

**CURRICULUM VITAE**

**NAME:** RICHARD W. KRIWACKI

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**ACADEMIC DEGREES:**

B. S.	1980	University of Connecticut, Storrs, CT (Chemistry)
M. S.	1986	University of Connecticut, Storrs, CT (Pharmaceutical Chemistry)
Ph. D.	1993	Yale University, New Haven, CT (Chemistry/Biophysics)

**PROFESSIONAL APPOINTMENTS:**

1982-89	Research Scientist, Analytical Chemistry, Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, Connecticut
1987-89	Research Affiliate, Chemistry, Yale University, New Haven, Connecticut
1989-93	Doctor of Philosophy, Chemistry, Yale university, New Haven, Connecticut
1994	Research Associate, Chemistry, Yale University, New Haven, Connecticut
1994-97	Research Associate, The Scripps Research Institute, La Jolla, California
1997 to 2003	Assistant Member, Department of Structural Biology, St. Jude Children's Research Hospital, Memphis, Tennessee
2003 to present	Associate Member, Department of Structural Biology, St. Jude Children's Research Hospital, Memphis, Tennessee
1998- to 2000	Adjunct Assistant Professor, Department of Biochemistry, The University of Tennessee, Memphis, Tennessee
2000 to 2005	Adjunct Assistant Professor, Department of Molecular Sciences, The University of Tennessee, Memphis, Tennessee
2005 to present	Adjunct Associate Professor, Department of Molecular Sciences, The University of Tennessee, Memphis, Tennessee

**PROFESSIONAL SOCIETY MEMBERSHIPS:**

American Association for the Advancement of Science  
American Association for Cancer Research  
American Chemical Society  
American Society for Biochemistry and Molecular Biology (ASBMB)  
Biophysical Society

**RESEARCH INTERESTS:**

Structural and biophysical studies of medically-relevant biological systems, focusing on molecular mechanisms of cancer and other human diseases. Specific areas of interest include proteins involved in regulation of cell division, apoptosis, and gene transcription. Research goals are to discover the physical basis for biomolecular function, often mediated by protein-protein interactions, using techniques that probe structure, dynamics and thermodynamics. A wide range of techniques are utilized, from low-resolution biophysical techniques (CD, fluorescence, ITC, SPR, AUC, and SAXS) to high-resolution structural techniques (NMR spectroscopy and X-ray crystallography).

**HONORS AND AWARDS:**

1989-90	NIH Biophysics Training Program Fellowship
1990-92	U.S. Department of Education Departmental Fellowship
1992-93	Yale University Teaching Fellowship
1994	National Cancer Institute Postdoctoral Fellowship
1994-97	Leukemia Society of America Postdoctoral Fellowship
1997	AACR---Hoffmann-LaRoche Inc. Young Investigator Award

**PUBLICATIONS:****Original Articles**

1. Makriyannis A, Fesik S, Kriwacki R. Nuclear magnetic resonance in drug research. Some new developments. *New Methods in Drug Research* **1**:19-43, 1985.
2. Kriwacki RW. Studies on the conformations of two cannabinoids and their interactions with model membranes using high-resolution NMR techniques. Master of Science, University of Connecticut, Storrs, Connecticut, 1986.
3. Carter C, Freter K, Kriwacki R, Leonard S, Pitner TP. Amidomethylation of indoles and cyclizations to spiro-(pyrrolo[4,3,2-deisoquinoline-3,4'-piperadines). *J Heterocyclic Chem* **24**:387-391, 1987.
4. Grozinger KG, Freter KR, Kriwacki RW. Amidomethylation of phenanthridines: synthesis and structure determination by <sup>1</sup>H NMR. *J Heterocyclic Chem* **25**:1701-1704, 1988.
5. Kriwacki RW, Makriyannis A. The conformational analysis of delta-nine- and delta-nine, eleven-THC in solution using high resolution NMR. *J Mol Pharmacol* **35**:495-503, 1989.
6. Kriwacki RW, Schultz SC, Steitz TA, Caradonna JP. Sequence-specific recognition of DNA by zinc-finger peptides derived from the transcription factor Sp1. *Proc Natl Acad Sci USA* **89**:9759-9763, 1992.
7. Grozinger KG, Kriwacki RW, Leonard CSF, Pitner TP. A novel stereoselective route to (S)-(+)-(fluoromethyl)histidine: -halomethylation of (2R,4A)-3-benzoyl-2-(1,1-dimethylethyl)-1-methyl-4-[(N-tritylimidazol-4'-yl) methyl]-1,3-imidazolidin-5-one. Synthesis and H-1 NMR spectroscopy. *J Org Chem* **58**:709-713, 1993.
8. Kriwacki RW, Hill RB, Flanagan JM, Caradonna JP, Prestegard JH. New NMR methods for the characterization of bound waters in macromolecules. *J Am Chem Soc* **115**:8907-8911, 1993.
9. Kriwacki RW. Biophysical studies of the three zinc finger domains of the transcription factor Sp1: DNA binding and conformational properties. Doctor of Philosophy. Yale University, New Haven, Connecticut, 1994.
10. Kriwacki RW, Wu J, Siuzdak G, Wright PE. Probing protein/protein interactions with mass spectrometry and isotopic labeling: analysis of the p21/Cdk2 complex. *J Am Chem Soc* **118**:5320-5321, 1996.
11. Kriwacki RW, Hengst L, Tennant L, Reed SI, Wright PE. Structural studies of p21<sup>Waf1/Cip1/Sdi1</sup> in the free and Cdk2-bound state: conformational disorder mediates binding diversity. *Proc Natl Acad Sci USA* **93**:11504-11509, 1996.
12. Narayan VA, Kriwacki RW, Caradonna JP. Solution structure determination of two zinc finger domains from the transcription factor Sp1: insights into sequence specific recognition of DNA. *J Biol Chem* **272**:7801-7809, 1997.
13. Kriwacki RW, Wu J, Tennant L, Wright PE, Siuzdak G. Probing protein structure using biochemical and biophysical methods: proteolysis, MALDI mass analysis, HPLC, and Gel-filtration chromatography of p21<sup>Waf1/Cip1/Sdi1</sup>. *J. Chromatography A* **777**:23-30, 1997.

