

# Histone Modification Table

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Histone	Modified Site	Modification Pattern	Modifying Enzymes	Proposed Function
H1	Arg54	Citrullination	PADI4	cellular reprogramming, nucleosome binding
	Ser17	Phosphorylation	unknown	transcriptional activation
	Ser27	Phosphorylation	unknown	transcriptional activation, chromatin decondensation
	Ser172	Phosphorylation	unknown	transcriptional activation
	Ser188	Phosphorylation	unknown	transcriptional activation
	Thr10	Phosphorylation	unknown	transcriptional activation
	Thr137	Phosphorylation	unknown	transcriptional activation
	Thr154	Phosphorylation	unknown	transcriptional activation
	Lys26	Methylation	Ezh2	transcriptional silencing
H2A	Lys 4 ( <i>S. cerevisiae</i> )	Acetylation	Esa 1	transcription activation
	Lys5 (mammals)	Acetylation	Tip60, p300/CBP	transcriptional activation
	Lys7 ( <i>S. cerevisiae</i> )	Acetylation	Hat1	unknown
	Lys7 ( <i>S. cerevisiae</i> )	Acetylation	Esa1	transcriptional activation
	Gln105 ( <i>S. cerevisiae</i> , human)	Methylation	Nop1, fibrillarin	gene expression
	Ser 1	Phosphorylation	unknown, MSK1	mitosis, chromatin assembly, transcriptional repression
	Thr119 ( <i>D. melanogaster</i> )	Phosphorylation	NHK1	mitosis
	Thr120 (mammals)	Phosphorylation	Bub1, VprBP	mitosis, transcriptional repression
	Thr142 (mammalian H2A.X)	Phosphorylation	WSTF	apoptosis, DNA repair
	Ser122 ( <i>S. cerevisiae</i> )	Phosphorylation	unknown	DNA repair
	Ser129 ( <i>S. cerevisiae</i> )	Phosphorylation	Mec1, Tel1	DNA repair
	Ser139 (mammalian H2AX)	Phosphorylation	ATR, ATM, DNA-PK	DNA repair
	Lys13 (mouse)	Ubiquitylation	Rnf168	DNA damage response
	Lys15 (mouse)	Ubiquitylation	Rnf168	DNA damage response
	Lys63 (mouse)	Ubiquitylation	Rnf8	DNA damage response
	Lys119 (mammals)	Ubiquitylation	Ring2	spermatogenesis
H2B	Lys126 ( <i>S. cerevisiae</i> )	Sumoylation	Ubc9	transcriptional repression
	Lys9	Biotinylation	biotinidase	unknown
	Lys13	Biotinylation	biotinidase	unknown
	Lys126	Biotinylation	biotinidase	cell proliferation, gene silencing, DNA damage response
	Lys127	Biotinylation	biotinidase	cell proliferation, gene silencing, DNA damage response
	Lys130	Biotinylation	biotinidase	cell proliferation, gene silencing, DNA damage response
	Lys5	Acetylation	p300, ATF2	transcriptional activation
	Lys11 ( <i>S. cerevisiae</i> )	Acetylation	Gcn5	transcriptional activation
	Lys12 (mammals)	Acetylation	p300/CBP, ATF2	transcriptional activation
	Lys15 (mammals)	Acetylation	p300/CBP, ATF2	transcriptional activation
	Lys16 ( <i>S. cerevisiae</i> )	Acetylation	Gcn5, Esa1	transcriptional activation
	Lys20	Acetylation	p300	transcriptional activation
	Ser10 ( <i>S. cerevisiae</i> )	Phosphorylation	Ste20	apoptosis
	Ser14 (vertebrates)	Phosphorylation	Mst1, unknown	apoptosis, DNA repair
	Ser33 ( <i>D. melanogaster</i> )	Phosphorylation	TAF1	transcriptional activation
H3	Ser36	Phosphorylation	AMPK	transcriptional activation
	Lys34 ( <i>S. cerevisiae</i> )	Ubiquitylation	MSL2	transcriptional activation
	Lys120 (mammals)	Ubiquitylation	UbcH6	meiosis
	Lys123 ( <i>S. cerevisiae</i> )	Ubiquitylation	Rad6	transcriptional activation, euchromatin
	Lys6 or Lys7 ( <i>S. cerevisiae</i> )	Sumoylation	Ubc9	transcriptional repression
	Lys16 ( <i>S. cerevisiae</i> )	Sumoylation	unknown	gene repression
	Lys17 ( <i>S. cerevisiae</i> )	Sumoylation	unknown	gene repression
	Lys4 ( <i>S. cerevisiae</i> )	Acetylation	Esa1, Hpa2	transcriptional activation
	Lys9	Acetylation	Gcn5, SRC-1, unknown	transcriptional activation, histone deposition
