

CURRICULUM VITAE
Steven Lanier McKnight

Education:

1974 - B.A., University of Texas, *summa cum laude* - Biology
1977 - Ph.D., University of Virginia - Biology

Positions Held:

Staff Associate, Carnegie Institution of Washington 1977-1981
Staff Member, Fred Hutchinson Cancer Research Center 1981-1983
Staff Member, Carnegie Institution of Washington 1983-1992
Investigator, Howard Hughes Medical Institute 1988-1992
Co-Founder, Director of Research, Tularik, Inc. 1991-1996
Professor and Chairman, Department of Biochemistry, UTSWMC 1996-

Awards and Professional Activities:

ARCOM Medal, Republic of Vietnam (1969)
Virginia Society of Fellows (1975-1976)
Helen Hay Whitney Foundation Fellowship (1977-1980)
National Institutes of Health Research Grants (1980-1991, 1996-)
Dai Nakada Memorial Lecture, University of Pittsburgh (1985)
DeWitt Stetten Lecture, National Institutes of Health (1987)
NIH Study Section on Molecular Cytology (1985-1988; Chairman 1987-1988)
Eli Lilly Award, American Society for Microbiology (1989)
Newcomb-Cleveland Award, AAAS (1989)
Steinberg-Wylie Lecture, University of Maryland (1990)
Monsanto Award, National Academy of Sciences (1991)
Bernard Cohen Lecture, University of Pennsylvania (1991)
Gerhard Schmidt Lecture, Tufts University (1991)
Board of Directors, Tularik, Inc. (1991-2004)
Honorary Member, Japanese Society for Biochemistry (1992)
Harvey Lecture, Rockefeller University (1992)
Fellow, American Society for Microbiology (1992)
John Enders Lecture, Harvard University (1993)
Hall of Fame Inductee, New Mexico Military Institute (1995)
Commencement Speaker, UT Austin College of Natural Sciences (1995)
Chairman, Life Sciences Research Foundation (1995-)
Scientific Advisory Board, Howard Hughes Medical Institute (1998-2006)
Board of Trustees, Carnegie Institution of Washington (1999-2009)
Scientific Advisory Board, IMP-Vienna (2001-2008)
Hall of Honor Inductee, UT Austin College of Natural Sciences (2003)
NIH Pioneer Award (2004-2009)
Scientific Advisory Board, PTV Ventures (2004-)

Scientific Advisory Board, Amgen Inc. (2004-6)
 Chancellors Lecture, UC San Diego (2005)
 Mendel Lecture, Brno, Czch Republic (2005)
 Sabel Lecture, Case Western Reserve University (2005)
 Burdette Lecture, University of Texas (2007)
 Pritchett Memorial Lecture, University of Pennsylvania (2007)
 Council Member, National Institute of General Medical Sciences (2007-)
 Fellow, American Association for the Advancement of Science (2007)
 David Sigmund Lecture, UCLA (2008)
 Daniel Nathans Memorial Lecture, Johns Hopkins University (2008)

Member:

National Academy of Sciences
 American Academy of Arts and Sciences
 Institute of Medicine
 American Society for Biochemistry and Molecular Biology
 American Chemical Society

Bibliography:

