

Protein	Role of acetylation	References
Nuclear factors		
p53	Regulation of stability, DNA binding and transcriptional activity	¹
E2F family	Regulation of transcriptional activity and DNA binding (E2F 1, 2, 3)	^{2,3}
EKLF	Switch between coactivator and corepressor binding	⁴
TFIIB	Regulation of transcriptional activity	5
TFIIE	Not characterized	⁶
TFIIF	Not characterized	⁶
STAT3	Dimerization and nuclear translocation	⁷
SMAD7	Stability by competing with ubiquitination	⁸
PGC-1	Selective regulation of glucose homeostasis by deacetylation	⁹
DEK	Subnuclear distribution	¹⁰
MEF2	Regulation of transcriptional activity	¹¹
Nuclear receptors	Ligand sensitivity in transcriptional regulation	¹²
BETA2	Regulation of insulin gene expression	¹³
AML1	Regulation of transcriptional activity and DNA binding	¹⁴
β-catenin	Increased association with Tcf4	¹⁵
CREB	Regulation of transcriptional activity	¹⁶
MSL-3	Dosage compensation in <i>Drosophila</i>	¹⁷
POP-1	Subcellular localization	¹⁸
IRF family members	Regulation of transcriptional activity and DNA binding	^{19,20}
TDG	Regulation of base mismatch repair	²¹
NEIL2	Inactivation of base excision repair	²²
FEN1	Inactivation of endonuclease activity, DNA metabolism	²³

NFkB	<i>Transcriptional activation, DNA-binding affinity and IκB-alpha assembly</i>	²⁴
GATA family	<i>Regulation of transcriptional activity and DNA binding (GATA-1, 2, 3, 4)</i>	²⁵
HMGI(Y)	<i>Disruption of the enhanceosome, regulation of co-activator properties</i>	²⁶
Retinoblastoma	<i>Protein-protein interaction</i>	²⁷
NFkB	<i>Transcriptional activation, DNA-binding affinity and IκB-alpha assembly</i>	²⁴
<i>Nuclear import</i>		
Importin family	<i>Nuclear import</i>	²⁸
<i>Cytoplasmic factors</i>		
Alpha-tubulin	<i>Microtubule function and cell motility</i>	²⁹
HMGB1	<i>Subcellular localization and secretion</i>	³⁰
KU70	<i>Disruption of KU70-Bax complexes, regulation of apoptosis</i>	^{31, 32}
HSP90	<i>Regulation of chaperone function</i>	³³
IRS-1	<i>Facilitation of insulin signaling</i>	³⁴

Table 1. A tentative list of acetylated non-histone proteins, and the role of acetylation in the regulation of their function. Shuttling proteins are listed at the site of action which is mostly affected by acetylation.

1. Bode AM, Dong Z. Post-translational modification of p53 in tumorigenesis. *Nat Rev Cancer* **4**, 793-805 (2004).
2. Martínez-Balbás MA, Bauer UM, Nielsen SJ, Brehm A, Kouzarides T. Regulation of E2F1 activity by acetylation. *EMBO J* **19**, 662-671 (2000).
3. Marzio G, Wagener C, Gutierrez MI, Cartwright P, Helin K, Giacca M. E2F family members are differentially regulated by reversible acetylation. *J Biol Chem* **275**, 10887-10892 (2000).
4. Chen X, Bieker JJ. Stage-specific repression by the EKLF transcriptional activator. *Mol Cell Biol* **24**, 10416-10424 (2004).
5. Choi CH, Hiromura M, Usheva A. Transcription factor IIB acetylates itself to regulate transcription. *Nature* **424**, 965-969 (2003).
6. Imhof A, Yang XJ, Ogryzko VV, Nakatani Y, Wolffe AP, Ge H. Acetylation of general transcription factors by histone acetyltransferases. *Curr Biol* **7**, 689-692 (1997).
7. Yuan ZL, Guan YJ, Chatterjee D, Chin YE. Stat3 dimerization regulated by reversible acetylation of a single lysine residue. *Science* **307**, 269-273 (2005).

