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Education and Research Experience

Jan. 2002-	Professor Harvard Medical School Department of Biological Chemistry and Molecular Pharmacology Member, Harvard Center for Cancer Research
Oct. 1997- Dec. 2001	Associate Professor Harvard Medical School Department of Biological Chemistry and Molecular Pharmacology
March 1994-	Tutor , Harvard College Board of Tutors in Biochemical Sciences
March 1994- Sept. 1997	Assistant Professor Harvard Medical School Department of Biological Chemistry and Molecular Pharmacology
April 1990- June 1994	Whitehead Institute Fellow Whitehead Institute for Biomedical Research.
April 1990- June 1990	Visiting Senior Research Fellow in Genetics Harvard Medical School, Department of Genetics Lab head: Fred Winston Project: Genetic analysis of SPT15 (TFIID)
Sept. 1984- March 1990	Ph.D. Massachusetts Institute of Technology, Department of Biology Advisor: Phillip A. Sharp Thesis: Transcription Initiation by RNA Polymerase II
Summer 1984	Summer Internship National Cancer Institute, National Institutes of Health Laboratory of Molecular Virology Supervisors: George Khoury and John Brady Project: Regulation of SV40 late transcription by T-antigen
1980-1984	A.B., Summa cum laude Princeton University, Department of Biochemical Sciences

Honors

2012	Fellow, American Academy of Microbiology (American Society for Microbiology)
2012	Lester O. Krampitz Lecturer, Case Western Reserve University
2004	Stohlman Scholar, Leukemia and Lymphoma Society
2004	Scholar, The Academy at Harvard Medical School
2004	The George Khoury Memorial Lecturer, Wistar Institute
2002	Honorary Master of Arts Degree, Harvard University
1999-2004	Leukemia and Lymphoma Society Scholar Award
1998	Harvard Medical School Biological and Biomedical Sciences (PhD program) Teaching Award
1996-1999	American Cancer Society Junior Faculty Research Award
1995-1999	Pew Scholar Award
1990-1994	Whitehead Institute Fellowship
1990-	Sigma Xi - Full Member
1984-1987	National Science Foundation Graduate Research Fellowship
1984-1990	Sigma Xi - Associate Member
1984	Phi Beta Kappa

Professional Activities

Editorial Positions: *Molecular Cell* (1998-), *Molecular and Cellular Biology* (2003-2008, 2010-), *Transcription* (2010-2015), *Science* (2004-2009), and *Genes to Cells* (1999-2003), Guest Editor for *PLOS Genetics* and *eLife*.

Reviewer for *Science*, *Nature*, *Nature Structure and Molecular Biology*, *Nature Cell Biology*, *Nature Communications*, *Cell*, *Molecular Cell*, *Cell Reports*, *Genes and Development*, *Molecular and Cellular Biology*, *eLife*, *EMBO Journal*, *EMBO Reports*, *Journal of Biological Chemistry*, *Proceedings of the National Academy of Science USA*, *Genetics*, *G3*, *Journal of Molecular Biology*, *Biochemistry*, *Nucleic Acids Research*, *Transcription*, *Current Biology*, *Genes to Cells*, *Plasmid*, *BBA-Gene Expression*, *BBA-Gene Regulatory Mechanisms*, *Cell Research*, *Scientific Reports*, *ACS Chemical Biology*, *Genome Research*, *Chemical Reviews*, *Epigenetics*, *FEBS Journal*, *RNA*, *Eukaryotic Cell*, *PLOS journals*, *Molecular Biology of the Cell*.

Grant reviewer

National

American Cancer Society -Nucleic Acids and Proteins Section (ad hoc) 1994-1995
 National Science Foundation (ad hoc) - 1995- present
 Human Frontiers Science Program (ad hoc) - 1997, 2001
 Collaborative Center for X-linked Dystonia Parkinsonism (XDP) at MGH (ad hoc) - 2015
 National Institutes of Health - Biochemistry Section (ad hoc) 1995; Cell Development and Function 2 (ad hoc) 1999-2004; Molecular Genetics C (ad hoc) 2005; Nuclear Dynamics and Transport (ad hoc) 2007; 2006, 2009, 2011; Molecular Genetics B (ad hoc) 2012; Molecular Genetics A (ad hoc) 2015; ZRG1 CB-K (55) MIRA panel (ad hoc) 2017, 2019, 2021; 4D Nucleome (ad hoc) 2020

