

# Cul1/Rbx1 [untagged]

## E3 Ligase

**Alternate Names:** Cul1 = Cullin1, MGC149834, MGC149835  
Rbx1 = HRT1, Regulator of cullins 1, Ring finger protein 75, RNF75, ROC1, ZYP protein

**Cat. No.** 63-1000-025  
**Lot. No.** 30153

**Quantity:** 25 µg  
**Storage:** -70°C

FOR RESEARCH USE ONLY

NOT FOR USE IN HUMANS



CERTIFICATE OF ANALYSIS Page 1 of 2

## Background

The enzymes of the ubiquitylation pathway play a pivotal role in a number of cellular processes including the regulated and targeted proteasome dependent degradation of substrate proteins. Three classes of enzymes are involved in the process of ubiquitylation; activating enzymes (E1s), conjugating enzymes (E2s) and protein ligases (E3s). Cullin-RING-Ligases (CRLs) are one largest class of ubiquitin E3 ligases and the enzymes of the NEDDylation pathway play a pivotal role in the activation of these, akin to ubiquitylation, the E1 activating enzyme (APP-BP1/UBA3 heterodimer) and the E2 conjugating enzymes (UBE2M or UBE2F) are involved in mammalian NEDDylation of the Cullin Ring Ligases (CRLs) (Meyer-Schaller *et al.*, 2009; Huang *et al.*, 2011; Morimoto *et al.*, 2003). The human Cullin 1-5 genes were first described by Kipreos *et al.* (1996). Cullin RING ligases (CRL) comprise the largest sub-family of ubiquitin ligases which are activated by Neddyltion. CRLs are involved in cell cycle regulation, DNA replication, DNA damage response (DDR). CRLs contain subunits including, a scaffold protein (cullin family protein), a Ring finger protein either Rbx1 (Cul1-4) or Rbx2 (Cul5) that binds a ubiquitin E2 Ube2M or Ube2F respectively (Sarikas *et al.*, 2011; Skowyra *et al.*, 1997). Many CRL E3 ligases have an additional linker proteins such as Skp1 associated with Cul1 and DDB1

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## Physical Characteristics

**Species:** human

**Source:** insect (Sf21)

**Quantity:** 25 µg

**Concentration:** 0.5 mg/ml

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

**Molecular Weight:**

Cul1: ~89.9 kDa; Rbx1: ~12.3 kDa

**Purity:** >95% by InstantBlue™ SDS-PAGE

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

**Protein Sequences:** Please see page 2

## Quality Assurance

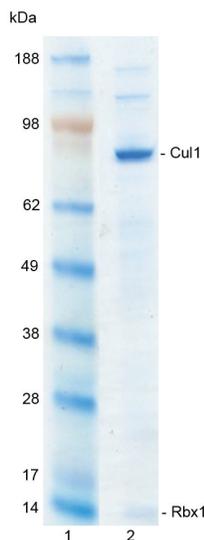
**Purity:**

4-12% gradient SDS-PAGE

InstantBlue™ staining

Lane 1: MW markers

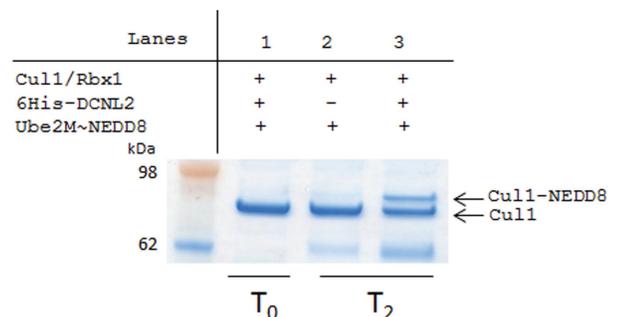
Lane 2: 1 µg Cul1/Rbx1



**Protein Identification:**

Confirmed by mass spectrometry.

**E3 Ligase Assay:** The activity of Cul1/Rbx1 was validated indirectly through its ability to act as a substrate for the neddylation in the presence of the NEDD8 E3 ligase His-DCNL2 and thioester-loaded His-Ube2M~NEDD8. Incubation of Cul1/Rbx1 and thioester loaded His-Ube2M~NEDD8 in the presence or absence of His-DCNL2 at 4°C was compared at two time points T<sub>0</sub> and T<sub>2</sub> minutes. neddylation of the Cul1 subunit in the presence of His-DCNL2 was demonstrated.