8. Grönroos E, Hellman U, Heldin CH, Ericsson J. Control of Smad7 stability by competition between acetylation and ubiquitination. *Mol Cell* **10**, 483-493 (2002).
9. Rodgers JT, Lerin C, Haas W, Gygi SP, Spiegelman BM, Puigserver P. Nutrient control of glucose homeostasis through a complex of PGC-1alpha and SIRT1. *Nature* **434**, 113-118 (2005).
10. Cleary J, *et al.* p300/CBP-associated factor drives DEK into interchromatin granule clusters. *J Biol Chem* **280**, 31760-31767 (2005).
11. McKinsey TA, Zhang CL, Olson EN. Activation of the myocyte enhancer factor-2 transcription factor by calcium/calmodulin-dependent protein kinase-stimulated binding of 14-3-3 to histone deacetylase 5. *Proc Natl Acad Sci U S A* **97**, 14400-14405 (2000).
12. Fu M, Wang C, Zhang X, Pestell RG. Acetylation of nuclear receptors in cellular growth and apoptosis. *Biochem Pharmacol* **68**, 1199-1208 (2004).
13. Qiu Y, Guo M, Huang S, Stein R. Acetylation of the BETA2 transcription factor by p300-associated factor is important in insulin gene expression. *J Biol Chem* **279**, 9796-9802 (2004).
14. Yamaguchi Y, *et al.* AML1 is functionally regulated through p300-mediated acetylation on specific lysine residues. *J Biol Chem* **279**, 15630-15638 (2004).
15. Lévy L, *et al.* Acetylation of beta-catenin by p300 regulates beta-catenin-Tcf4 interaction. *Mol Cell Biol* **24**, 3404-3414 (2004).
16. Lu Q, Hutchins AE, Doyle CM, Lundblad JR, Kwok RP. Acetylation of cAMP-responsive element-binding protein (CREB) by CREB-binding protein enhances CREB-dependent transcription. *J Biol Chem* **278**, 15727-15734 (2003).
17. Buscaino A, *et al.* MOF-regulated acetylation of MSL-3 in the Drosophila dosage compensation complex. *Mol Cell* **11**, 1265-1277 (2003).
18. Gay F, *et al.* Acetylation regulates subcellular localization of the Wnt signaling nuclear effector POP-1. *Genes Dev* **17**, 717-722 (2003).
19. Caillaud A, *et al.* Acetylation of interferon regulatory factor-7 by p300/CBP-binding protein (CBP)-associated factor (PCAF) impairs its DNA binding. *J Biol Chem* **277**, 49417-49421 (2002).
20. Masumi A, Yamakawa Y, Fukazawa H, Ozato K, Komuro K. Interferon regulatory factor-2 regulates cell growth through its acetylation. *J Biol Chem* **278**, 25401-25407 (2003).
21. Tini M, Benecke A, Um SJ, Torchia J, Evans RM, Chambon P. Association of CBP/p300 acetylase and thymine DNA glycosylase links DNA repair and transcription. *Mol Cell* **9**, 265-277 (2002).
22. Bhakat KK, Hazra TK, Mitra S. Acetylation of the human DNA glycosylase NEIL2 and inhibition of its activity. *Nucleic Acids Res* **32**, 3033-3039 (2004).
23. Hasan S, *et al.* Regulation of human flap endonuclease-1 activity by acetylation through the transcriptional coactivator p300. *Mol Cell* **7**, 1221-1231 (2001).
24. Chen LF, Greene WC. Shaping the nuclear action of NF-kappaB. *Nat Rev Mol Cell Biol* **5**, 392-401 (2004).
25. Boyes J, Byfield P, Nakatani Y, Ogryzko V. Regulation of activity of the transcription factor GATA-1 by acetylation. *Nature* **396**, 594-598 (1998).
26. Munshi N, Agalioti T, Lomvardas S, Merika M, Chen G, Thanos D. Coordination of a transcriptional switch by HMGI(Y) acetylation. *Science* **293**,

1133-1136 (2001).

27. Chan HM, Krstic-Demonacos M, Smith L, Demonacos C, La Thangue NB. Acetylation control of the retinoblastoma tumour-suppressor protein. *Nat Cell Biol* **3**, 667-674 (2001).

28. Bannister AJ, Miska EA, Görlich D, Kouzarides T. Acetylation of importin- α nuclear import factors by CBP/p300. *Curr Biol* **10**, 467-470 (2000).

29. Palazzo A, Ackerman B, Gundersen GG. Cell biology: Tubulin acetylation and cell motility. *Nature* **421**, 230 (2003). 30. Bonaldi T, *et al.* Monocytic cells hyperacetylate chromatin protein HMGB1 to redirect it towards secretion. *EMBO J* **22**, 5551-5560 (2003).

31. Cohen HY, *et al.* Acetylation of the C terminus of Ku70 by CBP and PCAF controls Bax-mediated apoptosis. *Mol Cell* **13**, 627-638 (2004).

32. Cohen HY, *et al.* Calorie restriction promotes mammalian cell survival by inducing the SIRT1 deacetylase. *Science* **305**, 390-392 (2004).

33. Kovacs JJ, *et al.* HDAC6 regulates Hsp90 acetylation and chaperone-dependent activation of glucocorticoid receptor. *Mol Cell* **18**, 601-607 (2005).

34 Kaiser C, James SR. Acetylation of insulin receptor substrate-1 is permissive for tyrosine phosphorylation. *BMC Biol* **2**, 23 (2004).