14. Long JJ, Leresche A, Kriwacki RW, Gottesfeld JM. Repression of TFIID transcriptional activity and TFIID-associated cdk7 kinase activity at mitosis. *Mol & Cell Biol* **18**:1467-1476, 1998.
15. Kallen J, Welzenbach K, Ramage P, Geyl D, Kriwacki R, Legge G, Cottens S, Weitz-Schmidt G, Hommel U. Structural basis for LFA-12 inhibition upon lovastatin binding to the CD11a I-domain. *J Mol Biol* **292**:1-9, 1999.
16. Legge GB, Kriwacki RW, Chung J, Hommel U, Ramage P, Case DA, Dyson HJ, Wright PE. NMR solution structure of the inserted domain of human leukocyte function associated antigen-1. *J Mol Biol* **295**:1251-1264, 2000.
17. Weber JD, Kuo ML, Bothner B, DiGiammarino EL, Kriwacki RW, Roussel MF, Sherr CJ. Cooperative signals governing ARF-mdm2 interaction and nucleolar localization of the complex. *Mol Cell Biol* **20**:2517-2528, 2000.
18. Kriwacki RW, Legge GB, Hommel U, Ramage P, Chung J, Tennant LL, Wright PE, Dyson JH. Assignment of <sup>1</sup>H, <sup>13</sup>C, and <sup>15</sup>N resonances for the I-domain of human leukocyte function associated antigen-1. *J Biomol NMR* **16**:271-272, 2000.
19. DiGiammarino EL, Bothner B, Filippov I, Weber JD, Xiao L, Kriwacki RW. Solution structure of the p53 regulatory domain of the ARF tumor suppressor. *Biochemistry* **40**:2379-2386, 2001.
20. Li N, Zhang W, White SW, Kriwacki RW. Solution Structure of the Transcriptional Activation Domain of the Bacteriophage T4 Protein, MotA. *Biochemistry* **40**:4293-302, 2001.
21. Bothner B, Lewis W, DiGiammarino EL, Weber JD, Bothner S, and Kriwacki RW. Defining the Molecular Basis of Arf and Hdm2 Interactions. *Journal of Molecular Biology* **314**:263-277, 2001.
22. DiGiammarino EL, Lee A, Cadwell, C, Zhang W, Bothner B, Zambetti G, Ribeiro R, and Kriwacki RW. Evidence for a Novel Molecular Mechanism of Tumorigenesis: pH-Dependent Destabilization of the p53 Tetramer. *Nat. Struct. Biol.* **9**:12-16, 2002.
23. Jayawardene DS, Liu J, Zhang W, and Richard W. Kriwacki RW. Assignments of the <sup>1</sup>H, <sup>13</sup>C, and <sup>15</sup>N resonances of the winged helix domain of the proto-oncoprotein cQin (FoxG1B). *J. Biomol. NMR*, **23**:243-4, 2002.
24. Somerville L, Krynetski EY, Krynetskaia NF, Beger RD, Zhang W, Marhefka CA, Evans WE, Kriwacki RW. Structure of Thioguanine-modified Duplex DNA. *J. Biol. Chem.*, **278**:1005-11, 2003.
25. Lee AS, Galea C, DiGiammarino EL, Jun B, Murti G, Ribeiro RC, Zambetti G, Schultz CP, Kriwacki RW. Reversible Amyloid Formation by the p53 Tetramerization Domain and a Cancer-associated Mutant. *J. Mol. Biol.*, **327**:699-709, 2003.
26. Bothner B, Aubin Y, Kriwacki RW. Peptides derived from two dynamically disordered proteins self-assemble into amyloid-like fibrils. *J. Am. Chem. Soc.*, **125**:3200-3201 (2003).
27. Nishimoto SK, Waite JH, Nishimoto M, Kriwacki RW. Structure, Activity, and Distribution of Fish Osteocalcin. *J. Biol. Chem.*, **278**:11843-11848, 2003.
28. McKenzie PP, Danks MK, Kriwacki RW, and Harris LC. P21Waf1/Cip1 dysfunction in neuroblastoma: a novel mechanism of attenuating G0-G1 cell cycle arrest. *Cancer Research*, **63**:3840-4, 2003.
29. Lacy ER, Filippov I, Lewis WS, Otieno S, Xiao L, Weiss S, Hengst L, Kriwacki RW. p27 binds cyclin-CDK complexes through a sequential mechanism involving binding-induced protein folding. *Nat. Struct. Mol. Biol.*, **11**:358-64, 2004.
30. Lacy ER, Wang Y, Post J, Nourse A, Webb W, Mapelli M, Musacchio A, Siuzdak G, Kriwacki RW.