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Dundee, Scotland, UK

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Lot-specific COA version tracker: v1.0.1

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CERTIFICATE OF ANALYSIS Page 2 of 2

## Background

Continued from page 1

associated with Cul4. The first CRL E3 ligase identified was named Skp1/Cullin or Cdc53/F-box (SCF) from *Saccharomyces cerevisiae*. CRLs function through their cognate substrate-recognition molecules, such as the F-box proteins SOCS, BTB and DCAF, each of these contain a distinct motif that is recognized by an adaptor molecule, which is itself linked to a cognate cullin. There are approximately 61 human F-box proteins all of which can bind to Skp1 through the F-box domain. It is thought most of the F-box proteins can be assembled into the SCF E3 complex through Skp1, which binds to CUL1 (Sarikas *et al.*, 2011).

### References:

Huang G, Kaufman A J, Ramanathan Y, Singh B, (2011) SCCRO (DCUN1D1) promotes nuclear translocation and assembly of the neddylation E3 complex, *J Biol Chem* **286**, 10297-10304.

Kipreos ET, Lander LE, Wing JP, He WW, Hedgecock EM (1996) cul-1 is required for cell cycle exit in *C. elegans* and identifies a novel gene family, *Cell* **85**, 829-839.

Meyer-Schaller N, Chou YC, Sumara I, Martin DD, Kurz T, Katheder N, Hofmann K, Berthiaume LG, Sicheri F, Peter M. (2009) The human Dcn1-like protein DCNL3 promotes Cul3 neddylation at membranes, *Proc Natl Acad Sci U S A* **106**, 12365-12370.

Morimoto M, Nishida T, Nagayama Y, Yasuda H (2003) Nedd8-modification of Cul1 is promoted by Roc1 as a Nedd8-E3 ligase and regulates its stability, *Biochem Biophys Res Commun* **301**, 392-398.

Sarikas, A, Hartmann, T and Pan, ZQ (2011) The cullin protein family, *Genome Biology* **12**, 220.

Skowyra D, Craig KL, Tyers M, Elledge SJ, Harper JW (1997) F-box proteins are receptors that recruit phosphorylated substrates to the SCF ubiquitin-ligase complex, *Cell* **91**, 209-219.

## Physical Characteristics

Continued from page 1

### Protein Sequence: Cullin 1

GGSMSSTRSQNP HGLKQIGLDQIWDDL  
RAGIQQVYTRQSMASRYMELYTHVYNYCTS  
VHQSNQARGAGVPPSKSKKGQTPGGAQFVGLE  
LYKRLKEFLKNYLTNLLKDGEDLMDESVLK  
FYTQQWEDYRFSSKVLNGICAYLNHRHWVREC  
DEGRKGIYEIYSLALVTWRDCLFRPLNKQVT  
NAVLLKIEKERNGETINTRLISGVVQSYVEL  
GLNEDDAFAKGP TLTVYKESFESQFLADTER  
FYTRESTEF LQQNPVTEYMKKAEARLLEEQR  
RVQVYLHES TQDELARKCEQV LIEKHLE  
IFHTEFQNL LDADKNE DLGRMYNLVSR IQDG  
LGELKKLLETHIHNQGLAAIEKCGEAA LNDPK  
MYVQTVL DVHKKYNALVMSAFNNDAGFVAALD  
KACGRFINNNAVTKMAQSSSKSPELLARYCD  
SLLKKSSKNPEAELED TLNQVMVVFYI ED  
KDVFQK FYAKMLAKRLVHQNSASDDAEAS  
MISKLKQACGF EYTSKLQRMFQDIGVSKDL  
NEQFKKHL TNSEPLDLDFSIQVLSSG SWP  
FQQSCTFALPSELERSYQRF TAFYASRHS  
GRKLTWLYQLSKGELVTNCFKNRYTLQASTFQ  
MALLQYNTEDAYTVQQLTDSTQIKMDILAQV  
LQILLKSKLLVLEDENANVDEVELKPD TLIK  
LYLGYKNNKLRVNIINVP MKTEQKQE QETH  
KNIEEDRKL LIQAAIVRIMKMRKVLKHQQLL  
GEVLTQLSSRFKPRVPVIKCCIDILIEKEY  
LERVDGEKDTYSYLA

The residues underlined remain after cleavage and removal of the purification tag.

Cullin1 (regular text): Start ***bold italics*** (amino acid residues 1-776)

Accession number: NP\_003583.2

### Protein Sequence: Rbx1

MAAAMDVDTPSGTNSGAGKKRFEVKKW  
NAVALWAWDIVVDNCAICRNHIMDLCTEC  
QANQASATSEECTVAWGVCNHFHFCISR  
WLKTRQVCP LDNREWEFQKYGH

Rbx1 (regular text): Start ***bold italics*** (amino acid residues 1-115)

Accession number: NP\_055063.1

Cullin1 [Dac-tagged] / Rbx1 was cleaved with TEV protease [6His-tagged]. The Dac tag and TEV protease [6His-tagged] were removed by capturing on amp sepharose and nickel resin respectively.



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