

## Product Information

### UBIQUITIN-CARRIER PROTEIN H9

Human, Recombinant  
Expressed in *E. coli*

Product Number **U 9257**

#### Product Description

Ubiquitin-carrier Protein H9 (UbcH9) is produced from a DNA sequence corresponding to human Ubc9. This recombinant protein has a molecular weight of approx. 20 kDa.

Degradation of short-lived, key regulatory proteins by the ubiquitin-proteasome pathway plays key roles in a number of cellular processes. A number of proteins are degraded by this system including: cyclins, cyclin-dependent kinases<sup>1,2</sup> and their inhibitors, tumor suppressors, oncoproteins, and transcriptional activators and their inhibitors.

Two discrete steps are involved in the ubiquitin-mediated degradation of proteins: signaling by covalent conjugation of multiple ubiquitin moieties and degradation of the tagged substrate. Conjugation occurs by a three-step mechanism involving three different enzymes that act sequentially: E1, E2 and E3. Ubiquitin-activating enzyme (E1) catalyzes the activation of ubiquitin then E2 (ubiquitin-conjugating enzyme, or ubiquitin carrier protein) transfers activated ubiquitin to E3, which is bound to substrate. E3 catalyzes the polyubiquitination of the targeted protein. The polyubiquitin tagged protein is then degraded by the 26S proteasome in an ATP-dependent process, and free ubiquitin is released.<sup>3-5</sup> Although it appears there is a single ubiquitin-activating enzyme (E1), a number of species or isoforms of ubiquitin-carrier proteins (E2s) and multiple families of ubiquitin-protein ligases (E3s) exist.<sup>6</sup>

In addition to targeting molecules for degradation, other functions of ubiquitination have been identified. In addition molecules other than ubiquitin may be linked to specific proteins.<sup>7</sup> Sentrin (SUMO-1) is a ubiquitin-like protein shown to be a substrate for ligation by UbcH9 to the death domains of Fas, tumor necrosis factor receptor 1, PML, Rad51, Rad52, and RanGAP1. In fact, UbcH9 appears to be the key conjugating enzyme in the sentrinization pathway.<sup>8</sup>

#### Reagent

UbcH9 is supplied as 100 µg of protein in a solution of 50 mM HEPES, pH 7.6, 125 mM NaCl, 1 mM DTT, and 10% glycerol.

#### Precautions and Disclaimer

For laboratory use only. Not for drug, household or other uses. Please consult the Material Safety Data Sheet for handling recommendations before working with this material.

#### Storage/Stability

Store at -70 °C. Avoid repeated freeze-thaw cycles. Do not store in a frost-free freezer.

#### Product Profile

Purity: minimum 95% by SDS-PAGE

#### References

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3. Tanaka, K., et al., The ligation systems for ubiquitin and ubiquitin-like proteins. *Mol. Cells*, **8**, 503-512 (1998).
4. Myung, J., et al., The ubiquitin-proteasome pathway and proteasome inhibitors. *Med. Res. Rev.*, **21**, 245-273 (2001).
5. Benaroudj, N., et al., The unfolding of substrates and ubiquitin-independent protein degradation by proteasomes. *Biochimie*, **83**, 311-318 (2001).
6. Hershko, A. and Ciechanover, A., The ubiquitin system. *Annu. Rev. Biochem.*, **67**, 425-479 (1998).

7. Desterro, J. M. P. et al., Identification of the enzyme required for activation of the small ubiquitin-like protein SUMO-1. *J. Biol. Chem.*, **274**, 10618-10624 (1999).

8. Gong, L. et al., Preferential interaction of sentrin with a ubiquitin-conjugating enzyme, Ubc9. *J. Biol. Chem.*, **272**, 28198-28201 (1997).

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