- McKnight, S.L. and Miller, O.L., Jr. (1976). Ultrastructural Patterns of RNA Synthesis During the Early Embryogenesis of *Drosophila melanogaster*. *Cell* 8:305-319.
- McKnight, S.L. and Miller, O.L., Jr. (1977). Electron Microscopic Analysis of Chromatin Replication in the Cellular Blastoderm *Drosophila melanogaster* Embryo. *Cell* 12:795-804.
- McKnight, S.L., Bustin, M. and Miller, O.L., Jr. (1978). Electron Microscopic Analysis of Chromosome Metabolism in the *Drosophila melanogaster* Embryo. *Cold Spring Harbor Symp. Quant. Biol.* 42:741-754.
- McKnight, S.L. and Miller, O.L., Jr. (1979). Post-Replicative Non-Ribosomal Transcription Units of *Drosophila melanogaster* Embryos. *Cell* 17:551-563.
- Beyer, A.L., Miller, O.L., Jr. and McKnight, S.L. (1980). Ribonucleoprotein Structure in Nascent hnRNA is Non-Random and Sequence Dependent. *Cell* 17:551-563.
- McKnight, S.L., Hipskind, R.A. and Reeder, R.H. (1980). Unstructural Analysis of Ribosomal Gene Transcription *in vitro*. *J. Biol. Chem.* 255:7907-7919.
- McKnight, S.L. (1980). The Nucleotide Sequence and Transcript Map of the Herpes Simplex Virus Thymidine Kinase Gene. *Nucleic Acids Research* 8:5949-5964.
- McKnight, S.L. and Gavis, E.R. (1980). Expression of the Herpes Simplex Virus Thymidine Kinase Gene in *Xenopus laevis* Oocytes: An Assay for the Study of Deletion Mutants Constructed *in vitro*. *Nucleic Acids Research* 8:5931-5948.

McKnight, S.L., Kingsbury, R.C., Gavis, E.R. and Axel, R. (1981). Analysis of Transcriptional Regulatory Signals of the Herpes Thymidine Kinase Gene: Identification of an Upstream Control Region. *Cell* 25:385-398.

Sollner-Webb, B. and McKnight, S.L. (1982). Accurate Transcription of Cloned *Xenopus* rRNA Genes by RNA Polymerase I: Demonstration by S₁ Nuclease Mapping. *Nucleic Acids Research* 10:3391-3406.

McKnight, S.L. and Kingsbury, R. (1982). Transcriptional Control Signals of a Eukaryotic Protein-Coding Gene. *Science* 217:316-325.

McKnight, S.L. (1982). Functional Relationships Between Transcriptional Control Signals of the HSV Thymidine Kinase Gene. *Cell* 31:355-365.

Harland, R.M., Weintraub, H. and McKnight, S.L. (1982). Transcription of DNA Injected into *Xenopus* Oocytes is Influenced by Template Topology. *Nature* 301:38-43.

McKnight, S.L. (1982). Constitutive Control Signals of the HSV Thymidine Kinase Gene. *Cold Spring Harbor Symp. Quant. Biol.* 46:945-958.

Harland, R.M. Weintraub, H. and McKnight, S.L. (1982). Transcription of Circular and Linear DNA in Amphibian Oocytes. *Cold Spring Harbor Symp. Quant. Biol.* 45:958-963.

McKnight, S.L., Kingsbury, R.C., Spence, A. and Smith, M. (1984). The Distal Transcription Signals of the Herpes Virus tk Gene Share a Common Hexanucleotide Control Sequence. *Cell* 37:253-262.

Merrill, G.F., Harland, R.M. Groudine, M. and McKnight, S.L. (1984). Genetic and Physical Analysis of the Chicken tk Gene. *Mol. Cell Biol.* 4:1769-1776.

Merrill, G.F., Hauschka, S.D. and McKnight, S.L. (1984). tk Enzyme Expression in Differentiating Muscle Cells is Regulated Through an Internal Segment of the Cellular tk Gene. *Mol. Cell Biol.* 4:1777-1784.

Eisenberg, S.P., Coen, D.M. and McKnight, S.L. (1985). Promoter Domains Required for Expression of Plasmid-Borne Copies of the Herpes Simplex Virus tk Gene in Virus-Infected Mouse Fibroblasts and Microinjected Frog Oocytes. *Mol. Cell Biol.* 5:1940-1947.

Graves, B.J., Eisenman, R.N. and McKnight, S.L. (1985). Delineation of Transcriptional Control Signals Within the Moloney Murine Sarcoma Virus LTR. *Mol. Cell Biol.* 5:1948-1958.

