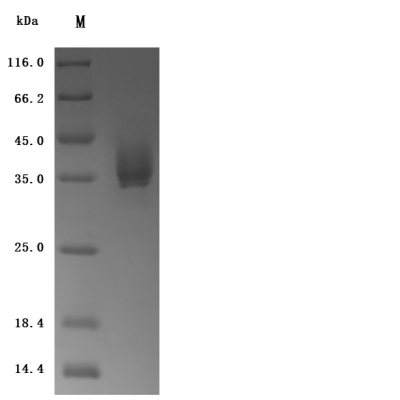
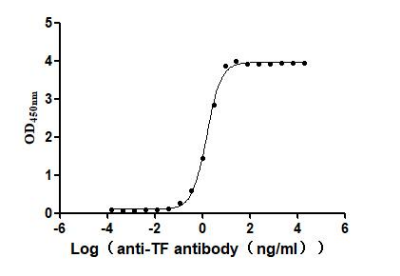
Recombinant Human Tissue factor (F3), partial (Active)

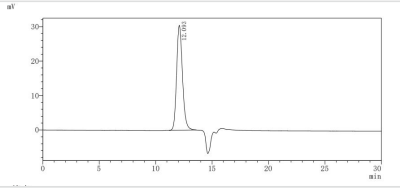
Product Code	CSB-MP007928HU2
Abbreviation	Recombinant Human F3 protein, partial (Active)
Storage	The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20?/-80?. The shelf life of lyophilized form is 12 months at -20?/-80?.
Uniprot No.	P13726
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 TF at 2 μg/mL can bind Anti-TF recombinant antibody (CSB-RA007928MA2HU). The EC50 is 1.434-1.635 ng/mL.
Purity	Greater than 95% as determined by SDS-PAGE. Greater than 95% as determined by SEC-HPLC.
Sequence	SGTTNTVAAYNLTWKSTNFKTILEWEPKPVNQVYTVQISTKSGDWKSKCFYTT DTECDLTDEIVKDVKQTYLARVFSYPAGNVESTGSAGEPLYENSPEFTPYLET NLGQPTIQSFEQVGTKVNVTVEDERTLVRRNNTFLSLRDVFGKDLIYTLYYWK SSSSGKKTAKTNTNEFLIDVDKGENYCFSVQAVIPSRTVNRKSTDSPVECMGQ EKGEFRE
Source	Mammalian cell
Target Names	F3
Expression Region	33-251aa
Notes	Repeated freezing and thawing is not recommended. Store working aliquots at 4? for up to one week.
Tag Info	C-terminal 10xHis-tagged
Mol. Weight	26.2 kDa
Protein Length	Partial
Image	



(Tris-Glycine gel) Discontinuous SDS-PAGE (reduced) with 5% enrichment gel and 15% separation gel.



Activity
Measured by its binding ability in a functional ELISA. Immobilized Human TF at 2 μg/ml can bind Anti-TF recombinant antibody (CSB-RA007928MA2HU). The EC_{50} is 1.434-1.635 ng/mL.



The purity of F3 was greater than 95% as determined by SEC-HPLC

Description

The generation for the recombinant human tissue factor (F3) involves gene amplification, plasmid creation, protein expression, purification, and characterization. Specific primers amplify the tissue factor region corresponding to amino acids 33-251, which is inserted into a plasmid containing a C-terminal 10xHis-tag. Mammalian cells are transfected with the plasmid, and after 24 hours, a selective antibiotic is used to identify the target protein-producing cells. The selected cells are cultured and induced to express the target proteins. The recombinant human tissue factor is released through cell lysis and purified from the supernatant using Ni-NTA affinity chromatography. The purified tissue factor protein achieves >95% purity (SDS-PAGE and SEC-HPLC) and <1.0 EU/μg endotoxin levels (LAL). ELISA confirms the functional binding of this recombinant tissue factor to the TF recombinant antibody (CSB-RA007928MA2HU) with an EC_{50} of 1.434-1.635 ng/mL.

Human tissue factor (TF), also known as thromboplastin, is a critical transmembrane glycoprotein that plays a pivotal role in the initiation of the extrinsic pathway of blood coagulation. It is primarily expressed in cells that are not typically in contact with blood, such as fibroblasts and endothelial cells, but can be induced by inflammatory cytokines, particularly in pathological conditions [1][4][10]. Upon vascular injury, TF binds to circulating factor VIIa (FVIIa), forming a complex that activates FIX and FX, leading to thrombin generation and subsequent clot formation [1][4][12]. TF also has significant roles beyond

coagulation, influencing various pathophysiological processes including inflammation, angiogenesis, and tumor progression [2][9][12].

