

# Ubiquitin Aldehyde: sc-4316

## BACKGROUND

Ubiquitin (Ub) is among the most phylogenetically conserved proteins known. The primary function of ubiquitin is to clear abnormal, foreign and improperly folded proteins by targeting them for degradation by the 26S proteasome. This small, 76 amino acid, 8.5 kDa protein can be covalently attached to cellular proteins via an isopeptide linkage between the carboxy terminal group of ubiquitin and lysine amino groups on the acceptor protein. For proteolysis to occur, ubiquitin oligomers must be assembled. Ubiquitin chains on proteolytic substrates are commonly found to have an isopeptide bridge between Lysine 48 of one ubiquitin molecule and the carboxy terminus of a neighboring ubiquitin molecule. Ubiquitin also plays a role in regulating signal transduction cascades through the elimination inhibitory proteins, such as I $\kappa$ B- $\alpha$  and p27.

## REFERENCES

- Ciechanover, A. 1994. The Ubiquitin-proteasome proteolytic pathway. *Cell* 79: 13-21.
- Ciechanover, A. and Schwartz, A.L. 1994. The Ubiquitin-mediated proteolytic pathway: mechanisms of recognition of the proteolytic substrate and involvement in the degradation of native cellular proteins. *FASEB J.* 8: 182-191.
- Hochstrasser, M. 1995. Ubiquitin, proteasomes and the regulation of intracellular protein degradation. *Curr. Opin. Cell Biol.* 7: 215-223.
- Jennissen, H.P. 1995. Ubiquitin and the enigma of intracellular protein degradation. *Eur. J. Biochem.* 231: 1-30.
- Muller, S. and Schwartz, L.M. 1995. Ubiquitin in homeostasis, development and disease. *Bioessays* 17: 677-684.
- Pagano, M., et al. 1995. Role of the Ubiquitin-proteasome pathway in regulating abundance of the cyclin-dependent kinase inhibitor p27. *Science* 269: 682-685.
- Hochstrasser, M. 1996. Protein degradation or regulation: Ub the judge. *Cell* 84: 813-815.
- Chen, Z.J., et al. 1996. Site-specific phosphorylation of I $\kappa$ B- $\alpha$  by a novel ubiquitination-dependent protein kinase activity. *Cell* 84: 853-862.

## SOURCE

Ubiquitin Aldehyde is produced in *E. coli* as an 8.5 kDa protein corresponding to amino acids 1-76 representing full length ubiquitin of human origin with an aldehyde attachment.

## PRODUCT

Ubiquitin Aldehyde is purified by bacterial lysates (> 98%) by glutathione agarose affinity chromatography; supplied as 50  $\mu$ g in 0.1 ml buffer.

## STORAGE

Store at -20 $^{\circ}$  C; stable for one year from the date of shipment. Non-hazardous. No MSDS required. Minimize repeated freezing and thawing.

## APPLICATIONS

Ubiquitin Aldehyde is a potent and specific inhibitor of multiple ubiquitin hydrolases involved in pathways of intracellular protein modification and turnover. Useful for stabilizing endogenous or *in vitro* synthesized ubiquitin-protein conjugates. Also useful for enhancing or decreasing the rates of ubiquitin-protein degradation.

## SELECT PRODUCT CITATIONS

- Hershko, A. and Rose, I.A. 1987. Ubiquitin-Aldehyde: a general inhibitor of ubiquitin-recycling processes. *Proc. Natl. Acad. Sci. USA* 84: 1829-1833.
- Dunten, R.L. and Cohen, R.E. 1989. Recognition of modified forms of ribonuclease A by the Ubiquitin system. *J. Biol. Chem.* 264: 16739-16747.
- Melandri, F., et al. 1996. Kinetic studies on the inhibition of isopeptidase T by Ubiquitin Aldehyde. *Biochemistry* 35: 12893-12900.
- Dang, L.C., et al. 1998. Kinetic and mechanistic studies on the hydrolysis of ubiquitin C-terminal 7-amido-4-methylcoumarin by deubiquitinating enzymes. *Biochemistry* 37: 1868-1879.
- Johnston, S.C., et al. 1999. Structural basis for the specificity of Ubiquitin C-terminal hydrolases. *EMBO J.* 18: 3877-3887.
- Sakata, N. and Dixon, J.L. 1999. Ubiquitin-proteasome-dependent degradation of apolipoprotein B100 *in vitro*. *Biochim. Biophys. Acta* 1437: 71-79.
- Borodovsky, A., et al. 2001. A novel active site-directed probe specific for deubiquitylating enzymes reveals proteasome association of USP14. *EMBO J.* 20: 5187-5196.
- Burnett, B., et al. 2003. The polyglutamine neurodegenerative protein ataxin-3 binds polyubiquitylated proteins and has Ubiquitin protease activity. *Hum. Mol. Genet.* 12: 3195-3205.
- Shackelford, J., et al. 2003. Epstein-Barr virus activates  $\beta$ -catenin in type III latently infected B lymphocyte lines: association with deubiquitinating enzymes. *Proc. Natl. Acad. Sci. USA* 100: 15572-15576.
- Hu, M., et al. 2005. Structure and mechanisms of the proteasome-associated deubiquitinating enzyme USP14. *EMBO J.* 24: 3747-3756.
- Ferrero, M., et al. 2011. Phosphorylation of AIB1 at mitosis is regulated by CDK1/CYCLIN B. *PLoS ONE* 6: e28602.
- Sun, W., et al. 2017. Interaction between von hippel-lindau protein and fatty acid synthase modulates hypoxia target gene expression. *Sci. Rep.* 7: 7190.

## RESEARCH USE

For research use only, not for use in diagnostic procedures.

## PROTOCOLS

See our web site at [www.scbt.com](http://www.scbt.com) for detailed protocols and support products.