Graves, B.J., Eisenberg, S.P., Coen, D.M. and McKnight, S.L. (1985). Alternate Utilization of Two Regulatory Domains Within the MSV LTR. *Mol. Cell Biol.* 5:1959-1968.

Coen, D.M., Weinheimer, S.P. and McKnight, S.L. (1986). A Genetic Approach to Promoter Recognition During *trans* Induction of Viral Gene Expression. *Science* 234:53-59.

Graves, B.J., Johnson, P.F. and McKnight, S.L. (1986). Homologous Recognition of a Promoter Domain Common to the MSV LTR and the HSV tk Gene. *Cell* 44:565-576.

McKnight, S.L. and Tijan, R. (1986). Transcriptional Selectivity of Viral Genes in Mammalian Cells. *Cell* 46:795-805.

Johnson, P.F., Landschulz, W.H., Graves, B.J. and McKnight, S.L. (1987). Identification of a Rat Liver Nuclear Protein that Binds to the Enhancer Core Element of Three Animal Viruses. *Genes and Dev.* 1:133-146.

Tufaro, F., Snider, M.D. and McKnight, S.L. (1987). Identification and Characterization of a Mouse Cell Mutant Defective in the Intracellular Transport of Glycoproteins. *J. Cell Biol.* 105:647-657.

Weinheimer, S.P. and McKnight, S.L. (1987). Transcriptional and Post-Transcriptional Controls Establish the Cascade of Herpes Simplex Virus Protein Synthesis. *J. Mol. Biol.* 195:819-833.

Treizenberg, S.J., Kingsbury, R.C. and McKnight, S.L. (1988). Functional Dissection of VP16, the *trans*-activator of Herpes Simplex Virus Immediate Early Gene Expression. *Genes and Dev.* 2:718-729.

Treizenberg, S.J., LaMarco, K.L. and McKnight, S.L. (1988). Evidence of DNA: Protein Interactions that Mediate HSV-1 Immediate Early Gene Activation by VP16. *Genes and Dev.* 2:730-742.

Landschulz, W.H., Johnson, P.F. and McKnight, S.L. (1988). The Leucine Zipper: A Hypothetical Structure Common to a New Class of DNA Binding Proteins. *Science* 240:1759-1764.

Landschulz, W.H., Johnson, P.F., Adashi, E.Y., Graves, B.J. and McKnight, S.L. (1988). Isolation of a Recombinant Copy of the Gene Encoding C/EBP. *Genes and Dev.* 2:786-800.

Vinson, C.R., LaMarco, K.L., Johnson, P.F., Landschulz, W.H. and McKnight, S.L. (1988). *in situ* Detection of Sequence-Specific DNA Binding Activity Specified by a Recombinant Bacteriophage. *Genes and Dev.* 2:801-806.

Friedman, A.D., Treizenberg, S.J. and McKnight, S.L. (1988). Expression of a Truncated Viral *trans*-activator in Mammalian Cells Selectively Impedes Lytic Infection by its Cognate Virus. *Nature* 335:452-454.