International

Australian Research Council (ad hoc) - 2002, 2004
 Genome Canada (ad hoc) - 2004
 Israel Science Foundation (ad hoc) - 1998, 2001, 2003, 2004
 The Royal Society (UK) (ad hoc) - 2011
 National Research Foundation of South Africa (ad hoc) - 2011
 Japan Society for the Promotion of Science (ad hoc) - 2012
 Medical Research Council (UK) (ad hoc) - 2012
 Estonian Research Council (ad hoc) - 2013
 Foundation for Polish Science (ad hoc) - 2013, 2014
 Wellcome Trust (ad hoc) - 2007, 2009, 2011, 2014, 2015

French National Research Agency- ANR (ad hoc) - 2016, 2018, 2019
ATIP-avenir Program, INSERM, France (ad hoc) - 2018
National Science Centre of Poland (ad hoc) – 2018
European Research Council (ad hoc) – 2011, 2019

Site Visit Committee Member

National Institutes of Health - NICHD, Cell Biology and Metabolism Branch 1998
National Institutes of Health - NIEHS, Lab of Molecular Carcinogenesis 2007, 2015
National Institutes of Health - NCI, Receptor Biology and Gene Expression 2022
UCLA Molecular Biology Independent Degree PhD Program 2014

Organizer: 1994 Whitehead Institute Symposium: Transcriptional Control
2005, 2007, 2010, 2012, 2014 Boston Area Gene Expression Meeting
2009, 2011, 2013 Cold Spring Harbor Meeting on Eukaryotic Transcription
2013 ASBMB Annual Meeting- "Gene Transcription and Regulation" Theme Organizer

Current Funding

National Institutes of Health Grant R01 GM046498
The RNA Polymerase II Transcription Initiation Complex
7/1/96-6/30/25

National Institutes of Health Grant R01 GM056663
The mRNA Capping Enzyme
7/1/99 - 4/30/23

National Institutes of Health Grant R01 CA246500
Single Molecule Analysis of Eukaryotic Transcription Activation
1/1/20 - 12/30/24

Publications

S. Buratowski, S. Hahn, P.A. Sharp, and L. Guarente
Function of a yeast TATA element-binding protein in a mammalian transcription system
Nature 334, 37-42 (1988)

S. Buratowski, S. Hahn, L. Guarente, and P.A. Sharp
Five intermediate complexes in transcription initiation by RNA polymerase II
Cell 56, 549-561 (1989)

L.A. Chodosh, S. Buratowski, and P.A. Sharp
A yeast protein possesses the DNA-binding properties of the adenovirus major late transcription factor
Mol. Cell. Biol. 9, 820-822 (1989)

S. Hahn, S. Buratowski, P.A. Sharp, and L. Guarente
Yeast TATA binding protein TFIID binds to TATA elements with degenerate DNA sequence
Proc. Natl. Acad. Sci. USA 86, 5718-5722 (1989)

S. Hahn, S. Buratowski, P.A. Sharp, and L. Guarente
Identification of a yeast protein homologous in function to the mammalian general transcription factor TFIIA
EMBO J. 8, 3379-3382 (1989)

S. Hahn, S. Buratowski, P.A. Sharp, and L. Guarente
Isolation of the gene encoding the yeast TATA-binding protein TFIID: A gene identical to the SPT15 suppressor of TY element insertions
Cell 58, 1173-1181 (1989)

S. Buratowski and P.A. Sharp
Transcription initiation complexes and upstream activation with RNA polymerase II lacking the largest subunit C-terminal domain
Mol. Cell. Biol. 10, 5562-5564 (1990)

S. Buratowski, M. Sopta, J. Greenblatt, and P.A. Sharp
RNA polymerase II-associated proteins are required for a DNA conformation change in the transcription initiation complex
Proc. Natl. Acad. Sci. USA 88, 7509-7513 (1991)

P.A. Sharp and S. Buratowski
Regulation of Transcription
Molecular mechanisms and their clinical application in malignancies: Bristol-Myers Squibb Cancer Symposia. v. 12, (D.E. Bergasel and T.W. Mak, eds.), Academic Press, Inc., Boston, pp. 109-124 (1991)