- Molecular Basis for the Specificity of p27 Toward Cyclin-dependent Kinases that Regulate Cell Division. *J. Mol. Biol.*, **349**:764-773, 2005. Epub 2005 Apr 26.
31. Luo R, Mann B, Lewis WS, Rowe A, Heath R, Stewart ML, Hamburger AE, Sivakolundu S, Lacy ER, Bjorkman PJ, Tuomanen E, Kriwacki RW. Solution structure of choline binding protein A, the major adhesin of *Streptococcus pneumoniae*. *EMBO J.*, **24**:34-43, 2005. Epub 2004 Dec 16.
  32. Luo R, Mann B, Tuomanen E, Kriwacki RW. NMR assignment of the R2 domain of pneumococcal choline binding protein A (CbpA). *J. Biomol. NMR.*, **32**:93, 2005.
  33. Sivakolundu SG, Bashford D, Kriwacki RW. Disordered p27<sup>Kip1</sup> Exhibits Intrinsic Structure Resembling the Cdk2/cyclin A-bound Conformation. *J. Mol. Biol.*, **353**:1118, 2005.
  34. Wang Y, Filippov I, Richter C, Luo R, Kriwacki RW. Solution NMR Studies of an Intrinsically Unstructured Protein within a Dilute, 75 kDa Eukaryotic Protein Assembly; Probing the Practical Limits for Efficiently Assigning Polypeptide Backbone Resonances. *ChemBioChem.*, **6**:2242, 2005.
  35. Galea C, Bowman P, Kriwacki RW. Disruption of an inter-monomer salt bridge in the p53 tetramerization domain results in an increased propensity to form amyloid fibrils. *Protein Science*, **14**:2993, 2005 [Note: cover article].
  36. Bowman P, Galea C, Lacy E, Kriwacki RW. Thermodynamic Characterization of Interactions between p27<sup>Kip1</sup> and Activated and Non-activated Cdk2; Intrinsically Unstructured Proteins as Thermodynamic Tethers. *Biochimica Biophysica Acta*, **1764**:182, 2005.
  37. West AN, Ribeiro RC, Jenkins J, Rodriguez-Galindo C, Figueiredo BC, Kriwacki R, and Zambetti GP. Identification of a Novel Germ Line Variant Hotspot Mutant p53-R175L in Pediatric Adrenal Cortical Carcinoma. *Cancer Res.*, **66**:5056, 2006.
  38. Jordan JB, Kovacs H, Wang Y, Mobli M, Luo R, Anklin C, Hoch JC, Kriwacki RW. 3D <sup>13</sup>C-detected CH<sub>3</sub>-TOCSY using selectively protonated proteins: Facile methyl resonance assignment and protein structure determination. *J. Amer. Chem. Soc.*, **128**:9119, 2006.
  39. Ribeiro RC, Rodriguez-Galindo C, Figueiredo BC, Kriwacki R, and Zambetti GP. Letter to the Editor: Germline TP53 R337H mutation is not sufficient to determine Li-Fraumeni or Li-Fraumeni-like syndrome. In press, *Cancer Letters*, **247**:353, 2007.
  40. Galea CA, Pagala V, Obenauer JC, Park C, Slaughter CA, Kriwacki RW. Proteomic Studies of the Intrinsically Unstructured Mammalian Proteome. *J. Proteome Res.*, **5**:2839, 2006.
  41. Grimmer M, Wang Y, Mund T, Cilensek Z, Keidel EM, Waddell MB, Jakel H, Kullmann M, Kriwacki RW, Hengst L. Cdk-inhibitory activity and stability of p27<sup>Kip1</sup> are directly regulated by oncogenic tyrosine kinases. *Cell*, **128**:269, 2007.
  42. Zhan J, Easton JB, Huang S, Mishra A, Xiao L, Lacy ER, Kriwacki RW, Houghton PJ. Negative regulation of ASK1 by p21<sup>Cip1</sup> involves a small domain that includes Serine 98 that is phosphorylated by ASK1 in vivo. *Mol. Cell Biol.*, **27**:3530, 2007.
  43. Pham TC, Kriwacki RW, Parrill AL. Peptide design and structural characterization of a GPCR loop mimetic. *Biopolymers*, **86**:298, 2007.
  44. Kerr ID, Sivakolundu S, Li Z, Buchsbaum JC, Knox LA, Kriwacki R, White SW. Crystallographic and NMR analyses of UvsW and UvsW.1 from bacteriophage T4. *J Biol Chem.*, **282**:34392, 2007.
  45. Galea CA, Nourse A, Wang Y, Sivakolundu SG, Heller WT, Kriwacki RW. Role of intrinsic flexibility in signal transduction mediated by the cell cycle regulator, p27<sup>Kip1</sup>. *J Mol Biol.*, **376**:827, 2008. Note: Featured in "News and Views" piece in *Nat. Chem. Biol.*, **4**:229 (2008).

46. Sivakolundu, SG, Nourse A, Moshiach S, Bothner B, Ashley C, Satumba J, Lahti J, Kriwacki RW. Intrinsically Unstructured Domains of Arf and Hdm2 Form Bi-molecular Oligomeric Structures In Vitro and In Vivo. *J Mol Biol.*, **384**:240 (2008). Epub 2008 Sep 16.
47. Galea CA, High AA, Obenauer JC, Mishra A, Park CG, Punta M, Schlessinger A, Ma J, Rost B, Slaughter CA, Kriwacki RW. Large-Scale Analysis of Thermostable, Mammalian Proteins Provides Insights into the Intrinsically Disordered Proteome. *J. Proteome Res.*, **8**:211 (2009). 2008 Dec 9. [Epub ahead of print]
48. Teichert A, Arnold LA, Otieno S, Oda Y, Augustinaite I, Geistlinger TR, Kriwacki RW, Guy RK, Bikle DD. Quantification of the vitamin D receptor-coregulator interaction. *Biochemistry*, **48**:1454 (2009).
49. Chipuk JE, Fisher JC, Dillon CP, Kriwacki RW, Kuwana T, Green DR. Mechanism of apoptosis induction by inhibition of the anti-apoptotic BCL-2 proteins. *Proc Natl Acad Sci U S A.*, **105**:20327 (2008). Epub 2008 Dec 12.
50. Fisher JC, Chipuk JE, Yun MK, Revington M, White SW, Green DR, Kriwacki RW. PUMA-induced dimerization of BCL-xL provides the mechanistic basis for PUMA-specific release of cytoplasmic p53 from BCL-XL. Under review, *Nature*.
51. Lwin TZ, Galea CA, Xiao L, Kriwacki RW, Bashford D. Quantitative analysis of the ionic network stabilizing the oligomerization domain of p53. Submitted, reviewed and under revision for *J. Mol. Biol.*

#### Review Articles

1. Kriwacki RW, Pitner TP. Current aspects of practical 2D NMR spectroscopy: application to structure elucidation. *J Pharm Res* **6**:531-554, 1989.
2. Kriwacki RW, Siuzdak G. Combined use of proteases and mass spectrometry in structural biology. *J. Biomolecular Technology* **5**:5-15, 1998.
3. Kriwacki RW, Siuzdak G. *Protein and Peptide Analysis; Advances in the Use of Mass Spectrometry*, ed. Chapman JR. Humana Press, Inc., New York, 1998.
4. Galea CA, Wang Y, Sivakolundu S, Kriwacki RW. Regulation of Cell Division by Intrinsically Unstructured Proteins; Intrinsic Flexibility, Modularity and Signaling Conduits, Invited "Current Topics" review, *Biochemistry*, **47**:7598 (2008). Identified as an "Editor-selected Paper in Cell Biology".
5. Dunker AK and Kriwacki RW. Disordered Proteins in Biology. Invited review for *Scientific American*, Submitted, August, 2009.

