PRODUCT INFORMATION

Histidine-rich Glycoprotein (human, recombinant)

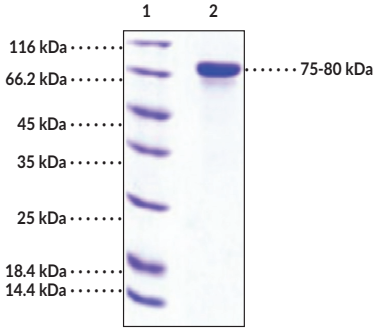
Item No. 37017

Overview and Properties

Synonyms:	Histidine-proline-rich Glycoprotein, HPRG, HRG
Source:	Active recombinant human C-terminal His-tagged histidine-rich glycoprotein expressed in HEK293 cells
Amino Acids:	19-525
Uniprot No.:	P04196
Molecular Weight:	59 kDa
Storage:	-80°C (as supplied)
Stability:	≥1 year
Purity:	≥97% estimated by SDS-PAGE
Supplied in:	Lyophilized from sterile PBS, pH 7.4
Endotoxin Testing:	<1.0 EU/µg, determined by the LAL endotoxin assay
Bioactivity:	See figures for details

Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Image



Lane 1: MW Markers
Lane 2: Histidine-rich Glycoprotein

SDS-PAGE Analysis of Histidine-rich Glycoprotein. This protein has a calculated molecular weight of 59 kDa. It has an apparent molecular weight of approximately 75-80 kDa by SDS-PAGE under reducing conditions due to glycosylation.

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Description

Histidine-rich glycoprotein is an abundant plasma glycoprotein that is involved in diverse biological processes, including angiogenesis, hemostasis, cell adhesion, and immunity.[1,2] It is composed of a signal peptide and two cystatin-like regions in the N-terminal domain, a central domain with a histidine-rich region (HRR) and two proline-rich regions (PRRs) on either side, and a C-terminal domain. Histidine-rich glycoprotein is mainly produced by the liver but is also found in platelets and megakaryocytes.[3,4] It has many binding partners, including IgG, immunoglobulin γ receptor (FcγR), and complement 1q (C1q), which bind to the N-terminal domain, zinc, heme, and microbes, which bind to the HRR, heparin and heparan sulfate, which bind to the N-terminal domain and HRR, plasminogen and thrombospondin, which bind to the N-terminal and C-terminal domains, and phospholipids, fibrinogen, and complement components, which have undefined binding regions.[2] Histidine-rich glycoprotein is also able to bind to various cell types such as T cells, B cells, erythrocytes, endothelial cells, and several cancer types. It modulates macrophage polarization, facilitates the clearance of apoptotic and necrotic cells, promotes antitumor immunity, and has antibacterial and antiviral activities.[1,2] Overexpression of *HRG* decreases tumor burden, metastasis, hypoxia, and blood vessel density and increases tumor-associated macrophage (TAM) accumulation in several mouse xenograft models.[5] Increased plasma levels of histidine-rich glycoprotein are associated with the development of post-thrombotic syndrome following a venous thromboembolic event (VTE).[6] Cayman's Histidine-rich Glycoprotein (human, recombinant) protein can be used for cell-based adhesion assays. This protein consists of 518 amino acids, has a calculated molecular weight of 59 kDa, and a predicted N-terminus of Val19 after signal peptide cleavage. By SDS-PAGE, under reducing conditions, the apparent molecular mass of the protein is 75-80 kDa due to glycosylation.

References

1. Pan, Y., Deng, L., Wang, H., *et al*. Histidine-rich glycoprotein (HRGP): Pleiotropic and paradoxical effects on macrophage, tumor microenvironment, angiogenesis, and other physiological and pathological processes. *Genes Dis*. **9(2)**, 381-392 (2022).
2. Poon, I.K.H., Patel, K.K., Davis, D.S., *et al*. Histidine-rich glycoprotein: the Swiss Army knife of mammalian plasma. *Blood* **117(7)**, 2093-2101 (2011).
3. Koide, T., Foster, D., Yoshitake, S., *et al*. Amino acid sequence of human histidine-rich glycoprotein derived from the nucleotide sequence of its cDNA. *Biochemistry* **25(8)**, 2220-2225 (1986).
4. Leung, L.L.K., Harpel, P.C., Nachman, R.L., *et al*. Histidine-rich glycoprotein is present in human platelets and is released following thrombin stimulation. *Blood* **62(5)**, 1016-1021 (1983).
5. Rolny, C., Mazzone, M., Tugues, S., *et al*. HRG inhibits tumor growth and metastasis by inducing macrophage polarization and vessel normalization through downregulation of PlGF. *Cancer Cell* **19(1)**, 31-44 (2011).
6. Siudut, J., Natorska, J., Son, M., *et al*. Increased levels of histidine-rich glycoprotein are associated with the development of post-thrombotic syndrome. *Sci. Rep*. **10(1)**, 14419 (2020).

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