Product Data Sheet

Product Name: Toripalimab
Cat. No.: GC64561

Chemical Properties

Cas. No.	1924598-82-2	
Formula	M.Wt	147.3 kDa
Solubility	Storage	4°C,do not freeze.
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ for several months.	
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.	
Structure	Toripalimab	

Protocol

Cell experiment [1]:

Cell lines	Human peripheral blood mononuclear cell (PBMC)-derived T cells
Preparation Method	Human PBMCs were isolated and cultured for six days in the presence of IL-4 and GM-CSF to generate immature dendritic cells (imDCs). The imDCs were then incubated with TNF-α for three days to obtain mature dendritic cells (mDCs). T cells were isolated from the PBMCs of the same donors and labeled with CFSE. The mDCs, T cells, and Tetanus Toxoid (10ng/mL) were mixed. Different concentrations of Toripalimab (0.01 to 10μg/mL), Nivolumab (positive control), or hIgG4 (negative control) were added to the mixtures.

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Reaction Conditions	0.01 to 10μg/mL; 10 days.
Applications	Treatment with Toripalimab dose-dependently stimulated human T cell proliferation, as well as IFN-γ and TNF-α secretion. Toripalimab was more effective in promoting T cell proliferation and cytokine secretion at concentrations of 0.1-3μg/mL.

Animal experiment [2]:

Animal models	hPD-1 knock-in mice with a C57BL/6 background (C57/hPD-1 mice)
Preparation Method	Mice were subcutaneously inoculated with 1 x 10^6 MC38 syngeneic tumor cells on day 0. On day 6, the inoculated mice were randomized into groups and treated via intraperitoneal injection with either control IgG, saline, or Toripalimab at 0.3-10mg/kg.
Dosage form	0.3-10mg/kg; i.p.; twice a week for 3 weeks.
Applications	Toripalimab inhibited tumor growth in a dose-dependent manner, with substantial antitumor efficacy observed at doses of 1, 3, and 10mg/kg.

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References:
[1] Fu J, Wang F, Dong LH, et al. Preclinical evaluation of the efficacy, pharmacokinetics and immunogenicity of JS-001, a programmed cell death protein-1 (PD-1) monoclonal antibody. Acta Pharmacol Sin. 2017 May;38(5):710-718.
[2] Liu H, Guo L, Zhang J, et al. Glycosylation-independent binding of monoclonal antibody toripalimab to FG loop of PD-1 for tumor immune checkpoint therapy. MAbs. 2019 May/Jun;11(4):681-690.

Background

Toripalimab is a recombinant humanized anti-PD-1 monoclonal antibody. Toripalimab binds to the PD-1 receptor on the surface of T cells, blocking PD-1 interaction with the ligands PD-L1 and PD-L2, thereby alleviating the PD-1 signaling pathway-mediated immune suppression[1-2]. Toripalimab can be used in research related to cancers such as melanoma, urothelial carcinoma, nasopharyngeal carcinoma, and esophageal squamous cell carcinoma[3-4].

In vitro, treatment of SEB-stimulated human peripheral blood mononuclear cells (PBMCs) with Toripalimab (3.3-10μg/mL) for 3 days, or treatment of anti-CD3/anti-CD28 stimulated human naïve CD8+ T cells for 3 days. Toripalimab significantly enhanced the secretion of Th1 cytokines (IFN-γ, IL-2, TNF) and myeloid-derived inflammatory cytokines

(IL-1α, IL-1β), while also enhancing T cell activation. In ex vivo cultures of dissociated tumor cells from NSCLC patients, treatment with Toripalimab (10μg/mL) combined with anti-CD3/anti-CD28 stimulation for 6-24 hours significantly upregulated IFN-γ production and the expression of genes related to immune cell pathways[5]. Treatment of human PBMCs with Toripalimab (0.01-10μg/mL) for 6-10 days, Toripalimab stimulated human T cell proliferation in a dose-dependent manner and enhanced the secretion of IFN-γ and TNF-α[6].

In vivo, C57/hPD-1 knock-in mice bearing MC38 tumors were treated with Toripalimab (0.3-10mg/kg, intraperitoneal injection, twice weekly) for 3 weeks. Toripalimab significantly inhibited tumor growth in a dose-dependent manner[7]. hPD-1 knock-in mice subcutaneously inoculated with B16-vec or B16-IL33 melanoma cells were treated with Toripalimab (200μg/100μL, twice weekly, for 3 weeks). The combination of Toripalimab and IL-33 significantly suppressed tumor growth and prolonged the survival of tumor-bearing mice[8].

References:
[1] Zhang X, Zheng J, Niu Y, et al. Long-term survival in extensive-stage small-cell lung cancer treated with different immune checkpoint inhibitors in multiple-line therapies: A case report and literature review. Front Immunol. 2022 Nov 30;13:1059331.
[2] Thuss-Patience P, Stein A. Immunotherapy in Squamous Cell Cancer of the Esophagus. Curr Oncol. 2022 Mar 30;29(4):2461-2471.
[3] Lian D, Yang Y, Gan Y, et al. Cost-effectiveness of toripalimab plus chemotherapy versus chemotherapy as first-line treatment for advanced non-small cell lung cancer in China: a societal perspective. Expert Rev Pharmacoecon Outcomes Res. 2025 Apr;25(4):587-596.
[4] Zhang L, Hao B, Geng Z, et al. Toripalimab: the First Domestic Anti-Tumor PD-1 Antibody in China. Front Immunol. 2022 Jan 12;12:730666.
[5] Rajasekaran N, Wang X, Ravindranathan S, et al. Toripalimab, a therapeutic monoclonal anti-PD-1 antibody with high binding affinity to PD-1 and enhanced potency to activate human T cells. Cancer Immunol Immunother. 2024 Feb 24;73(3):60.
[6] Fu J, Wang F, Dong LH, et al. Preclinical evaluation of the efficacy, pharmacokinetics and immunogenicity of JS-001, a programmed cell death protein-1 (PD-1) monoclonal antibody. Acta Pharmacol Sin. 2017 May;38(5):710-718.
[7] Liu H, Guo L, Zhang J, et al. Glycosylation-independent binding of monoclonal

antibody toripalimab to FG loop of PD-1 for tumor immune checkpoint therapy. MAbs. 2019 May/Jun;11(4):681-690.
[8] He H, Shi L, Meng D, et al. PD-1 blockade combined with IL-33 enhances the antitumor immune response in a type-1 lymphocyte-mediated manner. Cancer Treat Res Commun. 2021;28:100379.

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