S. Buratowski and H. Zhou
TFIID mutants defective for interactions with TFIIA
Science 255, 1130-1132 (1992)

A.J. Koleske, S. Buratowski, M. Nonet, and R.A. Young
A novel transcription factor provides a functional link between RNA polymerase II and TFIID
Cell 69, 883-894 (1992)

S. Buratowski and H. Zhou
A suppressor of TBP mutations encodes an RNA polymerase III transcription factor homologous to TFIIIB
Cell 71, 221-230 (1992)

S. Buratowski and P.A. Sharp
Initiation of transcription by RNA polymerase II

Transcriptional Regulation. Cold Spring Harbor Monograph Series. (S. McKnight and K. Yamamoto, eds.)
Cold Spring Harbor Press, Cold Spring Harbor, NY, pp.227-246 (1992)

S. Buratowski
DNA repair and transcription: The helicase connection
Science 260, 37-38 (1993)

S. Buratowski and H. Zhou
Functional domains of transcription factor TFIIIB
Proc. Natl. Acad. Sci. USA 90, 5633-5637 (1993)

S. Buratowski
Transcription-coupled DNA repair (Response)
Science 262, 439-440 (1993)

W.J. Feaver, J.Q. Svejstrup, L. Bardwell, A.J. Bardwell, S. Buratowski, K.D. Gulyas, T.F. Donahue, E.C. Friedberg, and R.D. Kornberg
Dual roles of a multiprotein complex from *Saccharomyces cerevisiae* in transcription and DNA repair
Cell 75, 1379-1387 (1993)

S. Buratowski
Yeast Genetics as a Tool for Studying Transcription Initiation
Transcription: Mechanisms and regulation. Raven Press Series on Molecular and Cellular Biology, vol. 3,
(R.C. Conaway and J.W. Conaway, eds.)
Raven Press, New York, NY, pp. 161-170 (1994)

S. Buratowski
The basics of basal transcription by RNA polymerase II
Cell 77, 1-3 (1994)

L.D. Fresco and S. Buratowski
Active site of the mRNA capping enzyme guanylyltransferase from *Saccharomyces cerevisiae*: Similarity to the nucleotidyl attachment motif of DNA and RNA ligases
Proc. Natl. Acad. Sci. USA 91, 6624-6628 (1994)

S. Buratowski
RNA polymerase III transcription in the yeast *Saccharomyces cerevisiae*
Genetic Engineering. (J. Setlow, ed.)
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Z. Wang, S. Buratowski, J. Q. Svejstrup, W. J. Feaver, X. Wu, R. D. Kornberg, T. F. Donohue, and E. C. Friedberg
Yeast TFB1 and SSL1 genes encoding subunits of transcription factor IIH (TFIIH) are required for nucleotide excision repair
Mol. Cell. Biol. 15, 2288-2293 (1995)

P. Matsui, J. DePaulo, and S. Buratowski
An interaction between the Tfb1 and Ssl1 subunits of yeast TFIIH correlates with DNA repair activity
Nucleic Acids Res. 23, 767-772 (1995)

S. Buratowski
Mechanisms of Gene Activation
Science 270, 1773-1774 (1995)

L.D. Fresco and S. Buratowski

Conditional mutants in the yeast mRNA capping enzyme show that the cap enhances, but is not required for, mRNA splicing
RNA 2, 584-596 (1996)

S. Buratowski and L. Chodosh
Mobility shift DNA-binding assay using gel electrophoresis
in Current Protocols in Molecular Biology
(F. Ausubel et al., eds.)
John Wiley & Sons, Inc., New York
pp. 12.2.1-12.2.8, 1996

Z. Moqtaderi, J. DePaulo-Yale, K. Struhl, and S. Buratowski
Yeast homologues of higher eukaryotic TFIID subunits
Proc. Natl. Acad. Sci. USA 93, 14654-14658 (1996)

A. Sachs and S. Buratowski
Common themes in translational and transcriptional regulation
Trends Biochem. Sci. 22, 189-192 (1997)

T. Takagi, C.R. Moore, F. Diehn, and S. Buratowski
An RNA 5'-triphosphatase related to the protein tyrosine phosphatases
Cell 89, 867-873 (1997)