#### INVITED LECTURES:

1. Kriwacki RW. Practical aspects of 2D NMR spectroscopy in organic chemistry. Presented as a two day workshop to the Department of Medicinal Chemistry, School of Pharmacy, the University of Connecticut, Storrs, CT, May, 1989.
2. Kriwacki RW, Hengst L, Tennant L, Reed SI, Wright PE. Structural determinants in Cdk2 inhibition by p21<sup>wf1/cip1</sup>. Presented at the "Cancer" Gordon Conference, Newport, RI, August, 1995.
3. Kriwacki RW. Is protein structure a prerequisite for function: the special case of cyclin-dependent kinase inhibitors. Presented to The Department of Molecular and Cellular Biology, the University of Arizona, Tucson, AZ, October, 1996.
4. Kriwacki RW. Is protein structure a prerequisite for function?. Presented to The Department of Biochemistry, University of Illinois, Urbana-Champaign, IL, December, 1996; The Center for Advanced Research in Biotechnology, Rockville, MD, December, 1996; The Department of Chemistry, Texas A & M University, College Station, TX, January, 1997; The Department of Structural Biology, St. Jude Children's Research Hospital, Memphis, TN, January 1997; The Department of Biochemistry, Duke University,

- Durham, NC, January, 1997; The Department of Chemistry, Pennsylvania State University, State College, PA, January, 1997; The Department of Chemistry and Biochemistry, Notre Dame University, West Bend, IN, January, 1997; The Department of Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, PA, January, 1997; The Department of Chemistry, University of Chicago, Chicago, IL, February, 1997; and the Department of Biochemistry, University of Utah, Salk Lake City, UT, February, 1997.
5. Kriwacki RW, Wright PE. Understanding the inhibitory specificity of the Cdk inhibitor p21. American Association for Cancer Research 1997 Annual Meeting, April 12-16, 1997, San Diego, CA. AACR--Hoffmann-LaRoche Inc. Young Investigator Award lecture.
  6. Kriwacki RW. Mass spectrometry in protein structural studies. Presented to the Beckman Center for Chemical Sciences, The Scripps Research Institute, San Diego, CA, June, 1997.
  7. Kriwacki RW. Is protein structure required for function? Department of Biochemistry, University of Tennessee, Memphis, December, 1997.
  8. Kriwacki RW. Understanding the Qin oncogene 'molecular switch' using NMR spectroscopy. XVIIIth International Conference on Magnetic Resonance in Biological Systems, Tokyo, Japan, August 1998.
  9. Kriwacki RW. Structural determinants in p21 function. Department of Chemistry, University of Mississippi, Oxford, MS, October 1998.
  10. Kriwacki RW. First year research overview. St. Jude Children's Research Hospital, Memphis, TN, December 1998.
  11. Kriwacki RW. Structural studies of cyclin-dependent kinase inhibitors: Dynamics and flexibility are the story. Southeast Regional American Chemical Society Meeting, Knoxville, Tennessee, October, 1999.
  12. Kriwacki RW. Structural studies of cyclin-dependent kinase inhibitors: Dynamics and flexibility are the story. Tennessee Academy of Sciences Annual Society Meeting, Memphis, Tennessee, November, 1999.
  13. Kriwacki RW. Structural Determinants of Cdk Inhibitor Function: Dynamics and Flexibility are the Story. Pfizer, Inc., Ann Arbor, MI, October 6, 2000.
  14. Kriwacki, RW. *2001 lectures*. Mechanisms of Cell Cycle Control: Cyclins, Cycle-Dependent Kinases, and Their Regulators, Cancer Forum Series, St. Jude Children's Research Hospital, Memphis, TN, March 19; Probing the Molecular Mechanisms of Oncogene and Tumor Suppressor Function, Department of Chemistry and Biochemistry, University of Memphis, Memphis, Tennessee, April 20; The Molecular Basis of Disease: Ideas for Novel Anticancer Therapies from Studies of Tumor Suppressors, Eastern Analytical Symposium, Atlantic City, New Jersey, September 30-October 3; Using NMR To Understand How Cells Regulate the Division Cycle. Vanderbilt Biomolecular NMR Symposium, Nashville, Tennessee, October 6, 2001.
  15. Kriwacki, RW. *2002 lectures*. Figueiredo, B, Ribeiro, R, Zambetti, G, Kriwacki, RW., Understanding Childhood Adrenal Cortical Carcinoma: Insights from Structural Studies, Director's Rounds, St. Jude Children's Research Hospital, Memphis, Tennessee, January 25; p53 Mutation And Adrenal Cortical Carcinoma; New Insights From Structural Studies. International Agency for Research on Cancer, Lyon, France, February 13; Pushing the Limits of NMR: Solution Studies of Protein Complexes that Regulate Cell Division, ESRF User's Meeting, Grenoble, France, February 14; Structural Polymorphism Amongst Tumor Suppressor Proteins: Examples from the p53/Arf Pathway, Max Planck Institute of Biochemistry, München, Germany, February 26; Laboratory for Structural Biology and Genomics, IGBMC, Strasbourg, France, March 1; and Division of Protein Structure National Institute for Medical Research London, England, March 4; Structural Polymorphism Amongst Tumor Suppressor Proteins: Examples from the p53/Arf Pathway, Medical University of South Carolina, Charleston, South Carolina, May 14; Protein Disorder in Cell Cycle Regulation, Protein Society Meeting, San Diego, California, August 18; Structural Polymorphism Amongst Tumor Suppressor Proteins, Department of Chemistry, University of Memphis, Memphis, Tennessee, September 20; Department of Biochemistry, Indiana University, Bloomington, Indiana, Nov. 1; Department of Chemistry and Biochemistry, University of California, San Diego, San Diego, California, Nov. 7; Faculty Lecture Series, St. Jude Children's Research Hospital, Memphis, Tennessee, November 11; Department of

