3050 Spruce Street, St. Louis, MO 63103 USA
Tel: (800) 521-8956 (314) 771-5765 Fax: (800) 325-5052 (314) 771-5757
email: techservice@sial.com sigma-aldrich.com

# Product Information

**Lectin from *Phaseolus vulgaris* (red kidney bean)**
**Phytohemagglutinin PHA-P**

Product Number **L8754**
Storage Temperature 2–8 °C

## Product Description

PHA-P is a mixture of PHA-E (MW = 128 kDa) and PHA-L (MW = 126 kDa).

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.[1] 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.

Lectin PHA-P is not inhibited easily by monosaccharides, but may be inhibited by oligosaccharides.

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, but they have proved to be very valuable in a wide variety of applications *in vitro*, including:

1. blood grouping and erythrocyte polyagglutination studies.
2. mitogenic stimulation of lymphocytes.
3. lymphocyte subpopulation studies.
4. fractionation of cells and other particles.
5. histochemical studies of normal and pathological conditions.

Sigma offers a range of lectins suitable for the above applications. Most Sigma lectins are highly purified by affinity chromatography. Some products are offered as purified or partially purified lectins, suitable for specific applications.

Many of the lectins are available as conjugates (conjugation does not alter the specificity of the lectin):

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

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

## Procedure

A general agglutination procedure using this lectin with 96-well plates is as follows:

1. Prepare a lectin solution of 1 mg/ml in PBS buffer, pH 6.8.
2. Pipette 50 µL of fresh PBS into each well and add 50 µL of the lectin solution into the first well.
3. Serial dilutions are made by pipetting 50 µL from each successive well into the next well.
4. Blood type A with a 2% hematocrit is used as the substrate.
5. Pipette 50 µL of blood into each well.
6. Visually determine agglutination.

## Precautions and Disclaimer

This product is 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.

## Preparation Instructions

This lectin is soluble in phosphate buffered saline, pH 6.8, at 1 mg/ml.

## Storage/Stability

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

| Lectin | MW (kDa) | Subunits | Specificity | | Mitogenic Activity |
|---|---|---|---|---|---|
| | | | Blood Group | Sugar | |
| *Abrus precatorius* | | | – | | + |
| Agglutinin | 134 | 4 | | gal | |
| Abrin A (toxin) | 60 | 2 | | gal | |
| Abrin B (toxin) | 63.8 | 2(αβ) | | gal | |
| *Agarius bisporus* | 58.5 | – | – | β-gal(1→3)galNAc | |
| *Anguilla anguilla* | 40 | 2 | H | α-L-Fuc | |
| *Arachis hypogaea* | 120 | 4 | T | β-gal(1→3)galNAc | |
| *Artocarpus integrifolia* | 42 | 4 | T | α-gal→OMe | + |
| *Bandeiraea simplicifolia* | | | | | |
| BS-I | 114 | 4 | A, B | α-gal, α-galNAc | |
| BS-I-$A_4$ | 114 | 4 | A | α-galNAc | |
| BS-I-$B_4$ | 114 | 4 | B | α-gal | |
| BS-II | 113 | 4 | acq, B, Tk, T | glcNAc | |
| *Bauhinia purpurea* | 195 | 4 | – | β-gal(1→3)galNAc | + |
| *Caragana arborescens* | 60; 120[a] | 2/4 | – | galNAc | |
| *Cicer arietinum* | 44 | 2 | – | fetuin | |
| *Codium fragile* | 60 | 4 | – | galNAc | |
| *Concanavalin A* | 102 | 4 | – | α-man, α-glc | + |
| *Succinyl-Concanavalin A* | 51 | 2 | – | α-man, α-glc | +[b] |
| *Cytisus scoparius* | – | – | – | galNAc, gal | |
| *Datura stramonium* | 86 | 2(αβ) | – | $(glcNAc)_2$ | |
| *Dolichos biflorus* | 140 | 4 | $A_1$ | α-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 | α-gal(1→3)gal | + |
| *Galanthus nivalis* | 52 | 4 | (h) | non-reduc. α-man | |
| *Glycine max* | 110 | 4 | – | galNAc | +[c] |
| *Helix aspersa* | 79 | – | A | galNAc | |
| *Helix pomatia* | 79 | 6 | A | galNAc | |
| *Lathyrus odoratus* | 40-43 | 4(αβ) | – | α-man | + |
| *Lens culinaris* | 49 | 2 | – | α-man | + |
| *Limulus polyphemus* | 400 | 18 | – | NeuNAc | |
| Bacterial agglutinin | – | – | – | galNAc, glcNAc | |
| *Lycopersicon esculentum* | 71 | – | – | $(glcNAc)_3$ | |
| *Maackia amurensis* | 130 | 2(αβ) | O | 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) | α-D-man | |
| *Perseau americana* | – | – | – | – | |
| *Phaseolus coccineus* | 112 | 4 | – | – | |
| *Phaseolus limensis* | 247(II) | 8 | A | galNAc | + |
| | 124(III) | 4 | | | |
| *Phaseolus vulgaris* | | | | | |
| PHA-E | 128 | 4 | – | oligosaccharide | + |
| PHA-L | 128 | 4 | – | oligosaccharide | + |
| PHA-P | | | | | |
| PHA-M | | | | | |