N. Kuldell, and S. Buratowski
Genetic analysis of the large subunit of transcription factor IIE reveals two regions with distinct functions
Mol. Cell. Biol. 17, 5288-5298 (1997)

S. Buratowski
Multiple TATA-binding factors come back into style
Cell 91, 13-15 (1997)

E.J. Cho, T. Takagi, C.R. Moore, and S. Buratowski
The mRNA capping enzyme is recruited to the transcription complex by phosphorylation of the RNA polymerase II C-terminal domain
Genes Dev. 11, 3319-3326 (1997)

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DSIF, a novel transcription factor that regulates RNA polymerase II processivity, is composed of human Spt4 and Spt5 homologs
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A PTP-like protein from baculovirus has RNA 5'-triphosphatase and diphosphatase activities
Proc. Natl. Acad. Sci. USA 95, 9808-9813 (1998)

E.J. Cho, C.R. Rodriguez, T. Takagi, and S. Buratowski
Allosteric interactions between capping enzyme subunits and the RNA polymerase II carboxy-terminal domain
Genes Dev. 12, 3319-3326 (1998)

B. Michel, P. Komarnitsky, and S. Buratowski
Histone-like TAFs are essential for transcription in vivo
Molecular Cell 2, 663-673 (1998)

C.R. Rodriguez, T. Takagi, E.J. Cho, and S. Buratowski

A *Saccharomyces cerevisiae* RNA 5'-triphosphatase related to mRNA capping enzyme
Nucleic Acids Res. 27, 2181-2188 (1999)

T. Deshpande, T. Takagi, L. Hao, S. Buratowski, and H. Charbonneau
Human PIR1 of the protein tyrosine phosphatase superfamily has RNA 5'-triphosphatase and diphosphatase activities
J. Biol. Chem. 274, 16590-16594 (1999)

E.J. Cho and S. Buratowski
Evidence that TFIIB is required for a post-assembly step in transcription initiation
J. Biol. Chem. 36, 25807-25813 (1999)

H. Morehouse, R.M. Buratowski, P.A. Silver, and S. Buratowski
The importin/karyopherin Kap114 mediates the nuclear import of TATA-binding protein
Proc. Natl. Acad. Sci. USA 96, 12542-12547 (1999)

P. Komarnitsky, B. Michel, and S. Buratowski
TFIID-specific Taf40 is essential for RNA polymerase II mediated transcription in vivo
Genes Dev. 13, 2484-2489 (1999)

C.R. Rodriguez, E.J. Cho, M.C. Keogh, C.L. Moore, A.L. Greenleaf, and S. Buratowski
Kin28, the TFIIF-associated CTD kinase, facilitates the recruitment of mRNA processing machinery to RNA polymerase II
Mol. Cell. Biol. 20, 104-112 (2000)

O. Matangkasombut, R.M. Buratowski, N.W. Swilling, S. Buratowski
Bromodomain Factor 1 corresponds to a missing piece of yeast TFIID
Genes Dev. 14, 951-962 (2000)

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Efficient synthesis of ¹³C, ¹⁵N labeled RNA containing the cap structure m⁷GpppA
J. Am. Chem. Soc. 122, 2417-2421 (2000)

S. Buratowski
Snapshots of RNA polymerase II transcription initiation
Curr. Opinions in Cell Biol. 12, 320-325 (2000)

P. Komarnitsky, E.J. Cho, and S. Buratowski
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Genes Dev. 14, 2452-2460 (2000)

Y. Takase, T. Takagi, P. Komarnitsky, and S. Buratowski
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Mol. Cell. Biol., 20, 9307-9316 (2000)

T. Takagi and S. Buratowski
A *Plasmodium falciparum* protein related to fungal RNA 5'-triphosphatases
Mol. Biochem. Parasit., 114, 239-244 (2001)

W. Selleck, R. Howley, Q. Fang, V. Podolny, M.G. Fried, S. Buratowski, and S. Tan
A histone-fold TAF octamer within yeast TFIID transcriptional coactivator
Nature Struct. Biol. 8, 695-700 (2001)

E.J. Cho, M. Kobor, M. Kim, J. Greenblatt, and S. Buratowski

Opposing effects of Ctk1 kinase and Fcp1 phosphatase at serine 2 of the RNA polymerase II C-terminal domain
Genes Dev. 15: 3319-3329 (2001)

