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**Technical Bulletin** 

# Lectin from Phaseolus vulgaris (red kidney bean)

Leucoagglutinin PHA-L, lyophilized powder

#### L2769

# **Product Description**

Lectins are proteins or glycoproteins of non-immune origin that agglutinate cells and/or precipitate complex carbohydrates. Lectins can bind glycoproteins even in the presence of various detergents.<sup>1</sup> The agglutination activity of these highly specific carbohydrate-binding molecules is usually inhibited by a simple monosaccharide. However, for some lectins, di-, tri-, and even polysaccharides are required.

Lectins are isolated from a wide variety of natural sources, including seeds, plant roots and bark, fungi, bacteria, seaweed and sponges, mollusks, fish eggs, body fluids of invertebrates and lower vertebrates, and from mammalian cell membranes. The precise physiological role of lectins in nature is still unknown. However, lectins have proven very valuable in a wide variety of applications *in vitro*, including:

- blood grouping and erythrocyte polyagglutination studies
- mitogenic stimulation of lymphocytes
- lymphocyte subpopulation studies
- fractionation of cells and other particles
- histochemical studies of normal and pathological conditions

A range of lectins suitable for the above applications is available. Most of our lectins are highly purified by affinity chromatography. However, some are offered as purified or partially purified lectins, suitable for specific applications. Many of the lectins are available conjugated to the following moieties, where conjugation does not alter the specificity of the lectin:

- fluorochromes (for detection by fluorimetry)
- enzymes (for enzyme-linked assays)
- insoluble matrices (for use as affinity media)

Please refer to Table 1 for general information on the most common lectins.

Tri- and tetra-antennary glycopeptides containing outer galactose residues and an a-linked mannose residue substituted at positions C-2 and C-6 are specifically bound by PHA-L.<sup>2</sup> PHA-L also reacts with Tamm-Horsfall glycoprotein, fetuin, and porcine thyroglobulin (weakly). Agglutination activity is inhibited by galactosyl-(1,4)-N-acetylglucosaminyla(1,2)-mannose. However, PHA-L does not react with all glycoproteins that contain this sugar.

Lectins from *Phaseolus vulgaris*, have not been proven to be specific for any particular oligosaccharide.<sup>3,4</sup> Instead, PHA-L recognizes terminal galactose residues of complex glycans on mammalian glycoproteins such as thyroglobulin.

Five *Phaseolus vulgaris* isolectins with similar amino acid compositions can be separated: L4, L3E1, L2E2, L1E3, and E4.<sup>5</sup>

Several theses<sup>6-10</sup> and dissertations<sup>11-16</sup> cite use of product L2769 in their research protocols.

# Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

## Storage/Stability

Aggregation is thought to occur in the presence of high concentrations of 2-mercaptoethanol.

## **Preparation Instructions**

This lectin is soluble in phosphate buffered saline, pH 7.2 (1 mg/mL).



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# Table 1. General lectins guide