- Biochemistry, University of Alabama-Birmingham, Birmingham, Alabama, Nov. 18.
16. Kriwacki, RW. *2003 lectures*. Solution NMR Studies of Cell Cycle Regulatory Complexes, Frontiers of NMR in Molecular Biology VIII, Taos, New Mexico, February 6; Structural Polymorphism Amongst Tumor Suppressor Proteins; School of Molecular Biosciences, Washington State University, Pullman, WA, April 3; School of Biological Sciences, University of Missouri, Kansas City, MO, April 10; Department of Biology, Johns Hopkins University, April 17; First Houston High Field NMR Symposium Structure Solution to Biological Systems, University of Houston, Houston, TX, May 17. Flexibility and Dynamics in Biomolecular Recognition; Protein/Protein and Protein/DNA Interactions, University of Alabama—Huntsville BIOMolecular NMR Workshop, Huntsville, Alabama, May 2; Orderly Disorder in Tumor Suppressor Function (and Dysfunction), Department of Biochemistry, Wake Forest University School of Medicine, Chapel-Hill, NC, September 30; Orderly Disorder in Tumor Suppressor Function (and Dysfunction), Department of Physiology, University of Tennessee Health Science Center, Memphis, TN, October 23; Structural Polymorphism Amongst Tumor Suppressor Proteins, School of Biosciences, University of Nottingham, Nottingham, UK, December 9.
  17. Kriwacki, RW. *2004 lectures*. Protein Flexibility and Biomolecular Recognition; Examples from Disease-related Structural Studies, Department of Biochemistry and Molecular Biology, Southern Illinois University, Carbondale, IL, April 2; Protein Flexibility and Stability; Relationships to Function, St. Jude Molecular Oncology Program Weekly Seminar, April 12; p27 Binds Cyclin/Cyclin-dependent Kinase Complexes via a Sequential Mechanism Involving Binding-induced Protein Folding, Atlanta Microcalorimetry Symposium, Emory Conference Center, Atlanta, GA, May 17; The Role of p27 and Cyclin-dependent Kinases in Cell Cycle Regulation and Cancer, II International Symposium on Molecular Genetics, Environment and Epidemiology of Cancer, Curitiba, PR, Brazil, July 30; Protein Disorder in Tumor Suppressor Function and Dysfunction; The Cases of p21, p27 and p53, Laboratory of Structural Genomics Biophysics Institute Carlos Chagas Filho, Federal University of Rio de Janeiro, August 6.
  18. Kriwacki, RW. *2005 lectures*. The Role of Structural Biology in Discovering the Molecular Basis of Disease: An Introduction Through Two Examples, ALSAC DTSJ Society Donor Appreciation Luncheon, March 3; Protein Disorder and Biological Function; What Does “Disorder” Really Mean and What Does It Do? Indiana University School of Medicine, Department of Biochemistry and Molecular Biology, April 7; Diverse Functions of Floppy Proteins; Insights into How Some Tumor Suppressors Work, Department of Biochemistry, Vanderbilt University, November 21.
  19. Kriwacki, RW. *2006 lectures*. Biomolecular Calisthenics; The Role of Protein Flexibility in Cell Cycle Regulation, St. Jude Biomedical Research Forum, March 27; Diverse Functions of Floppy Proteins; Insights into How Some Tumor Suppressor Proteins Work, Biophysics Seminar Series, Northwestern University, Evanston, IL, April 3; Co-Chair of Minisymposium entitled Mechanisms of Cell Growth Control and DNA Repair AACR Annual Meeting, Washington, DC, April 5; Modulating p27 function through phosphorylation; Intrinsic protein disorder enables a two-step oncogenic mechanism leading to destruction, Annual Great Lakes Region ACS Meeting, Milwaukee, WI, June 1; The Role of Intrinsic Flexibility in Tumor Suppressor Protein Function, Biocenter - Medizinische Universität Innsbruck, July 6; Centre National de la Recherche Scientifique (CNRS), Architecture et Fonction des Macromolécules Biologiques, UMR 6098 CNRS et Université Aix-Marseille I et II, ESIL, Campus de Luminy, Marseille, France, July 19; Centre National de la Recherche Scientifique (CNRS), Institut de Pharmacologie Moléculaire et Cellulaire, Valbonne, France, July 19; “Un”-structure/Function Relationships of Proteins, Department of Biochemistry and Molecular Biology, The University of Chicago, November 1.
  20. Kriwacki, RW. *2007 lectures*. The Roles of Intrinsically Unstructured Proteins (IUPs) in Cell Cycle Regulation and Tumorigenesis, Department of Molecular Sciences, University of Tennessee Health Science Center, Memphis, Tennessee, February 5; The Roles of IDPs in Cell Cycle Regulation and Tumorigenesis, 1st Annual Meeting of the IDP Subgroup, Biophysical Society Annual Meeting, Baltimore, Maryland, March 3 (Co-founder of IDP Subgroup, Co-organizer of 1<sup>st</sup> Annual Meeting); The Roles of Intrinsically Unstructured Proteins (IUPs) in Cell Cycle Regulation and Tumorigenesis, Laboratory of Biochemistry and Molecular Biology (LBMB). Center for Cancer Research, National Cancer Institute, NIH, March 5; Keynote speaker: The Roles of Intrinsically Unstructured Proteins (IUPs) in Cell Cycle Regulation and Tumorigenesis, Virginia Tech Structural Biology Symposium, Blacksburg, Virginia, March 23; Intrinsically Unstructured Proteins as Tumor Suppressors, Department of Chemistry and Biochemistry, Southern Illinois University,

Carbondale, April 13; p14Arf and Hdm2 Form Bi-molecular, Native Amyloids; Relevance to p53 Tumor Suppression, EMBO-IUP meeting, CEU Conference Center, Budapest, Hungary, March 20-25; The Ever Expanding Role of Intrinsically Unstructured Proteins (IUPs) in Biology and Disease, Tennessee Structural Biology Symposium, Murfreesboro, Tennessee, June 21-23.

21. Kriwacki, RW. *2008 lectures*. Flexibility and Modularity in Signaling Mediated by Intrinsically Unstructured Proteins (IUPs), Biomolecular Interactions and Methods Gordon Research Conference, Ventura, California, January 15; p27Kip1: Phosphorylation, Degradation and Cancer, Director's Rounds, St. Jude Children's Research Hospital, March 7; Flexibility and Modularity in Signaling Mediated by Intrinsically Unstructured Proteins (IUPs), Department of Biochemistry and Biophysics, Oregon State University, Corvallis Oregon, April 4; Disorder-function Relationships for Cyclin-Dependent Kinase Inhibitors at International Workshop on Intrinsically disordered proteins and associated pathologies: prediction, characterization and function, Saint-Raphael, France, May 19-20; How PUMA Attacks Its Prey: Understanding the Molecular Basis of PUMA-Induced Cell Death, Tennessee Structural Biology Symposium, Vanderbilt University, Nashville, Tennessee, June 20; How Flexible Proteins Regulate Cell Division and Apoptosis; Arf, p27 and PUMA, Departments of Molecular & Cellular Biology, Pharmacology and Biochemistry, University of Iowa, Iowa City, Iowa, October 9; How Intrinsically Disordered Proteins Regulate Cell Division and Apoptosis; p27 and PUMA, Chinese Academy of Sciences, Institute of Organic Chemistry, October 27, National Institute of Biological Sciences (NIBS), Beijing, China, November 4, 2008, Chinese National NMR Center, Beijing, China, November 5, 2008.
22. Kriwacki, RW. *2009 lectures*. Regulation of Cell Division and Apoptosis by Intrinsically Disordered Proteins, Department of Biochemistry, Weill Cornell Medical College, New York, New York, March 19. A Structural-Based Mechanism For PUMA-Mediated Release of Cytosolic p53 From BCL-xL, Cancer Center Director's Rounds, Molecular Oncology Program, June 5. Regulation of Cell Division and Apoptosis by Intrinsically Disordered Proteins, Department of Biochemistry, Kansas State University, October 14. Flexibility and Modularity in Protein Function, Current Trends in Microcalorimetry and Biacore Symposium 2009, sponsored by GE Healthcare, Baltimore, MD, October 19-21, and Southeast Regional Meeting of the American Chemical Society, Vanderbilt University, Nashville, TN, November 6-8.