	Lys14	Acetylation	unknown, Gcn5, PCAF, Esa1, Tip60, SRC-1, Elp3, Hpa2, hTIF1C90, TAF1, Sas2, Sas3, p300	histone deposition, transcriptional activation, DNA repair , RNA polymerase II & III
	Lys18	Acetylation	Gcn5, p300/CBP	transcription, euchromatin
	Lys23	Acetylation	unknown, Gcn5, SAS3,p300/CBP	histone deposition , transcriptional activation,DNA repair
	Lys27	Acetylation	Gcn5	transcriptional activation
	Lys56 ( <i>S. cerevisiae</i> )	Acetylation	Spt10	transcriptional activation, DNA repair
H4	Lys4	Methylation	Set1 ( <i>S. cerevisiae</i> ), Set7/9 (vertebrates), MLL, ALL-1, Ash1 ( <i>D. melanogaster</i> )	permissive euchromatin (di-Me), transcriptional activation
	Arg2	Methylation	PRMT5, PRMT6	transcriptional repression
	Arg8	Methylation	PRMT5, PRMT2/6	transcriptional activation, transcriptional repression
	Lys9	Methylation	Suv39h, Clr4, G9a, SETDB1, Dim-5 ( <i>N.crassa</i> ), Kryptonite ( <i>A. thaliana</i> ), Ash1 ( <i>D. melanogaster</i> )	transcriptional silencing (tri-Me), transcriptional repression, genomic imprinting, DNA methylation (tri-Me), transcriptional activation
	Arg17	Methylation	CARM1	transcriptional activation
	Arg26	Methylation	CARM1	transcriptional activation
	Arg42	Methylation	CARM1	transcriptional activation
	Lys27	Methylation	Ezh2, G9a	transcriptional silencing, X inactivation (tri-Me)
	Lys36	Methylation	Set2	transcriptional activation (elongation)
	Lys79	Methylation	Dot1	euchromatin, transcriptional activation (elongation), checkpoint response
	Thr3	Phosphorylation	Haspin/Gsg2	mitosis
	Ser10	Phosphorylation	Aurora-B kinase, MSK1, MSK2, IKK- $\alpha$ , Snf1	mitosis, meiosis, immediate-early gene activation,transcriptional activation
	Thr6	Phosphorylation	PKCbl	unknown
	Thr11 (mammals)	Phosphorylation	Dik/Zip	mitosis
	Tyr41	Phosphorylation	JAK2	transcriptional activation
	Tyr45	Phosphorylation	PKC $\delta$	apoptosis
	Ser28 (mammals)	Phosphorylation	Aurora-B kinase, MSK1, MSK2	mitosis, immediate-early activation
H5	Lys4	Biotinylation	biotinidase	gene expression
	Lys9	Biotinylation	biotinidase	gene expression
	Lys18	Biotinylation	biotinidase	gene expression
	Lys5	Acetylation	Hat1, Esa1, Tip60, ATF2, Hpa2, p300	histone deposition, transcriptional activation, DNA repair
	Lys8	Acetylation	Gcn5, PCAF, Esa1, Tip60, ATF2, Elp3, p300	transcriptional activation, DNA repair
	Lys12	Acetylation	Hat1, Esa1, Tip60, Hpa2, p300	histone deposition, telomeric silencing, transcriptional activation, DNA repair
	Lys16	Acetylation	Gcn5, MOF ( <i>D. melanogaster</i> ), Esa1, Tip60, ATF2, Sas2	transcriptional activation, DNA repair, euchromatin
	Lys91 ( <i>S. cerevisiae</i> )	Acetylation	Hat1/Hat2	chromatin assembly
	Arg3	Methylation	PRMT1/6	transcriptional activation
	Arg3	Methylation	PRMT5/7	transcriptional repression
H6	Lys8 ( <i>S. cerevisiae</i> )	Methylation	SET5	stress response
	Lys12 ( <i>S. cerevisiae</i> )	Methylation	SET5	stress response
	Lys20	Methylation	PR-Set7, Suv4-20h, Ash1 ( <i>D. melanogaster</i> ), Set9 ( <i>S. pombe</i> )	transcriptional silencing (mono-Me), heterochromatin (tri-Me), transcriptional activation, checkpoint response
	Lys59	Methylation	unknown	transcriptional silencing
	Ser1	Phosphorylation	unknown, CK2	mitosis, chromatin assembly, DNA repair
	N-terminal tail ( <i>S. cerevisiae</i> )	Ubiquitylation	Ubc9	transcriptional repression
	Lys12	Biotinylation	biotinidase	DNA damage response
	Lys59	Sumoylation	SUMO-1, SUMO-3	transcriptional repression

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