Phytohemagglutinin

Cat. No.:	HY-N7038
CAS No.:	9008-97-3
Target:	NF-κB; COX; Interleukin Related; Reactive Oxygen Species (ROS)
Pathway:	NF-κB; Immunology/Inflammation; Metabolic Enzyme/Protease
Storage:	4°C, protect from light * In solvent : -80°C, 6 months; -20°C, 1 month (protect from light)

Phytohemagglutinin

SOLVENT & SOLUBILITY

In Vitro	H_2O : 10 mg/mL (ultrasonic and warming and heat to 60°C)
In Vivo	1. Add each solvent one by one: PBS Solubility: 50 mg/mL (Infinity mM); Clear solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description	Phytohemagglutinin (PHA-M), the major seed lectin of the common bean, Phaseolus vulgaris, is a T-cell activator. Phytohemagglutinin stimulates human mononuclear leukocytes, inducing the expression of ChAT mRNA and potentiating ACh synthesis. Phytohemagglutinin induces dose- and time-dependent toxicity in THP-1 monocytes/macrophages, alters cellular morphology, causes organelle dysfunction, and increases the expression of ***NF-κB***, ***COX2***, ***IL-1***β[1][2][3][4].
IC_{50} & Target	Apoptosis[1]
In Vitro	Phytohemagglutinin (0.1-1000 μg/mL, 24 h) induces a reduction in cell number, the adoption of a rounded morphology, cytoskeletal destabilization and toxic response in THP-1 cells[1]. Phytohemagglutinin (0.1-1000 μg/mL, 24-72 h) reduces mitochondrial activity and lysosomal activity in MDM cells, causing significant viability loss at higher concentrations (1000 μg/mL) and prolonged exposure (72 h)[1]. Phytohemagglutinin (0.1-1000 μg/mL, 1-72 h) does not significantly induce ROS production in MDM cells at concentrations up to 1000 μg/mL over 72 h, showing only a slight increase in free radicals at 24 h with 1000 μg/mL[1]. Phytohemagglutinin (10-1000 μg/mL, 24 h) increases the expression of NF-κB, COX2, IL-1β and decreases the expression of TNF-α in MDM cells[1]. Phytohemagglutinin binds to the membranes of T-cells, stimulates metabolic activity, cell division [2]. Phytohemagglutinin (5μg/mL, 48 h) stimulates PBMCs to secrete high levels of inflammatory cytokines, including IL-6, TNF-α, IL-1β, IFN-γ, IL-4, IL-2, IL-12, IL-10, and IL-17, while significantly reducing IL-8 levels[4]. Phytohemagglutinin significantly reduces RGC-32 expression and inhibits the growth of renal cancer cells, an effect reversed by PD-L1 ligation[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only. Immunofluorescence[1]

Cell Line:	THP-1 cells and MDM cells
Concentration:	0.1, 1, 100, 1000 μg/mL
Incubation Time:	24 h
Result:	Induced a loss of membrane integrity, which in turn led to the detachment of THP-1cells from the culture flask at 1000 μg/mL. Caused a reduction in cell number as a result of membrane destabilization. Induced lysosomal membrane destabilization and reduction in MDM cell number at 100 and 1000 μg/mL. Reduced mitochondrial membrane potential at 10 and 1000 μg/mL in MDM cells. Elicited significant membrane permeabilization in MDM cells at 1000 μg/mL.

CUSTOMER VALIDATION

- Cancer Commun (Lond). 2024 May 12.
- Drug Resist Updat. 2024 Jun 24:76:101112.
- J Ethnopharmacol. 2022 Jun 12:291:115126.
- Int Immunopharmacol. 2025 Dec 17:169:116039.
- Sci Rep. 2025 Oct 27;15(1):37515.

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REFERENCES

[1]. Prajitha N, et al. Intracellular inflammatory signalling cascades in human monocytic cells on challenge with phytohemagglutinin and 2,4,6-trinitrophenol. Mol Cell Biochem. 2022 Feb;477(2):395-414.

[2]. Movafagh A, et al. The Significance Application of Indigenous Phytohemagglutinin (PHA) Mitogen on Metaphase and Cell Culture Procedure. Iran J Pharm Res. 2011 Fall;10(4):895-903.

[3]. Fujii T, et al. Induction of choline acetyltransferase mRNA in human mononuclear leukocytes stimulated by phytohemagglutinin, a T-cell activator. J Neuroimmunol. 1998 Feb;82(1):101-107.

[4]. Li L, et al. Response Gene to Complement 32 is associated with poor patient survival and an inflamed tumor-immune microenvironment in clear cell renal cell carcinoma. Transl Oncol. 2025 Feb;52:102248.

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