M.C. Keogh, E. J. Cho, V. Podolny, and S. Buratowski
Kin28 is found within TFIIF and a Kin28-Ccl1-Tfb3 trimer complex with differential sensitivities to T-loop phosphorylation
Mol. Cell. Biol. 22, 1288-1297 (2002)

T. Takagi, E.J. Cho, R.T.K. Janoo, V. Podolny, Y. Takase, M.C. Keogh, S.A. Woo, L.D. Fresco-Cohen, C.S. Hoffman, S. Buratowski
Divergent subunit interactions among fungal mRNA 5'-capping machineries
Euk. Cell 1, 448-457 (2002)

Krogan, N.J., M. Kim, S.H. Ahn, G. Zhong, M.S. Kobor, G. Cagney, A. Emili, A. Shilatifard, S. Buratowski, and J. Greenblatt
RNA polymerase II elongation factors of *Saccharomyces cerevisiae*: a targeted proteomics approach
Mol. Cell. Biol. 22, 6979-6992 (2002)

Buratowski, R.M., J. Downs, and S. Buratowski
Interdependent interactions between TFIIB, TATA Binding Protein, and DNA
Mol. Cell. Biol. 22, 8735-8743 (2002)

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Mol. Cell. 11, 353-363 (2003)

N.J. Krogan, M. Kim, A. Tong, A. Golshani, G. Cagney, V. Canadien, D. P. Richards, R. K. Beattie, A. Emili, C. Boone, A. Shilatifard, S. Buratowski, and J. Greenblatt
Methylation of histone H3 by Set2 in *Saccharomyces cerevisiae* is linked to transcriptional elongation by RNA polymerase II
Mol. Cell. Biol. 23, 4207-4218 (2003)

T. Takagi, A. K. Walker, C. Sawa, F. Diehn, Y. Takase, T. K. Blackwell, and S. Buratowski
The *Caenorhabditis elegans* mRNA 5'-capping enzyme: in vitro and in vivo characterization
J. Biol. Chem. 278, 14174-14184 (2003)

E. Nedeá, X. He, M. Kim, J. Pootoolal, G. Zhong, V. Canadien, T. Hughes, S. Buratowski, C. L. Moore, and J. Greenblatt
Organization and function of APT, a sub-complex of the yeast cleavage and polyadenylation factor involved in the formation of mRNA and snoRNA 3' ends
J. Biol. Chem. 278, 33000-33010 (2003)

M. Keogh, V. Podolny, and S. Buratowski
Bur1 kinase is required for efficient transcription elongation by RNA polymerase II
Mol. Cell. Biol. 23, 7005-7018 (2003)

S. Buratowski
The CTD code
Nat. Struct. Biol. 10, 679-680 (2003)

N.J. Krogan, M.C. Keogh, N. Datta, C. Sawa, O.W. Ryan, H. Ding, R.A. Haw, J. Pootoolal, A. Tong, V. Canadien, D.P. Richards, X. Wu, A. Emili, T.R. Hughes, S. Buratowski, and J.F. Greenblatt
A Snf2 family ATPase complex required for recruitment of the histone H2A variant Htz1

Mol. Cell 12, 1565-76 (2003)

S.H. Ahn, M. Kim, and S. Buratowski
Phosphorylation of Serine 2 within the RNA Polymerase II C-Terminal Domain Couples
Transcription and 3' End Processing
Mol. Cell 13, 67-76 (2004)
PMID: 14731395

M. Kim, S.H. Ahn, N. Krogan, J.F. Greenblatt, and S. Buratowski
Transitions in RNA polymerase II elongation complexes at the 3' ends of genes
EMBO J. 23, 354-364 (2004)
PMID: 14739930

O. Matangkasombut, R. Auty, and S. Buratowski
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Adv. Protein Chem. 67, 67-92 (2004)
PMID: 14969724

M.C. Keogh and S. Buratowski
Using chromatin immunoprecipitation to map cotranscriptional mRNA processing in
Saccharomyces cerevisiae
Methods Mol. Biol. 257, 1-16 (2004)
PMID: 14769992

C. Sawa, E. Nedeá, N. Krogan, T. Wada, H. Handa, J. Greenblatt, and S. Buratowski
Bromodomain Factor 1 (Bdf1) is phosphorylated by protein kinase CK2
Mol. Cell. Biol. 24, 4734-4742 (2004)
PMID: 15143168