#### MEETING ORGANIZATION:

1. Co-organizer (with Jie Zheng) of the Southeast Regional American Chemical Society Meeting, Memphis, TN, November 3, 2005. Organized sessions entitled, "NMR Spectroscopy and Structural Biology", and "NMR Applications in Metabonomics and Metabolomics".
2. Co-Chair of Minisymposium entitled "Mechanisms of Cell Growth Control and DNA Repair", 2006 AACR Annual Meeting, Washington, DC, April 5, 2006.
3. Co-Organizer of and speaker at the 1<sup>st</sup> Annual Meeting of the Intrinsically Disordered Protein (IDP) Subgroup, Biophysical Society Annual Meeting, Baltimore, MD, March 3, 2007 (Co-founder of IDP Subgroup, Chair, 2008-2009).
4. Co-organizer and co-chair of a symposium entitled, "Protein Modularity and Flexibility in Signal Transduction," at the 2009 Annual Biophysical Society Meeting in Boston, Massachusetts, March 1, 2009.

#### PRESENTATIONS:

1. Kriwacki RW, Schultz SC, Steitz TA, Caradonna JP. DNA binding properties of the Sp1 zinc fingers. Presented at the "Topics in Gene Transcription" Keystone Conference, Copper Mountain Resort, CO, April, 1992.
2. Kriwacki RW, Hill RB, Flanagan J, Caradonna JP, Prestegard JH. New NMR methods for the characterization of water/macromolecule interactions. Presented at the "Frontiers of NMR in Molecular Biology", Keystone Conference, Taos, NM, March, 1993.



3. Kriwacki RW, Hengst L, Reed SI, Tennant L, Wright PE. Structural determinants in Cdk2 inhibition by p21<sup>waf1/cip1</sup>. Presented at the "Histopathobiology of Neoplasia", A.A.C.R. Cancer Workshop, Keystone, CO, July, 1995.
4. Kriwacki RW, Hengst L, Reed SI, Tennant L, Wright PE. Structural determinants in Cdk2 inhibition by p21<sup>waf1/cip1</sup>. Presented at the Leukemia Society of America Annual Medical Symposium, Pittsburgh, PA, October, 1995.
5. Kriwacki RW, Wu J, Siuzdak G, Wright PE. Probing/protein/protein interactions with mass spectrometry and isopic labeling: analysis of the p21/Cdk2 complex. Presented at the Leukemia Society of America Annual Medical Symposium, La Jolla, CA, November, 1996.
6. Kriwacki RW, Wright PE. Structural insights into p21-cyclin/Cdk interactions: therapeutic leads towards selective induction of apoptosis in DNA damaged cells. Presented at the "Apoptosis" Keystone Conference, Tamarron, CO, February, 1997.
7. Kriwacki RW. New approaches to probing protein/protein interactions using mass spectrometry and isotope labeling. Beckman Symposium entitled Solution Interactions of Macromolecules, Galveston, TX, November, 1997.
8. Li N, Zhang W, Kriwacki RW, and White SW. "Structural Studies of the bacteriophage T4 transcription factor MotNF domain by NMR". 40<sup>th</sup> Experimental NMR Conference, April, 2000, Monterey, CA.
9. Kriwacki RW, Filippov I, Veazie C, and Xiao L. "Structural Disorder is Important for Biological Function: Studies of the Cyclin-dependent Kinase Inhibitors p21 and p27." 19<sup>th</sup> Annual International Conference on Magnetic Resonance in Biological Systems, August, 2000, Florence, Italy.
10. Kriwacki RW, DiGiammarino EL, Bothner B, Filippov I and Weber JD. "Solution Structure of the p53 Regulatory Domain of the p19<sup>Arf</sup> Tumor Suppressor Protein". Keystone Symposium entitled "Frontiers of NMR in Molecular Biology", January 20-26, 2001, Big Sky, Montana.
11. Somerville L, Krynetski EY, Krynetskaia NF, Beger R, Zhang W, Evans WE, and Kriwacki RW. "Structural Analysis of Thioguanine-modified DNA". Keystone Symposium entitled "Frontiers of NMR in Molecular Biology", January 20-26, 2001, Big Sky, Montana.
12. Jayawardene DS, Stewart ML, Liu J, Pabst D, Zhang W, and Kriwacki RW. Understanding the Qin Molecular Switch: NMR studies of the Qin Winged-helix Domain. Keystone Symposium entitled "Frontiers of NMR in Molecular Biology", January 20-26, 2001, Big Sky, Montana.
13. Bothner B, Lewis W, DiGiammarino EL, Weber JD, Bothner SJ, and Kriwacki RW. Molecular Mechanism of Arf-Hdm2 Interactions. Frontiers in Structural Biology, Keystone Symposium, Breckenridge, Colorado, January 6-11, 2002.
14. Luo R-S, Mann B, Health R, Tuomanen E, and Kriwacki RW. Structural Studies Of Pneumococcal Proteins Involved In Pathogenesis. St. Jude/PIDS Pediatric Microbial Research Conference, Memphis, Tennessee, Feb. 21-23, 2002.
15. Jayawardene DS, Stewart ML, Lacy ER, Zhang W, and Kriwacki RW. Understanding the Qin Molecular Switch: NMR studies of the Qin Winged-helix Domain. Gordon Conference entitled "Biopolymers", Newport, RI, June 16-21, 2002.
16. Lacy ER, Filippov I, Xiao L, and Kriwacki RW. Calorimetric studies of the interaction of the cyclin dependent kinase inhibitor p27 with cyclin A and cyclin-dependent kinase 2. European Conference on Current Trends in Microcalorimetry, Dublin, Ireland, August 27-30, 2002.
17. Luo R-S, Mann B, Health R, Tuomanen E, and Kriwacki RW. NMR Structural Studies Of Pneumococcal Proteins Involved In Pathogenesis, XXth ICMRBS Conference, Toronto, Canada, August 25-30, 2002.