- Johnson, P.F. and McKnight, S.L. (1989). Eukaryotic Transcriptional Regulatory Proteins. *Ann. Rev. Biochem.* 58:799-839.
- Landshulz, W.H., Johnson, P.F. and McKnight, S.L. (1989). The DNA Binding Domain of C/EBP is Bipartite. *Science* 243:1681-1688.
- Birkenmeier, E.H., Gwynn, B., Howard, S., Jerry, J., Gordon, J.I., Landschulz, W.H. and McKnight, S.L. (1989). Tissue-Specific Expression, Developmental Regulation and Genetic Mapping of the Gene Encoding C/EBP. *Genes and Dev.* 3:1146-1156.
- LaMarco, K.L. and McKnight, S.L. (1989). Purification of a Set of Cellular Polypeptides that Bind to the Purine-Rich *cis*-Regulatory Element of Herpes Simplex Virus Immediate Early Genes. *Genes and Dev.* 3:1372-1383.
- Freidman, A.D., Landschulz, W.H. and McKnight, S.L. (1989). C/EBP Activates the Serum Albumin Promoter in Cultured Hepatoma Cells. *Genes and Dev.* 3:1314-1322.
- Vinson, C.R., Sigler, P.B. and McKnight, S.L. (1989). A Scissors-Grip Model for DNA Recognition by a Family of Leucine Zipper Proteins. *Science* 246:911-916.
- Agre, P., Johnson, P.F. and McKnight, S.L. (1989). Cognate DNA Binding Specificity is Retained After Reciprocal Exchange of Leucine Zippers Between GCN4 and C/EBP. *Science* 246:922-926.
- McKnight, S.L., Lane, M.D. and Gluecksohn-Waelsch, S. (1989). Is CCAAT/Enhancer Binding Protein a Central Regulator of Energy Metabolism? *Genes and Dev.* 3:2021-2024.
- Friedman, A.D. and McKnight, S.L. (1990). Identification of Two Polypeptide Segments of CCAAT/Enhancer Binding Protein Required for Transcriptional Activation of the Serum Albumin Gene. *Genes and Dev.* 4:1416-1426.
- Shuman, J.D., Vinson, C.R. and McKnight, S.L. (1990). Evidence of Changes in Protease Sensitivity and Subunit Exchange Rate Upon DNA Binding by C/EBP. *Science* 249:771-774.
- Umek, R.M., Friedman, A. and McKnight, S.L. (1991). CCAAT/Enhancer Binding Protein: A Component of a Different Switch. *Science* 251:288-292.
- McKnight, S.L. (1991). Molecular Zippers in Gene Regulation. *Scientific American* 264(4):54.
- LaMarco, K., Thompson, C.C., Byers, B.P., Walton, E.M. and McKnight, S.L. (1991). Identification of Ets- and Notch-Related Subunits in GA Binding Protein. *Science* 253: 789-768.
- Thompson, C.C., Brown, T.A. and McKnight, S.L. (1991). Convergence of Ets- and Notch-Related Structural Motifs in a Heteromeric DNA Binding Complex. *Science* 253:762-768.

Cao, Z., Umek, R.M. and McKnight, S.L. (1991). Regulated Expression of Three C/EBP Isoforms During Adipose Conversion of 3T3-L1 Cells. *Genes and Dev.* 5:1538-1552.

Lamb, P. and McKnight, S.L. (1991). Diversity and Specificity in Transcriptional Regulation: The Benefits of Heterotypic Dimerization. *Trends in Biochemistry*, 16:417-422.

Thompson, C.C. and McKnight, S.L. (1992). Anatomy of an Enhancer. *Trends in Genetics* 8:232-236.

Brown, T.A. and McKnight, S.L. (1992). Specificities of Protein:Protein and Protein: DNA Interaction of GABP α and Two Newly defined Ets-Related Proteins. *Genes and Dev.* 6:2502-2512.

de la Brousse, F.C., Birkenmeier, E.H., King, D.S., Rowe, L.B. and McKnight, S.L. (1994). Molecular and Genetic Characterization of GABP β . *Genes and Dev.* 8:1853-1865.

Hou, J., Henzel, W.H., Ho, T.C., Brasseur, M. and McKnight, S.L. (1994). An Interleukin-4-Induced Transcription Factor: IL-4 Stat. *Science* 265:1701-1706.

Hou, J., Schindler, U., Henzel, W. J., Wong, S.C. and McKnight, S.L. (1995). Identification and purification of human STAT proteins activated in response to Interleukin-2. *Immunity* 2:321-329.

Yeh, W.-C., Cao, Z., Classon, M. and McKnight, S.L. (1995). Cascade Regulation of Terminal Adipocyte Differentiation by Three Members of the C/EBP Family of Leucine Zipper Proteins. *Genes and Dev.* 9:168-181.

Schindler, U., Wu, P., Rothe, M., Brasseur, M. and McKnight, S.L. (1995). Components of a Stat Recognition Code: Evidence for Two Layers of Molecular Selectivity. *Immunity* 2:689-697.

