J. Cancer*, **30A**, 1096-109 (1994).
11. Castronovo, V. *et al.*, Decreased expression of galectin-3 is associated with progression of human breast cancer. *J. Pathol.*, **179**, 43-48 (1996).
12. Idikio, H., Galectin-3 expression in human breast carcinoma: correlation with cancer histologic grade. *Int. J. Oncol.*, **12**, 1287-1290 (1998).
13. Matarrese, P. *et al.*, Galectin-3 overexpression protects from cell damage and death by influencing mitochondrial homeostasis. *FEBS Lett.*, **473**, 311–315 (2000).
14. Moon, B.K. *et al.*, Galectin-3 protects human breast carcinoma cells against nitric oxide-induced apoptosis. Implication of galectin-3 function during metastasis. *Am. J. Pathol.*, **159**, 1055–1060 (2001).
15. Shekhar, M.P. *et al.*, Alterations in galectin-3 expression and distribution correlate with breast cancer progression: functional analysis of galectin-3 in breast epithelial-endothelial interactions. *Am. J. Pathol.*, **165**, 1931-41 (2004).
16. O'Driscoll, L. *et al.*, Lack of prognostic significance of survivin, survivin- Δ Ex3, survivin-2B, galectin-3, bag-1, bax- α , and MRP-1 mRNAs in breast cancer. *Cancer Lett.*, **201**, 225-36 (2003).
17. Ochieng, J. *et al.*, Extracellular functions of galectin-3 (Review). *Glycoconj. J.*, **19**, 527-35 (2004).
18. Liu, F.T., Regulatory roles of galectins in the immune response (Review). *Int. Arch. Allergy Immunol.*, **136**, 385-400 (2005).
19. Takenaka, Y. *et al.*, Nuclear export of phosphorylated galectin-3 regulates its antiapoptotic activity in response to chemotherapeutic drugs. *Mol. Cell Biol.*, **24**, 4395–4406 (2004).

DG,MAM 07/05-1

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.