18. Kriwacki R, Luo R, Mann B, Lewis WS, Rowe A, Heath R, Stewart ML, and Tuomanen E, Structural Basis of Pneumococcal Adhesion and Invasion, Iglar NMR Tage Biomolecular NMR Conference, February 26-27, Innsbruck, Austria.
19. Kriwacki R, Luo R, Mann B, Lewis WS, Rowe A, Heath R, Stewart ML, and Tuomanen E, Solution Structure of Choline Binding Protein A of *Streptococcus pneumoniae* Reveals a Novel Mode of Interaction with Its Human Receptor, pIgR, Keystone Structural Biology Symposium, Snowbird, Utah, April 13-19, 2004.
20. Galea CA, Lee AS, Zhang W, Ribeiro RC, Zambetti G and Kriwacki RW, Characterization of amyloid-like fibrils formed by the p53 tetramerization domain, Keystone Structural Biology Symposium, Snowbird, Utah, April 13-19, 2004.
21. Wang Y, Filippov I, Xaio L, Richter C, Kriwacki RW, NMR Studies of p21 Bound to Cdk2/Cyclin A, a 75 kDa Ternary Complex, Keystone Structural Biology Symposium, Snowbird, Utah, April 13-19, 2004.
22. Lacy ER, Filippov I, Otieno S, Xiao L, Lewis WS, Kriwacki RW, Structural and Thermodynamic Studies of p27 and its Complexes: Understanding p27 Functional and Binding Diversity, Keystone Structural Biology Symposium, Snowbird, Utah, April 13-19, 2004.
23. Bowman P, Kriwacki RW, p27 Interaction with Phospho-Cdk2 and Cyclin A, POE Student Symposium, SJCRH, August, 2004.
24. Luo R, Mann B, Lewis WS, Rowe A, Heath R, Stewart ML, Sivakolundu S, Lacy E, Tuomanen E, Kriwacki RW, Solution Structure of Choline Binding Protein A of *Streptococcus pneumoniae* Reveals a Novel Mode of Interaction with Its Human Receptor, pIgR, International Society of Magnetic Resonance Meeting, Ponte Vedra Beach, Florida, October, 2004.
25. Wang Y, Kriwacki RW, p21 Structure, Dynamics and Function; Insights into Binding Diversity, New Insights into Small-molecule Cdk Inhibitor Function; Results from NMR Competition Experiments; Molecular Oncology Weekly Meeting, SJCRH, October 24, 2004.
26. Galea CA, Kriwacki RW, p53 Fibrils and Disease, St. Jude/Vanderbilt Structural Biology Meeting, SJCRH, Memphis, Tennessee, September 15, 2004.
27. Wang Y, Kriwacki RW, NMR Studies of p21 Bound to Cdk2/Cyclin A, a Dilute, 75 kDa Eukaryotic Protein Assembly, St. Jude/Vanderbilt Structural Biology Meeting, SJCRH, Memphis, Tennessee, September 15, 2004.
28. Satumba J, Nourse A, Bothner B, Kriwacki RW, Structural Insights into Interactions of the Arf Tumor Suppressor Protein with Nucleophosmin, ASBMB Annual Meeting, San Diego, California, April, 2005.
29. Sivakolundu S, Bashford D, Kriwacki RW, Structure and Dynamics of Natively Disordered Free p27, ASBMB Annual Meeting, San Diego, California, April, 2005.
30. Hilliard RW, Kriwacki RW, Structural Studies of the N-terminal Region of Choline Binding Protein A, the Major Adhesin of *Streptococcus Pneumoniae*, Tennessee Academy of Science Collegiate Division, Western Regional Meeting, Christian Brothers University, March 19, 2005.
31. Kriwacki RW, Luo R, Mann B, Lewis WS, Rowe A, Heath R, Stewart ML, Hamburger AE, Sivakolundu S, Lacy ER, Bjorkman PJ, Tuomanen E, Solution Structure of Choline Binding Protein A, the Major Adhesin of *Streptococcus pneumoniae*, Keystone Symposium – Frontiers of NMR in Molecular Biology IX, Banff Center, Banff, Alberta, Canada, January 29 - February 4, 2005.
32. Otieno S, Kriwacki RW, Probing the Role of Residual Structure in Protein Function; p27<sup>Kip1</sup> as a Regulator of Cell Division, Current Trends in Microcalorimetry Meeting, Boston, Massachusetts, July 27-30, 2005.