Yeh, W.-C., Li, T.-K., Bierer, B.E. and McKnight, S.L. (1995). Identification and Characterization of an Immunophilin Expressed During the Clonal Expansion Phase of Adipocyte Differentiation. *Proc. Natl. Acad. Sci. USA* 92:11081-11085.

Yeh, W.-C., Bierer, B.E. and McKnight, S.L. (1995). Rapamycin Inhibits Clonal Expansion and Adipogenic Differentiation of 3T3-L1 Cells. *Proc. Natl. Acad. Sci. USA* 92:11086-11090.

Tian, H., McKnight, S.L. and Russell, D.W. (1997). Endothelial PAS Domain Protein 1 (EPAS1), a Transcription Factor Selectively Expressed in Endothelial Cells. *Genes and Dev.* 11:72-82.

Zhou, Y.-D., Barnard, M.E., Tian, H., Li, X., Ring, H.Z., Francke, U., Shelton, J., Richardson, J., Russell, D.W. and McKnight, S.L. (1997). Molecular Characterization of Two Mammalian bHLH-PAS Domain Proteins Selectively Expressed in the Central Nervous System. *Proc. Natl. Acad. Sci. USA* 94:713-718.

- Batchelor, A.H., Piper, D.E., de la Brousse, F.C., McKnight, S.L. and Wolberger, C. (1998). The Structure of GABP α/β : An ETS Domain-Ankyrin Repeat Heterodimer Bound to DNA. *Science* 279:1037-1041.
- Tian, H., Hammer, R.E., Matsumoto, A.M., Russell, D.W. and McKnight, S.L. (1998). The Hypoxia-Responsive Transcription Factor EPAS1 is Essential for Catecholamine Homeostasis and Protection Against Heart Failure During Embryonic Development. *Genes & Dev.* 12:3320-3324.
- Garcia, J.A., Zhang, D., Estill, S.J., Michnoff, C., Rutter, J., Reick, M., Scott, K., Diaz-Arrastia, R. and McKnight, S.L. (2000). Impaired Cued and Contextual Memory in NPAS2-Deficient Mice. *Science* 288:2226-2230.
- Reick, M., Garcia, J.A., Dudley, C. and McKnight, S.L. (2001). NPAS2: An Analog of Clock Operative in the Mammalian Forebrain. *Science* 293:506-509.
- Rutter, J., Reick, M., Wu, L.C. and McKnight, S.L. (2001). Regulation of Clock and NPAS2 DNA Binding by the Redox State of NAD Cofactors. *Science* 293:510-514.
- Rutter, J., Michnoff, C.H., Harper, S. M., Gardner, K.H. and McKnight, S.L. (2001). PAS Kinase: An Evolutionarily Conserved PAS Domain-Regulated Serine/Threonine Kinase. *Proc. Natl. Acad. Sci.* 98:8991-8996.
- Bruick, R.K., McKnight, S.L. (2001). A Conserved Family of Prolyl-4-Hydroxylases That Modify HIF. *Science* 294:1337-1340.
- Rutter, J., Reick, M. and McKnight, S.L. (2002). Metabolism and the Control of Circadian Rhythm. *Annu. Rev. Biochem.* 71:307-331.
- Rutter, J., Probst, B.L. and McKnight, S.L. (2002). Coordinate Regulation of Sugar Flux and Translation by PAS Kinase. *Cell* 111:17-28.
- Dioum, E.M., Rutter, J., Tuckerman, J.R., Gonzalez, G., Gilles-Gonzalez, M.-A. and McKnight, S.L. (2002). NPAS2: A Gas-Responsive Transcription Factor. *Science* 298:2385-2387.
- Dudley, C.A, Erbel-Sieler, C., Estill, S.J., Reick, M., Franken, P., Pitts, S. and McKnight, S.L. (2003). Altered Patterns of Sleep and Behavioral Adaptability in NPAS2-Deficient Mice. *Science* 301:379-383.
- Harrison, S.C., Alberts, B., Ehrenfeld, E., Enquist, L., Fineberg, H., McKnight, S.L., Moss, B., O'Donnell, M., Ploegh, H., Schmid, S.L., Walter, K.P., and Theriot, J. (2004). Discovery of Antivirals Against Smallpox. *Proc. Natl. Acad. Sci.* 101:11178-11192.
- Erbel-Sieler, C., Dudley, C., Zhou, Y., Wu, X., Estill, S.J., Han, T., Diaz-Arrastia, R., Brunskill, E.W., Potter, S.S., and McKnight, S.L. (2004). Behavioral and Regulatory Abnormalities in Mice Deficient in the NPAS1 and NPAS3 Transcription Factors. *Proc. Natl. Acad. Sci.* 101:13648-13653.

