

Protein	Function	Target residue	Role of SUMOylation	References
p53	Tumor suppressor	K386	Modulates p53 transcriptional activity	(Gostissa et al., 1999; Kwek et al., 2001; Mei 2002; Melchior and Hengst, 2002; Muller e Rodriguez et al., 1999; Schmidt and Muller, 2002)
P73 α	P53 homologue	K627	Subnuclear relocalization of p73 α	(Minty et al., 2000)
c-Jun	Transcriptional activator	K229	Reduces c-Jun transcriptional activity	(Muller et al., 2000; Schmidt and Muller, 2002)
AR	Transcriptional activator	K386, 520	Reduces AR transcriptional activity	(Kotaja et al., 2002b; Nishida and Yasuda, 2000 al., 2000)
PR	Transcriptional activator	K388	Involves in auto-inhibition and transrepression of PR	(Abdel-Hafiz et al., 2002)
GR	Transcriptional activator	K277, 293, 703	Reduces GR transcriptional activity	(Le Drean et al., 2002; Tian et al., 2002)
LEF-1	Transcriptional activator	K25, 267	Represses LEF-1 activity by sequestration in nuclear dots	(Sachdev et al., 2001)
c-Myb	Transcriptional activator	K499, 523	Reduces c-Myb transcriptional activity	(Bies et al., 2002)
AP-2	Transcriptional activator	K10	Reduces AP-2 transcriptional activity	(Eloranta and Hurst, 2002)
GRIP-1	Co-activator	K239, 731, 788	Activates cooperation with AR	(Kotaja et al., 2002a)
Sp3	Transcriptional activator	K108, 539	Reduces Sp3 transcriptional activity	(Ross et al., 2002; Sapetschnig et al., 2002)
C/EBP α C/EBP β C/EBP δ C/EBP ϵ	Transcriptional activator	K159 K134 K120 K121	Regulates the repression effect of the regulatory domain motif of C/EBP proteins	(Kim et al., 2002)
HSF1	Heat shock factor	K298	Stimulates DNA binding and heat induced HSF1 activity	(Hong et al., 2001)
HSF2	Heat shock factor	K82	Stimulates DNA binding of HSF2	(Goodson et al., 2001)
HDAC1	Co-repressor	K444, 476	Enhances HDAC activity	(David et al., 2002)
HDAC4	Co-repressor	K559	Enhances HDAC activity	(Kirsh et al., 2002)
TEL	Transcriptional repressor	K99	Mediates the localization of TEL to nuclear dots	(Chakrabarti et al., 1999; Chakrabarti et al., 2000)
HIPK2	Co-repressor	K1182	Mediates the localization of HIPK2 to nuclear dots	(Kim et al., 1999)
IE2p86	Viral regulator	K175, 180	Required for transactivation potential of IE2	(Hofmann et al., 2000)
Ttk69	Transcriptional repressor	unknown	unknown	(Lehembre et al., 2000)
Dorsal	Signal transducer	K382	Activates nuclear import of Dorsal and regulates Dorsal-mediated activation	(Bhaskar et al., 2002; Bhaskar et al., 2000)
I κ B α	Signal transducer	K21	Inhibits ubiquitination of I κ B α and blocks NF- κ B activity	(Desterro et al., 1998)
PML	Tumor suppressor	K65, 160, 490	Required for PML nuclear bodies integrity	(Ishov et al., 1999; Muller et al., 1998; Zhong et al., 1999)
Sp100	PML body associated protein	K297	Mediates interaction with HP1	(Seeler et al., 2001; Sternsdorf et al., 1999)
TOP1, 2	DNA repair	K117 (TOP1)	Induced after DNA damage, involved in nuclear delocalization	(Mao et al., 2000a; Mao et al., 2000b; Mo et al., 2000)
TDG	DNA repair	K330	Releases of the DNA glycosylase from the abasic sites	(Hardeland et al., 2002)
PCNA	DNA repair	K127, 164	Prevents PCNA ubiquitination and inhibits DNA repair	(Hoegge et al., 2002)
ARNT	Transcriptional activator	K245	Modulates ARNT transcriptional activity and inhibits the interaction with PML	(Tojo et al., 2002)

Table I. SUMO targets and SUMOylation functions

AR: Androgen Receptor, PR: Progesterone Receptor, GR: Glucocorticoid Receptor, LEF-1: Leukocyte Enhancer Factor-1, GRIP-1: Glucocorticoid Receptor Interacting Protein-1, C/EBP: CCAAT/Enhancer Binding protein, HSF: Heat Shock Factor, HDAC: Histone DeAcetylase, HIPK2: Homeodomain-Interacting Protein Kinase 2, Ttk: Tramtrack, PML: ProMyelocytic Leukemia, HP1: Heterochromatin Protein 1, TOP: TOPoisomerase, TDG: Thymine DNA Glycosylase, PCNA: Proliferating Cell Nuclear Antigen, ARNT: Aryl hydrocarbon Receptor Nuclear Transporter.

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