33. Hilliard RW, Kriwacki RW, Structural Studies of the N-terminal Region of Choline Binding Protein A, the Major Adhesin of *Streptococcus Pneumoniae*, Rhodes College Undergraduate Research & Creative Activity Symposium (URCAS), April 29, 2005. Awarded 1<sup>st</sup> prize in student competition.
34. Sivakolundu SG, Nourse A, Kriwacki RW, Structural Insights into the Interaction of p14Arf and Hdm2, National American Chemical Society Meeting, Atlanta, Georgia, March 25-30, 2006.
35. WangY, Hengst L, Waddell B, Kriwacki RW, Modulating p27 Function Through Phosphorylation; A Two-step Oncogenic Mechanism Leading to Destruction, Biophysical Society Meeting, Salt Lake City, Utah, February 18-22, 2006.
36. Otieno S, Kriwacki RW, Probing the Role of Nascent Helicity in Protein Function; p27Kip1 as a Regulator of Cell Division, Protein Society Meeting, San Diego, California, August 5-9, 2006.
37. Hilliard RW, Kriwacki RW, Understanding the Molecular Basis of Pneumococcal Adhesion, Invasion and Mechanism of Pathogenesis in Humans, Structural Biology Keystone Meeting, Keystone, Colorado, January29-February 3, 2006.
38. Jordan JB, Wang Y, Mobli M, Kovacs H, Anklin C, Hoch JC, Kriwacki RW, <sup>13</sup>C-detected CH<sub>3</sub>-TOCSY Using Selectively Protonated Proteins: Facile Resonance Assignment and Structure Determination, Structural Biology Keystone Meeting, Keystone, Colorado, January29-February 3, 2006.
39. WangY, Hengst L, Waddell B, Kriwacki RW, Modulating p27 Function Through Phosphorylation; A Two-step Mechanism Leading to Destruction, Structural Biology Keystone Meeting, Keystone, Colorado, January29-February 3, 2006.
40. Otieno S, Kriwacki RW, Probing the Role of Nascent Helicity in Protein Function; p27Kip1 as a Regulator of Cell Division, Protein Society Meeting, San Diego, California, August 5-9, 2006.
41. Galea C, Kriwacki RW, Proteomic Studies of Intrinsically Unstructured Proteins, Tennessee Structural Biology Symposium, Knoxville, Tennessee, September 29-30, 2006.
42. Hilliard RW, Kriwacki RW, Tuomanen EI, Mann B, Understanding the Molecular Basis Of Pneumococcal Adhesion, Invasion and Mechanisms of Pathogenesis In Humans, Tennessee Structural Biology Symposium, Knoxville, Tennessee, September 29-30, 2006.
43. Galea C, Kriwacki RW, Invited talk: Proteomic studies of the intrinsically unstructured mammalian proteome, 39<sup>th</sup> Symposium on the Interface of Computing Science and Statistics: Systems Biology, Philadelphia, Pennsylvania, May 23-26, 2007.
44. Sivakolundu S, Nourse A, Kriwacki RW, Insights into the Structure of the p14Arf-Hdm2 Complex, NMR Keystone Meeting, Salt Lake City, January 6-10, 2007.
45. Otieno S, Kriwacki RW, Invited talk: Insights into the Relationship of Structure, Dynamics and Function in Intrinsically Unstructured Proteins; p27kip1 as a Regulator of the Cell Cycle, New England Science Symposium, Harvard Medical School, Boston, Massachusetts, March 2, 2007.
46. Lwin T-ZW, Galea G, Kriwacki R, Bashford D, An Ionic Network Stabilizes the p53 Tetramerization Domain, 234th ACS National Meeting, Boston, Massachusetts, August 19-23, 2007.
47. Fisher JC, Chipuk J, Green DR, Kriwacki RW, How PUMA Attacks Its Prey: Understanding the Molecular Basis Of PUMA-Induced Apoptosis, Biophysical Society Meeting, Long Beach, California, February 2-5, 2008. *This poster won a student travel award and the top poster prize in the Intrinsically Disordered Protein category.*
48. Fisher JC, Chipuk J, Green DR, Kriwacki RW, How PUMA Attacks Its Prey: Understanding the Molecular Basis Of PUMA-Induced Apoptosis, Apoptosis Keystone Meeting, Breckenridge, Colorado, February 7-12, 2008. *This poster won a student travel award.*

49. Revington R, Fisher JC, Galea C, Nourse A, Park C-G, Kriwacki R , Structural and dynamic studies of the BCL-x1/PUMA complex; Insights into the mechanism of p53-mediated apoptosis, Computational Aspects of Biomolecular NMR Gordon Research Conference, Il Ciocco, Italy, May 18-23, 2008.
50. Podgorski M, Philpott C, Nourse N, Kriwacki R, White S, Zuo J, Dynamic Conformational Features of Prestin's C-terminus, Association for Research in Otolaryngology Mid-Winter Meeting, Phoenix, Arizona, February 16-21, 2008.
51. Ou L, Xiao L, Kriwacki RW, Biochemical and Biophysical Characterization of Interactions Between p27 and Cdk4/cyclin D, Protein Society Meeting, San Diego, California, August, 2008.
52. Otieno S, Kriwacki RW, The Role of Intrinsic Helicity in p27Kip1 Function as a Cdk Inhibitor, Protein Society Meeting, San Diego, California, August, 2008.
53. Fisher JC, Chipuk J, Yun M-K, White SW, Green DR, Kriwacki RW, A Structural-Based Mechanism for PUMA-Mediated Release of Cytoplasmic p53 From BCL-xL, International p53 Workshop, Shanghai, China, October 27-31, 2008.
54. Lwin TZ, Galea CA, Xiao L, Kriwacki RW, Bashford D, An Ionic Network Stabilizes the Tetramerization Domain of p53; Implications regarding Evolutionary Robustness, International p53 Workshop, Shanghai, China, October 27-31, 2008.
55. Wang Y, Assem M, Sublet J, Xiao L, Russell M, Kriwacki RW, Structural and Dynamic Basis of the Diverse Activities of the Cell Cycle Regulator, p21Cip1, International p53 Workshop, Shanghai, China, October 27-31, 2008.
56. Fisher JC, Chipuk JE, Yun MK, White SW, Green DR, Kriwacki RW. A Structural-Based Mechanism For PUMA-Mediated Release Of Cytosolic p53 From BCL-xL. Apoptosis Keystone Symposium, Whistler, BC, Canada, March 22-27, 2009.

#### **AD HOC MANUSCRIPT REVIEW:**

*Biochemistry*  
*Bioessays*  
*Bioorganic and Medicinal Chemistry*  
*Biophysical Journal*  
*Cancer Cell*  
*Cell Biochemistry and Biophysics*  
*Cell Death and Differentiation*  
*ChemBioChem*  
*ChemMedChem*  
*Chemistry and Biology*  
*EMBO Journal*  
*FEBS Journal*  
*Journal of Biomolecular NMR*  
*Journal of Mass Spectrometry*  
*Journal of Medicinal Chemistry*  
*Journal of Molecular Biology*  
*Journal of Proteome Research*  
*Journal of Structural Biology*  
*Journal of the American Chemical Society*  
*Molecular Cell*  
*Molecular and Cellular Biology*  
*Nature*  
*Nature Chemical Biology*  
*Nature Structural & Molecular Biology*  
*Nature Protocols*

*Nucleic Acids Research*  
*Oncogene*  
*PLoS Computational Biology*  
*Proceedings of the National Academy of Sciences*  
*Proteins*  
*Protein Science*  
*Review of Scientific Instruments*  
*Science*  
*Structure*  
*Trends in Biochemical Sciences*