Wu, X., Alexander, P., He, Y., Kikkawa, M., Vogel, P., and McKnight, S.L. (2005). Mammalian Sprouty Proteins Assemble into Large, Monodisperse Particles Having the Properties of Intracellular Nanobatteries. *Proc. Natl. Acad. Sci.* 102:14058-14062.

Pieper, A., Wu, X., Han, T., Estill, S.J., Dang, Q., Wu, L., Reece-Fincannon, S., Dudley, C., Richardson, J., Brat, D., and McKnight, S.L. (2005) The Neuronal PAS Domain Protein 3 Transcription Factor Controls FGF-mediated Adult Hippocampal Neurogenesis in Mice. *Proc. Natl. Acad. Sci.* 102:14052-14057

Tu, B.P., Kudlicki, A., Rowicka, M., and McKnight, S.L. (2005). Logic of the Yeast Metabolic Cycle: Temporal Compartmentalization of Cellular Processes. *Science* 310:1152-1158.

Williams, N.S., Burgett, A.W.G., Atkins, A.S., Wang, X., Harran, P.G., and McKnight, S.L. (2006). Therapeutic Anticancer Efficacy of a Synthetic Diazonamide Analog in the Absence of Overt Toxicity. *Proc. Natl. Acad. Sci.* 104:2074-2079.

Tu, B.P. and McKnight, S.L. (2006). Metabolic Cycles as an Underlying Basis of Biological Oscillations. *Nat. Rev. Mol. Cell Biol.* 7:696-701.

Chen, Z., Odstrcil, E.A., Tu, B., and McKnight, S.L. (2007). Restriction of DNA Replication to the Reductive Phase of the Metabolic Cycle Protects Genome Integrity. *Science* 316:1916-1919.

Tu, B.P. and McKnight, S.L. (2007). The Yeast Metabolic Cycle: Insights into the Life of a Eukaryotic Cell. *Cold Spring Harbor Symp. Quant. Biol.* 72:1-5.

Tu, B.P., Mohler, R.E., Liu, J.C., Dombek, K.M., Young, E.T., Synovec, R.E. and McKnight, S.L. (2007). Cyclic Changes in Metabolic State During the Life of a Yeast Cell. *Proc. Natl. Acad. Sci.* 104:16886-16891.

Chen, Z. and McKnight, S.L. (2007). A Conserved DNA Damage Response Pathway Responsible for Coupling of the Cell Division Cycle to the Circadian and Metabolic Cycles. *Cell Cycle* 6:23:2906-2912.

Wang, J., Alexander, P., Wu, L., Hammer, R., Cleaver, O. and McKnight, S.L. (2009). Dependence of Mouse Embryonic Stem Cells on Threonine Catabolism. *Science* 325:435-439.

McKnight, S.L. (2009). Unconventional Wisdom (Editorial Essay). *Cell* 138:817-819.

Tu, B.P. and McKnight, S.L. (2009). Evidence of Carbon Monoxide-Mediated Phase Advancement of the Yeast Metabolic Cycle. *Proc. Nat. Acad. Sci.* 106:14293-14296.