Lectin	MW (kDa)	Subunits	Specificity		Mitogenic				
			Blood Group	Sugar	ACTIVITY				
Abrus precatorius +									
Agglutinin	134	4		Gal					
Abrin A (toxin)	60	2		Gal					
Abrin B (toxin)	63.8	2(αβ)		Gal					
Agarius bisporus	58.5	-	-	$\beta$ -gal(1 $\rightarrow$ 3)galNAc	+				
Anguilla anguilla	40	2	Н	a-L-Fuc					
Arachis hypogaea	120	4	Т	$\beta$ -gal(1 $\rightarrow$ 3)galNAc					
Artocarpus integrifolia	42	4	Т	α-gal→OMe	+				
Bandeiraea simplicifolia									
• BS-I	114	4	А, В	α-gal, α-galNAc					
• BS-I-A <sub>4</sub>	114	4	A	a-galNAc					
• BS-I-B <sub>4</sub>	114	4	В	a-gal					
• BS-II	113	4	acq, B, Tk, T	glcNAc					
Bauhinia purpurea	195	4		β-Gal(1→4)GalNAc	+				
Caragana arborescens	60; 120ª	2/4	-	GalNAc					
Cicer arietinum	44	2	-	Fetuin					
Codium fragile	60	4	-	GalNAc					
Concanavalin A	102	4	-	a-Man, a-Glc	+				
Succinyl-Concanavalin A	51	2	-	a-Man, a-Glc	+b				
Cytisus scoparius	-	-	-	GalNAc, Gal					
Datura stramonium	86	2(αβ)	-	(GlcNAc) <sub>2</sub>					
Dolichos biflorus	140	4	A1	a-GalNAc					
Erythrina corallodendron	60	2	-	β-Gal(1→4)GlcNAc	+				
Erythrina cristagalli	56.8	2(αβ)	-	β-Gal(1→4)GlcNAc					
Euonymus europaeus	166	4(αβ)	B,H	a-Gal(1→3)Gal	+				
Galanthus nivalis	52	4	(h)	Non-reduced a-Man					
Glycine max	110	4	-	GalNAc	+c				
Helix aspersa	79	-	А	GalNAc					
Helix pomatia	79	6	А	GalNAc					
Lathyrus odoratus	40-43	4(αβ)	-	a-Man	+				
Lens culinaris	49	2	-	a-Man	+				
Limulus polyphemus	400	18	-	NeuNAc					
Bacterial agglutinin	-	-	-	GalNAc, GlcNAc					
Lycopersicon esculentum	71	-	-	(GlcNAc)₃					
Maackia amurensis	130	2(αβ)	0	Sialic acid	+				
Maclura pomifera	40-43	2(αβ)		α-Gal, α-GalNAc					
Momordica charantia	115-129	4(αβ)	-	Gal, GalNAc					
Naja mocambique mocambique	-	-	-	-					
Naja naja kaouthia	-	-	-	-					

Narcissus pseudonarcissus	26	2	(h)	a-D-Man				
Persea americana	-	-	-	-				
Phaseolus coccineus	112	4	-	-				
Phaseolus limensis	247 (II)	8	A	GalNAc	+			
	124 (III)	4						
Phaseolus vulgaris		1	1	1				
РНА-Е	128	4	-	Oligosaccharide	+			
PHA-L	128	4	-	Oligosaccharide	+			
РНА-Р								
PHA-M								
Phytolacca americana	32	-	-	(GlcNAc)₃	+			
Pisum sativum	49	4(αβ)	-	a-Man	+			
Pseudomonas aeruginosa PA-I	13 - 13.7	-	-	Gal	+c			
Psophocarpus tetragonolobus	35	1	-	GalNAc, Gal				
Ptilota plumosa	65; 170	-	В	a-Gal				
Ricinus communis				11				
Toxin, RCA60	60	2	-	GalNAc, β-Gal				
Toxin, RCA120	120	4	-	β-Gal				
Sambucus nigra	140	4(αβ)	-	aNeuNAC(2→6)Gal, GalNAc	+c			
Solanum tuberosum	50, 100ª	1,2	-	(GlcNAc)₃				
Sophora japonica	133	4	A,B	β-GalNAc				
Tetragonolobus purpureas	120 [A]	4	н	a-L-Fuc				
	58 [BA]	2	н	a-L-Fuc				
	117 [C]	4	н	a-L-Fuc				
Triticum vulgaris	36	2	-	(GlcNAc)2, NeuNAc	+			
Ulex europaeus								
UEA I	68	-	н	a-L-Fuc				
UEA II	68	-						
Vicia faba	50	4(αβ)	-	Man,Glc	+			
Vicia sativa	40	4(αβ)	-	Glc,Man	+			
Vicia villosa	139	4	A <sub>1+</sub> T <sub>n</sub>	GalNAc				
• A4	134	4	A1	GalNAc				
• B4	143	4	Tn	GalNAc				
Vigna radiata	160	4	-	a-Gal				
Viscum album	115	4(αβ)	-	β-Gal				
Wisteria floribunda	68	2	-	GalNAc				

<sup>a</sup> Concentration-dependent molecular weight

<sup>c</sup> Mitogenic for neuraminidase-treated lymphocyte

<sup>b</sup> Non-agglutinating and mitogenic

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