N.J. Krogan, K. Baetz, M.C. Keogh, N. Datta, C. Sawa, T.C.Y. Kwok, N.J. Thompson, M.G.
Davey, J. Pootoolal, T.R. Hughes, A. Emili, S. Buratowski, P. Hieter, and J.F. Greenblatt
Regulation of chromosome stability by the histone H2A variant Htz1, the Swr1 chromatin
remodeling complex, and the histone acetyltransferase NuA4
Proc. Natl. Acad. Sci. USA 101, 13515-13518 (2004)
PMID: 15353583

R. Auty, H. Steen, L.C. Myers, J. Persinger, B. Bartholomew, S.P. Gygi, S. Buratowski
Purification of active TFIID from *Saccharomyces cerevisiae*: Extensive promoter contacts and
coactivator function
J Biol Chem. 279, 49973-49981 (2004)
PMID: 15448131

M. Kim, N. Krogan, L. Vasiljeva, O. Rando, J.F. Greenblatt, and S. Buratowski
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N..J. Krogan, M.H. Lam, J. Fillingham, M.C. Keogh, M. Gebbia, J. Li, N. Datta, G. Cagney, S.
Buratowski, A. Emili, J.F. Greenblatt
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PMID: 15610744

M. E. Bucheli and S. Buratowski
Npl3 is an antagonist of 3' end formation by RNA polymerase II
EMBO Journal 24, 2150-2160 (2005)

PMID: 15902270

S. Buratowski

Connections between mRNA 3' end processing and transcription termination

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S. Buratowski and D. Moazed

Expression and silencing coupled

Nature 435, 1174-1175 (2005)

PMID: 15988510

C.L. Liu, T. Kaplan, M. Kim, S. Buratowski, S.L. Schreiber, N. Friedman, and O.J. Rando

Single-nucleosome mapping of histone modifications in *S. cerevisiae*

PLoS Biol. 3, 1753-1769 (2005)

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M.C. Keogh, S.K. Kurdistani, S.A. Morris, S.H. Ahn, V. Podolny, S.R. Collins, M. Schuldiner, K. Chin, T. Punna, N.J. Thompson, C. Boone, A. Emili, J.S. Weissman, T.R. Hughes, B.D. Strahl, M. Grunstein, J.F. Greenblatt, S. Buratowski, N.J. Krogan

Cotranscriptional Set2 methylation of histone H3 lysine 36 recruits a repressive Rpd3 complex

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A phosphatase complex that dephosphorylates gammaH2AX regulates DNA damage checkpoint recovery

Nature 439, 497-501 (2006)

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D. Chowdhury, M.C. Keogh, H. Ishii, C.L. Peterson, S. Buratowski, J. Lieberman

Gamma-H2AX dephosphorylation by protein phosphatase 2A facilitates DNA double-strand break repair

Mol Cell. 20, 801-9 (2006)

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L. Vasiljeva and S. Buratowski

Nrd1 interacts with the nuclear exosome for 3' processing of RNA polymerase II transcripts.

Mol Cell. 21, 239-48 (2006)

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M.C. Keogh, T.A. Mennella, C. Sawa, S. Berthelet, N.J. Krogan, A. Wolek, V. Podolny, L.R. Carpenter, J.F. Greenblatt, K. Baetz, and S. Buratowski

The *Saccharomyces cerevisiae* histone H2A variant Htz1 is acetylated by NuA4

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Genes with internal repeats require the THO complex for transcription

Proc. Natl. Acad. Sci. USA 103, 14423-14428 (2006)

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M. Kim, L. Vasiljeva, O.J. Rando, A. Zhelkovsky, C. Moore, and S. Buratowski

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S. Buratowski
The 2007 Genetics Society of America Medal (citation for Shirley Tilghman)
Genetics 175, 463-464 (2007)
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T. Kim and S. Buratowski
Two *Saccharomyces cerevisiae* JmjC domain proteins demethylate histone H3 K36 in transcribed regions to promote elongation.
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The Rpb4 subunit of RNA polymerase II contributes to co-transcriptional recruitment of 3' processing factors
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T.W. Sikorski and S. Buratowski
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