Recombinant Human TMPRSS11A His-tag

Catalog Number: 11785-TP

DESCRIPTION

Source	Chinese Hamster Ovary cell line, CHO-derived human TMPRSS11A protein Phe41-Ile421, with modifications in the non-catalytic chain and a C-terminal 6-His tag Accession # KAI2534484.1
N-terminal Sequence Analysis	Phe41 & Ala149 (non-catalytic chain), Ile187 (catalytic chain)
Predicted Molecular Mass	17 kDa (non-catalytic), 29 kDa (catalytic)

SPECIFICATIONS

SDS-PAGE	19-22 kDa (non-catalytic), 29-39 kDa (catalytic), & 51-56 kDa (intact), reducing conditions
Activity	Measured by its ability to cleave the fluorogenic peptide substrate Boc-QAR-AMC (Catalog # ES014). The specific activity is >350 pmol/min/µg, as measured under the described conditions.
Endotoxin Level	<0.10 EU per 1 µg of the protein by the LAL method.
Purity	>90%, by SDS-PAGE visualized with Silver Staining and quantitative densitometry by Coomassie® Blue Staining.
Formulation	Supplied as a 0.2 µm filtered solution in MES and NaCl. See Certificate of Analysis for details.

Activity Assay Protocol

Materials

- Assay Buffer: 50 mM Tris, 0.05% BRIJ 35, pH 8.0
- Recombinant Human TMPRSS11A His-tag (rhTMPRSS11A) (Catalog # 11785-TP)
- Substrate: BOC-Gln-Ala-Arg-AMC (Catalog # ES014), 10 mM stock in DMSO
- Black 96-well Plate
- Plate Reader with Fluorescence Read Capability

Assay

1. Dilute rhTMPRSS11A to 2.0 µg/mL in Assay Buffer.
2. Dilute Substrate to 600 µM in Assay Buffer.
3. Load into a plate 50 µL of 2.0 µg/mL rhTMPRSS11A and start the reaction by adding 50 µL of 600 µM Substrate. Include a Substrate Blank containing 50 µL of Assay Buffer and 50 µL of 600 µM Substrate.
4. Read at excitation and emission wavelengths of 380 nm and 460 nm (top read), respectively, in kinetic mode for 5 minutes.
5. Calculate specific activity:

$$\text{Specific Activity (pmol/min/µg)} = \frac{\text{Adjusted } V_{max}\text{* (RFU/min) x Conversion Factor** (pmol/RFU)}}{\text{amount of enzyme (µg)}}$$

*Adjusted for Substrate Blank
**Derived using calibration standard 7-Amino, 4-Methyl Coumarin (AMC)

Final Assay Conditions

Per Well:

- rhTMPRSS11A: 0.1 µg
- Substrate: 300 µM

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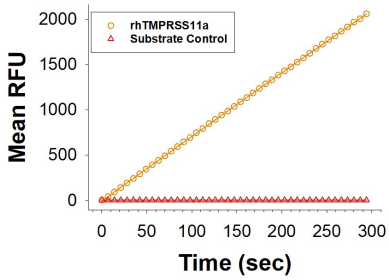
PREPARATION AND STORAGE

Shipping	The product is shipped with polar packs. Upon receipt, store it immediately at the temperature recommended below.
Stability & Storage	**Use a manual defrost freezer and avoid repeated freeze-thaw cycles.** • 6 months from date of receipt, -20 to -70 °C as supplied. • 3 months, -20 to -70 °C under sterile conditions after opening.

DATA

Enzyme Activity



Recombinant Human TMPRSS11A His-tag Enzyme Activity. Recombinant Human TMPRSS11a His-tag (Catalog # 11785-TP) is measured by its ability to cleave the fluorogenic peptide substrate Boc-QAR-AMC (Catalog # ES014).

BACKGROUND

Recombinant Transmembrane protease serine 11a (TMPRSS11a), also known as Airway trypsin-like protease 1 (HATL1), Esophageal cancer-susceptibility gene 1 protein (ECRG1), and HESP is a member of the type II transmembrane serine protease (TTSP) peptidase S1 family from the human airway trypsin-like (HAT) subgroup (1). TMPRSS11a is expressed in select tissues including esophagus, lung, and aged tissue (2,3). Similar to other members of the TTSP family, TMPRSS11a is produced as a zymogen and is autoactivated into disulfide-linked non-catalytic chains composed of the TM and sea urchin sperm protein (SEA) domain and catalytic chains with a highly conserved serine protease (SP) domain (1,4). TMPRSS11a consists of three distinct regions, including an N-terminal cytoplasmic tail, a single-pass transmembrane domain, and an extracellular domain composed of the SEA domain and C-terminal serine protease domain (4). In human and mouse airways TMPRSS11A is expressed on the epithelial surface (5). Proteolytic cleavage of viral particle surface proteins by TMPRSS11a as a host protease is involved in facilitation of cell entry for influenza A viruses and coronaviruses (5-7). Carriers of the mutant alleles of TMPRSS11A are thought to have increased risk of severe COVID 19 in association with systemic inflammation, hypercoagulability, and organ damage (8). Inhibitors of TTSPs including TMPRSS11a present in the lung have been proposed as broad-spectrum antiviral agents (5). TMPRSS11a downregulation is reported to play a role in cancer as variants are linked to the risk of oral and esophageal squamous cell carcinomas (9-11) and TMPRSS11a was identified as a putative tumor suppressor in human esophageal cancers (12,13). TMPRSS11a is upregulated in aged skin and gingival tissue, inhibits cell migration through binding to integrin β1 via a putative RGD motif contained within the C-terminal trypsin-like serine proteinase domain to play a role in inducing cellular senescence and attenuate wound healing capacity (3,13) making it a target for skin wound healing during aging (3).

References:

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