The signaling pathways activated by the TF-FVIIa complex are mediated through protease-activated receptors (PARs), specifically PAR1 and PAR2. These receptors are G-protein-coupled receptors that, when activated, can trigger a cascade of intracellular signaling events that contribute to cellular responses such as proliferation, migration, and survival [2][8]. The interaction of TF with FVIIa not only initiates coagulation but also modulates cellular behavior in non-hemostatic contexts, such as in cancer metastasis and inflammation [2][9][12]. The TF-FVIIa complex has been shown to enhance endothelial cell permeability and promote angiogenesis, which is crucial for tumor growth and metastasis [11][12].

Moreover, the regulation of TF activity is tightly controlled by tissue factor pathway inhibitor (TFPI), which serves as a natural anticoagulant. TFPI inhibits the TF-FVIIa complex and factor Xa, thereby preventing excessive coagulation and maintaining hemostatic balance [5][6][7]. The expression of TFPI can be modulated by various factors, including inflammatory cytokines, which can influence the overall coagulation response and the balance between pro-coagulant and anti-coagulant activities in the body [3][7]. Understanding the role of TF in coagulation and signaling pathways is crucial for developing therapeutic strategies for conditions such as thrombosis, cancer, and inflammatory diseases.

References:

[1] Adams, M., Thom, J., Hankey, G., Baker, R., Gilmore, G., Staton, J., … & Eikelboom, J. (2006). The tissue factor pathway in ischemic stroke. Blood Coagulation & Fibrinolysis, 17(7), 527-532. https://doi.org/10.1097/01.mbc.0000245294.41774.06

[2] Ahamed, J. and Ruf, W. (2004). Protease-activated receptor 2-dependent phosphorylation of the tissue factor cytoplasmic domain. Journal of Biological Chemistry, 279(22), 23038-23044. https://doi.org/10.1074/jbc.m401376200

[3] Ahamed, J., Belting, M., & Ruf, W. (2005). Regulation of tissue factor–induced signaling by endogenous and recombinant tissue factor pathway inhibitor 1. Blood, 105(6), 2384-2391. https://doi.org/10.1182/blood-2004-09-3422

[4] Camerer, E., Huang, W., & Coughlin, S. (2000). Tissue factor- and factor x-dependent activation of protease-activated receptor 2 by factor viia. Proceedings of the National Academy of Sciences, 97(10), 5255-5260. https://doi.org/10.1073/pnas.97.10.5255

[5] Girard, T., Grunz, K., Lasky, N., Malone, J., & Broze, G. (2018). Re?evaluation of mouse tissue factor pathway inhibitor and comparison of mouse and human tissue factor pathway inhibitor physiology. Journal of Thrombosis and Haemostasis, 16(11), 2246-2257. https://doi.org/10.1111/jth.14288

[6] Lizakowski, S., Zdrojewski, Z., Jagodzi?ski, P., & Rutkowski, B. (2007). Plasma tissue factor and tissue factor pathway inhibitor in patients with primary glomerulonephritis. Scandinavian Journal of Urology and Nephrology, 41(3), 237-242. https://doi.org/10.1080/00365590601016511

[7] Mast, A. (2016). Tissue factor pathway inhibitor. Arteriosclerosis Thrombosis and Vascular Biology, 36(1), 9-14. https://doi.org/10.1161/atvbaha.115.305996
[8] Rao, L. and Pendurthi, U. (2005). Tissue factor–factor viia signaling. Arteriosclerosis Thrombosis and Vascular Biology, 25(1), 47-56. https://doi.org/10.1161/01.atv.0000151624.45775.13
[9] Riewald, M. and Ruf, W. (2001). Mechanistic coupling of protease signaling and initiation of coagulation by tissue factor. Proceedings of the National Academy of Sciences, 98(14), 7742-7747. https://doi.org/10.1073/pnas.141126698
[10] Sethi, A., Lees, D., Douthwaite, J., & Corder, R. (2005). Factor viia stimulates endothelin-1 synthesis in tnf-primed endothelial cells by activation of protease-activated receptor 2. Clinical Science, 108(3), 255-263. https://doi.org/10.1042/cs20040237
[11] Uusitalo?Järvinen, H., Kurokawa, T., Mueller, B., Andrade?Gordon, P., Friedlander, M., & Ruf, W. (2007). Role of protease activated receptor 1 and 2 signaling in hypoxia-induced angiogenesis. Arteriosclerosis Thrombosis and Vascular Biology, 27(6), 1456-1462. https://doi.org/10.1161/atvbaha.107.142539
[12] Versteeg, H. and Ruf, W. (2006). Emerging insights in tissue factor-dependent signaling events. Seminars in Thrombosis and Hemostasis, 32(01), 024-032. https://doi.org/10.1055/s-2006-933337

Endotoxin	Less than 1.0 EU/ug as determined by LAL method.
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?/-80?. 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.