



Recombinant Human Thyrotropin receptor (TSHR)-VLPs (Active)

Product Code	CSB-MP025131HU
Abbreviation	Recombinant Human TSHR protein-VLPs (Active)
Storage	The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.
Uniprot No.	P16473
Form	Lyophilized powder
Storage Buffer	Lyophilized from a 0.2 µm filtered PBS, 6% Trehalose, pH 7.4
Product Type	Recombinant Protein
Immunogen Species	Homo sapiens (Human)
Biological Activity	Measured by its binding ability in a functional ELISA. Immobilized Human TSHR at 10 µg/mL can bind Anti-TSHR recombinant antibody (CSB-RA025131MA1HU). The EC50 is 30.81-36.12 ng/mL. The VLPs (CSB-MP3838) is negative control.
Purity	Greater than 90% as determined by SEC-HPLC.
Sequence	GMGCSSPPCECHQEEDFRVTCKDIQRIPSLPPSTQTLKLIETHLRTIPSHAFSN LPNISRIYVSIDVTLQQLESHSFYNLSKVTHIEIRNTRNLTYIDPDALKELPLLKFL GIFNTGLKMFPDLTKVYSTDIFFILEITDNPYMTSIPVNAFQGLCNETLTLKLYNN GFTSVQGYAFNGTKLDAVYLNKNKYLTVIDKDAFGGVYSGPSLLDVSQTSVTA LPSKGLEHLKELIARNTWTLKKLPLSLSFLHLTRADLSYP SHCCAFKNQKKIRGI LESLMCNESSMQSLRQRKSVNALNSPLHQEYEENLGDSIVGYKEKSKFQDTH NNAHYVVFEEQEDEIIGFGQELKNPQEETLQAFDSHYDYTCGDSEDMVCTP KSDEFNPCEDIMGYKFLRIVVWFVSLALLGNVFVLLILLTSHYKLVNPRFLMCN LAFADFCMGMYLLLIASVDLYTHSEYNNHAIWDWQTGPGCNTAGFFT VFASELS VYTLTVITLERWYAITFAMRLDRKIRLRHACAIMVGGWVCCFLLALLPLVGISSY AKVSICLPMDTETPLALAYIVFVLTNLIVAFVIVCCCYVKIYITVRNPQYNPGDKD TKIAKRMAVLIFTDFICMAPISFYALSAILNKPLITVSNSKILLVLFYPLNSCANPFL YAIFTKAFQRDVFILLSKFGICKRQAQAYRGQRVPPKNSTDIVQVQKVTHDMRQ GLHNMEDVYELIENSHLTPKKQGQISEEYMQTVL
Source	Mammalian cell
Target Names	TSHR
Expression Region	21-764aa
Notes	The VLPs are expressed from human 293 cells (HEK293). Mix the sample gently by repeatedly pipetting it up and down. Do not vortex. Repeated freezing and thawing is not recommended. Store the protein at -20°C/-80°C upon receiving it, and ensure to avoid repeated freezing and thawing, otherwise, it will affect the

protein activity. The immunization strategy should be optimized (antigen dose, regimen and adjuvant).

Tag Info

C-terminal 10xHis-tagged(This tag can be tested only under denaturing conditions)

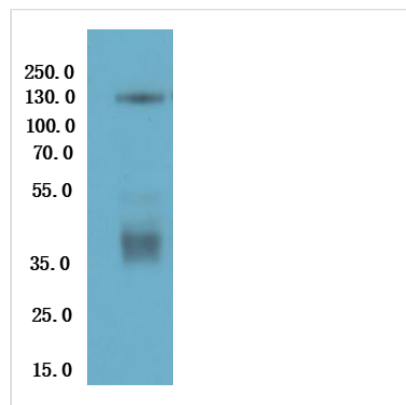
Mol. Weight

86.0 kDa

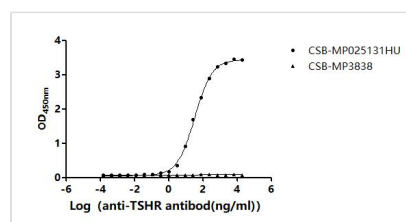
Protein Length

Full Length of Mature Protein

Image

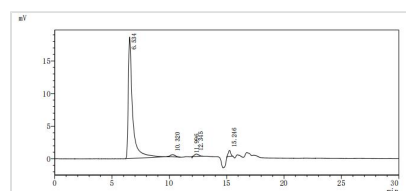


CSB-MP025131HU is detected by Mouse anti-6*His monoclonal antibody.



Activity

Measured by its binding ability in a functional ELISA. Immobilized Human TSHR at 10 μ g/ml can bind Anti-TSHR recombinant antibody (CSB-RA025131MA1HU). The EC_{50} is 30.81-36.12 ng/mL. The VLPs (CSB-MP3838) is negative control.



