# USP15 (isoform 2) [untagged]

**Deconjugating enzyme:** Deubiquitylase

**Alternate Names:** Unph2, Unph4

| | | | |
|---|---|---|---|
| **Cat. No.** | **64-0026-050** | Quantity: | 50 µg |
| **Lot. No.** | **30068** | Storage: | -70˚C |

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NOT FOR USE IN HUMANS



## Background

Deconjugating enzymes (DCEs) are proteases that process ubiquitin or ubiquitin-like gene products, reverse the modification of proteins by a single ubiquitin or ubiquitin-like protein (UBL) and remodel polyubiquitin (or poly-UBL) chains on target proteins (Reyes-Turcu *et al.*, 2009). The deubiquitylating – or deubiquitinating – enzymes (DUBs) represent the largest family of DCEs and regulate ubiquitin dependent signalling pathways. The activities of the DUBs include the generation of free ubiquitin from precursor molecules, the recycling of ubiquitin following substrate degradation to maintain cellular ubiquitin homeostasis and the removal of ubiquitin or ubiquitin-like proteins (UBL) modifications through chain editing to rescue proteins from proteasomal degradation or to influence cell signalling events (Komander *et al.*, 2009). There are two main classes of DUB, cysteine proteases and metalloproteases. Ubiquitin carboxyl-terminal hydrolase 15 (Ubiquitin Specific Protease 15; USP15) is a member of the cysteine protease enzyme family and cloning of the human gene was first described by Baker *et al.*, (Baker *et al.*, 1999). USP15 functions in COP9 signalosome mediated regulation of protein degradation and cellular signalling through catalysing the ubiquitin deconjugation reaction of a discrete number of substrates (Harper *et al.*, 2011). USP15 plays a role in the downregulation of the NF-κB pathway through deubiquitylating the NF-κB in-

*Continued on page 2*

## Physical Characteristics

**Species:** human

**Source:** *E. coli*

**Quantity:** 50 µg

**Concentration:** 0.5 mg/ml

**Formulation:** 50 mM HEPES pH 7.5, 150 mM sodium chloride, 2 mM dithiothreitol, 10% glycerol

**Molecular Weight:** ~111 kDa

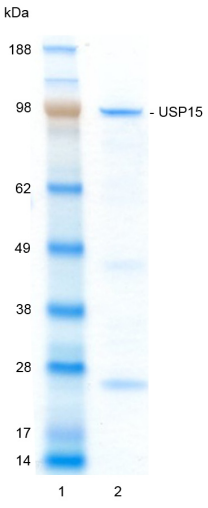
**Purity:** >53% by InstantBlue™ SDS-PAGE

**Stability/Storage:** 12 months at -70˚C; aliquot as required

**Protein Sequence:** Please see page 2

## Quality Assurance

**Purity:**
4-12% gradient SDS-PAGE
InstantBlue™ staining
Lane 1: MW markers
Lane 2: 1 µg USP15




**Protein Identification:**
Confirmed by mass spectrometry.

**Deubiquitylase Enzyme Assay:**
The activity of USP15 was validated by determining the increase in fluorescence measured as a result of the enzyme catalysed cleavage of the fluorogenic substrate Ubiquitin-Rhodamine110-Glycine generating Ubiquitin and Rhodamine110-Glycine. Incubation of the substrate in the presence or absence of USP15 was compared confirming the deubiquitylating activity of USP15.

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**Lot-specific COA version tracker:** v1.0.0

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## Background

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hibitor IκBα and also regulates human papillomavirus type 16 E6 oncoprotein stability. Among USPs, USP15 is most closely related to USP4 which has recently been implicated in mRNA splicing and more distantly to USP11 which has been linked to DNA damage repair pathways (Harper *et al.*, 2011). It has recently been demonstrated that USP15 plays an essential role in the stabilisation and activity of caspase-3 during Paclitaxel-induced apoptosis. It has therefore been proposed that USP15 may be a candidate diagnostic marker and therapeutic target for Paclitaxel-resistant cancers (Xu *et al.*, 2009).