Table (continued)

| Lectin | MW (kDa) | Subunits | Specificity | | Mitogenic Activity |
|---|---|---|---|---|---|
| | | | Blood Group | Sugar | |
| *Phytolacca americana* | 32 | – | – | $(glcNAc)_3$ | + |
| *Pisum sativum* | 49 | 4(αβ) | – | α-man | + |
| *Pseudomonas aeruginosa PA-I* | 13-13.7 | – | – | gal | +[c] |
| *Psophocarpus tetragonolobus* | 35 | 1 | – | galNAc, gal | |
| *Ptilota plumosa* | 65; 170 | – | B | α-gal | |
| *Ricinus communis* | | | | | |
| Toxin, $RCA_{60}$ | 60 | 2 | – | galNAc, β-gal | |
| Toxin, $RCA_{120}$ | 120 | 4 | – | β-gal | |
| *Sambucus nigra* | 140 | 4(αβ) | – | αNeuNAC(2→6)gal galNAc | +[c] |
| *Solanum tuberosum* | 50; 100[a] | 1, 2 | – | $(glcNAc)_3$ | |
| *Sophora japonica* | 133 | 4 | A, B | β-galNAc | |
| *Tetragonolobus purpureas* | 120(A) | 4 | H | α-L-fuc | |
| | 58(BA) | 2 | H | α-L-fuc | |
| | 117(C) | 4 | H | α-L-fuc | |
| *Triticum vulgaris* | 36 | 2 | – | $(glcNAc)_2$, NeuNAc | + |
| *Ulex europaeus* | | | | | |
| UEA I | 68 | – | H | α-L-fuc | |
| UEA II | 68 | – | – | $(glcNAc)_2$ | |
| *Vicia faba* | 50 | 4(αβ) | – | man, glc | + |
| *Vicia sativa* | 40 | 4(αβ) | – | glc, man | + |
| *Vicia villosa* | 139 | 4 | $A_{1+}T_n$ | galNAc | |
| $A_4$ | 134 | 4 | $A_1$ | galNAc | |
| $B_4$ | 143 | 4 | $T_n$ | galNAc | |
| *Vigna radiata* | 160 | 4 | – | α-gal | |
| *Viscum album* | 115 | 4(αβ) | – | β-gal | |
| *Wisteria floribunda* | 68 | 2 | – | galNAc | |

[a] Concentration-dependent molecular weight
[b] Non-agglutinating and mitogenic
[c] Mitogenic for neuraminidase-treated lymphocytes

**References**

1. Lotan, R., *et al.*, *Biochemistry*, **16(9)**, 1787-1794 (1977).