The purity of VLPs was greater than 90% as determined by SEC-HPLC

Description

The recombinant human TSHR is an active protein characterized by its high purity, exceeding 90%, as determined by SEC-HPLC. This protein is expressed in mammalian cells, covering the amino acid sequence from 21 to 764 of the human TSHR. It is tagged with a C-terminal 10xHis tag, facilitating purification and detection. The activity of the recombinant human TSHR is assessed through its binding capability in a functional ELISA. At a concentration of 10 μ g/mL, immobilized human TSHR can effectively bind to the anti-TSHR recombinant antibody (CSB-RA025131MA1HU), with the EC_{50} ranging from 30.81 to 36.12 ng/mL. The recombinant TSHR is provided in a lyophilized powder form, maintaining stability and activity during storage. This form allows for easy reconstitution and use in various experimental settings.

TSHR is a G-protein-coupled receptor primarily located on thyroid follicular cells and regulates thyroid gland function, growth, and hormone production. Activation of TSHR by thyrotropin (TSH) from the pituitary gland stimulates the



synthesis and release of thyroid hormones, thyroxine (T4) and triiodothyronine (T3), which are essential for metabolic regulation and growth [1]. TSH acts through TSHR by activating intracellular signaling pathways that promote cell proliferation and biosynthesis of thyroid hormones via mechanisms involving cAMP and phosphatidylinositol signaling [2].

In Graves' disease, TSHR undergoes hyperactivation due to the presence of autoantibodies that function as agonists. These antibodies stimulate the receptor independently of TSH, leading to unregulated thyroid hormone production and gland enlargement, manifesting as hyperthyroidism [3]. Interestingly, research suggests that different antibody profiles can activate distinct signaling pathways within thyrocytes, contributing to the varied clinical manifestations in Graves' disease, including Graves' ophthalmopathy [3][4].

Moreover, the presence of TSHR is not limited to the thyroid; it has been identified in various tissues, including adipose tissue, immune cells, and even the central nervous system. This extrathyroidal expression suggests that TSHR may have roles beyond thyroid function, particularly in modulating immune responses and various metabolic processes [1][5]. For example, TSHR signaling in adipocytes indicates a potential role in energy metabolism and obesity [5].

The regulation of TSHR is also finely tuned by feedback mechanisms involving thyroid hormones. Thyroid hormones can modulate the expression and function of TSHR; high levels of T3 can downregulate both TSH production in the pituitary and TSHR expression in the thyroid, highlighting a negative feedback loop critical for maintaining homeostasis [6].

This intricate regulatory network underscores the importance of TSHR in both endocrine and non-endocrine functions, affirming its role as a central player in human physiology and pathology related to thyroid health.

References:

- [1] S. Moshkelgosha, G. Masetti, et al. Gut microbiome in balb/c and c57bl/6j mice undergoing experimental thyroid autoimmunity associate with differences in immunological responses and thyroid function. *Hormone and Metabolic Research*, vol. 50, no. 12, p. 932-941, 2018. <https://doi.org/10.1055/a-0653-3766>
- [2] A. Franco, R. Malaguarnera, et al. Thyrotrophin receptor signaling dependence of braf-induced thyroid tumor initiation in mice. *Proceedings of the National Academy of Sciences*, vol. 108, no. 4, p. 1615-1620, 2011. <https://doi.org/10.1073/pnas.1015557108>
- [3] R. Bahn. Graves' ophthalmopathy. *New England Journal of Medicine*, vol. 362, no. 8, p. 726-738, 2010. <https://doi.org/10.1056/nejmra0905750>
- [4] M. Khan, S. Lone, S. Faiz, I. Farooq, & S. Majid. Graves' disease: pathophysiology, genetics and management. 2021. <https://doi.org/10.5772/intechopen.98238>
- [5] N. Daya, A. Fretz, et al. Association between subclinical thyroid dysfunction and fracture risk. *Jama Network Open*, vol. 5, no. 11, p. e2240823, 2022. <https://doi.org/10.1001/jamanetworkopen.2022.40823>
- [6] S. Joshi, L. Pantalena, et al. 1,25-dihydroxyvitamin d3ameliorates th17 autoimmunity via transcriptional modulation of interleukin-17a. *Molecular and*



Cellular Biology, vol. 31, no. 17, p. 3653-3669, 2011.
<https://doi.org/10.1128/mcb.05020-11>

Reconstitution

We recommend that this vial be briefly centrifuged prior to opening to bring the contents to the bottom. Please reconstitute protein in deionized sterile water to a concentration of 0.1-1.0 mg/mL. We recommend to add 5-50% of glycerol (final concentration) and aliquot for long-term storage at -20°C/-80°C. Our default final concentration of glycerol is 50%. Customers could use it as reference.

Shelf Life

The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.