**References:**


Baker RT, Wang XW, Woollatt E, White JA, Sutherland GR (1999) Identification, functional characterization, and chromosomal localization of USP15, a novel human ubiquitin-specific protease related to the UNP oncoprotein, and a systematic nomenclature for human ubiquitin-specific proteases. *Genomics* **59**, 264-274.

Harper S, Besong TM, Emsley J, Scott DJ, Dreveny I (2011) Structure of the USP15 N-terminal domains: a beta-hairpin mediates close association between the DUSP and UBL domains. *Biochemistry* **50**, 7995-8004.

Komander D, Clague MJ, Urbe S (2009) Breaking the chains: structure and function of the deubiquitinases. *Nat Rev Mol Cell Biol* **10**, 550-563.

Reyes-Turcu FE, Ventii KH, Wilkinson KD (2009) Regulation and cellular roles of ubiquitin-specific deubiquitinating enzymes. *Ann Rev Biochem* **78**, 363-397.

Xu M, Takanashi M, Oikawa K, Tanaka M, Nishi H, Isaka K, Kudo M, Kuroda M (2009) USP15 plays an essential role for caspase-3 activation during Paclitaxel-induced apoptosis. *Biochem Biophys Res Commun* **388**, 366-371.


## Physical Characteristics

*Continued from page 1*

**Protein Sequence:**

G P L G S P E F P G R L E R P L ***M*** A E G
GAADLDTQRSDIATLLKTSLRKGDTW
YLVDSRWFKQWKKYVGFDSWDKYQMGDQN
VYPGPIDNSGLLKDGDAQSLKEHLIDELDY
ILLPTEGWNKLVSWYTLMEGQEPIARKV
VEQGMFVKHCKVEVYLTELKLCENGNMNNV
VTRRFSKADTIDTIEKEIRKIFSIPDEKET
RLWNKYMSNTFEPLNKPDSTIQDAGLYQGQV
LVIEQKNEDGTWPRGPSTPNVKNSNYCLP
SYTAYKNYDYSEPGRNNEQPGLCGLSNL
GNTCFMNSAIQCLSNTPPLTEYFLNDKYQEEL
NFDNPLGMRGEIAKSYAELIKQMWSGKFSYVT
PRAFKTQVGRFAPQFSGYQQQDCQELLAFLL
DGLHEDLNRIRKKPYIQLKDADGRPDKVVAEE
AWENHLKRNDSIIVDIFHGLFKSTLVCPECAK
ISVTFDPFCYLTLPLPMKKERTLEVYLVRM
DPLTKPMQYKVVVPKIGNILDLCTALSALS
GIPADKMIVTDIYNHRFHRIFAMDENLSSIM
ERDDIYVFEININRTEDTEHVIIPVCLREK
FRHSSYTHHTGSSLFGQPFLMAVPRNNTED
KLYNLLLLRMCRYVKISTETEETEGSLHC
CKDQNINGNGPNGIHEEGSPSEMETDEPD
DESSQDQELPSENENSQSEDSVGGDNDSEN
GLCTEDTCKGQLTGHKKRLFTFQFNNLGNT
DINYIKDDTRHIRFDDRQLRLDERSFLALD
WDPDLKKRYFDENAAEDFEKHESVEYKPPK
KPFVKLKDCIELFTTKEKLGAEDPWYCPNCKE
HQQATKKLDLWSLPPVLVVHLKRFSYS
RYMRDKLDTLVDFPINDLDMSEFLINPNAGP
CRYNLIAVSNHYGGMGGGHYTAFAKNKDDGKW
YYFDDSSVSTASEDQIVSKAAYVLFYQRQDTF
SGTGFFPLDRETKGASAATGIPLESDED
SNDNDNDIENENCMHTN

The residues underlined remain after cleavage and removal of the purification tag.
USP15 (regular text): Start ***bold italics*** (amino acid residues 1-952)
Accession number: NP_006304
UniProt number: Q9Y4E8-2


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