

**DESCRIPTION**

<b>Source</b>	Chinese Hamster Ovary cell line, CHO-derived	
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">                     TSH <math>\alpha</math> (Ala25 - Ser116) Accession # P01215                 </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">                     TSH <math>\beta</math> (Phe21 - Val138) Accession # P01222                 </div>
	N-terminus	C-terminus
<b>N-terminal Sequence Analysis</b>	Ala25 (TSH $\alpha$ ) & Phe21 (TSH $\beta$ )	
<b>Structure / Form</b>	Noncovalently-linked heterodimer	
<b>Predicted Molecular Mass</b>	10.2 kDa (TSH $\alpha$ ), 13.5 kDa (TSH $\beta$ )	

**SPECIFICATIONS**

<b>SDS-PAGE</b>	15-29 kDa, reducing conditions
<b>Activity</b>	Measured by its ability to induce cAMP accumulation in HEK293 human embryonic kidney cells transfected with human TSH R. Morgenthaler, N.G. <i>et al.</i> (1998) <i>Horm. Metab. Res.</i> <b>30</b> :162. The ED <sub>50</sub> for this effect is typically 0.75-3.75 ng/mL.
<b>Endotoxin Level</b>	<1.0 EU per 1 $\mu$ g of the protein by the LAL method.
<b>Purity</b>	>90%, by SDS-PAGE under reducing conditions and visualized by silver stain.
<b>Formulation</b>	Lyophilized from a 0.2 $\mu$ m filtered solution in PBS with BSA as a carrier protein. See Certificate of Analysis for details.

**PREPARATION AND STORAGE**

<b>Reconstitution</b>	Reconstitute at 10 $\mu$ g/mL in sterile PBS containing at least 0.1% human or bovine serum albumin.
<b>Shipping</b>	The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.
<b>Stability &amp; Storage</b>	<p><b>Use a manual defrost freezer and avoid repeated freeze-thaw cycles.</b></p> <ul style="list-style-type: none"> <li>● 12 months from date of receipt, -20 to -70 °C as supplied.</li> <li>● 1 month, 2 to 8 °C under sterile conditions after reconstitution.</li> <li>● 3 months, -20 to -70 °C under sterile conditions after reconstitution.</li> </ul>

**BACKGROUND**

TSH (thyroid stimulating hormone), also known as thyrotropin, is a member of the cysteine knot growth factor superfamily (1 - 4). It is a heterodimer of a 15 kDa unique subunit, TSH  $\beta$ , with a 14 kDa alpha subunit, CG $\alpha$  (common glycoprotein hormone alpha) that is shared with lutropin (LH), follitropin (FSH) and chorionic gonadotropin (CG) (1 - 4). Beta subunits of the four glycoprotein hormones share 37 - 43% amino acid (aa) identity. Mature human TSH  $\beta$  shares 92%, 90%, 90%, 89%, 89%, 89%, and 88% aa identity with canine, rat, equine, mouse, bovine, porcine, and feline TSH  $\beta$ , respectively. Mature human CG $\alpha$  shares 69% - 73% aa identity with canine, rabbit, rat, mouse, bovine, ovine, porcine, feline and equine CG $\alpha$ . Each subunit forms a cysteine knot structure with three disulfide bridges (1). A loop of the TSH  $\beta$  subunit, termed a "seat-belt", wraps around the CG $\alpha$  subunit to stabilize non-covalent association of the subunits, and also confers receptor selectivity (5). Structure and charge of the three N-linked carbohydrate chains influence activity; the most complex forms have lower activity but a longer half-life (1, 5). Bovine and porcine TSH bind human TSH receptors (TSHR) with high affinity (6). The hypothalamic peptide TRH stimulates production and secretion of TSH by thyrotrophs (basophilic cells) in the anterior pituitary gland (1). TSH travels to thyroid TSHR to stimulate production of thyroxine (T<sub>4</sub>) (1). In the tissues, T<sub>4</sub> is converted to the active form of thyroid hormone, triiodothyronine (T<sub>3</sub>), which completes a feedback loop by inhibiting TSH production (1, 7). Studies in the mouse identify bone marrow as a secondary site of TSH production (8). In bone, TSH signaling through TSHR on osteoblast and osteoclast precursors negatively regulates skeletal remodeling (9, 10). Bone marrow cells that produce TSH may also circulate to the thyroid and appear to modulate thyroid hormone activity in times of immunological stress (7, 11).

**References:**

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