Joseph E. Wedekind, Ph.D.

Professor

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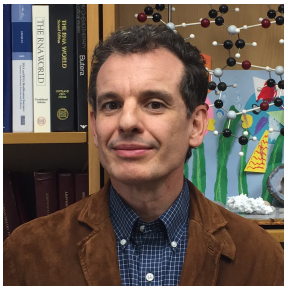

EDUCATION

Ph.D., Biochemistry 1995 (Structural Enzymology)
University of Wisconsin, Madison

B.S. Biochemistry 1990
University of California, Riverside

EXPERIENCE

2002 – present
Department of Biochemistry & Biophysics, University of Rochester, New York
Professor (2014 – present), Associate Professor (2006 – 2014, tenured 2010), Assistant Professor (2002-2006)

1999 – 2002
Department of Biochemistry & Molecular Biology, Rosalind Franklin University, Illinois
Assistant Professor

1995-1999
Department of Structural Biology, Stanford University, California
Post-Doctoral Research Fellow (Prof. David B. McKay)

1990-1995
Institute for Enzyme Research, University of Wisconsin at Madison
Graduate Research Assistant (Advisor: Prof. Ivan Rayment; co-advisor: Prof. Perry A Frey)

1988-1990
Department of Biochemistry, University of California at Riverside
Undergraduate Research Assistant (Prof. Alexander McPherson Jr.)

1989
Department of Pathology, University of Southern California, Los Angeles
Edmondson Summer Research Fellow (Prof. Alan Epstein)

1986-1989
United States Department of Agriculture and Department of Entomology, Riverside, California
Federal Work Study Program (Prof. Dan Gonzalez)

HONORS

05,'10,'15, '19	Teaching Award in Biophysics, University of Rochester
2012-13	Excellence in Research Award, University of Rochester Medical Center Faculty
1996-99	Burroughs Wellcome Fund Fellow of the Life Sciences Research Foundation
1995	Dean's Fellow, Stanford University School of Medicine
1992-95	NIH Biophysics Training Grant T32, U.W. Madison
1990	B.S., *Magna Cum Laude*, 3.80 GPA, U.C. Riverside (top 2% of class)
1990	Elected to *Phi Beta Kappa,* Iota Chapter of California
1986-90	Dean's List, Pell Grant, Cal Grant A

SERVICE

2019-2022	*Member*, Strategic Advisory Committee, University of Rochester

2018-22 *Seated Member*, MSFB Study Section, NIH Center for Scientific Review
2017-19 *Elected Secretary*, Medical Faculty Council, University of Rochester
2013-present *Scientific Advisory Board*, Functional Proteomics Core, University of Rochester
2011-16 *Editorial Board Member*, Journal of Biological Chemistry
2010-present *Founder & Co-Director*, Struct. Biol. & Biophys. Facility, University of Rochester
2008-10 *Elected Secretary*, Board of Directors, The Pittsburgh Diffraction Society

ONGOING RESEARCH SUPPORT

R01 AI150463 Wedekind (PI) 08/01/17 – 07/31/21
NIH/NIAID
Cyclic Peptide Inhibitors of HIV-1 Proliferation
Goals: The goal of this project is to develop novel constrained peptides that target HIV-1 TAR based on our library of lab-evolved TAR Binding Proteins (TBPs). The novel co-crystal structure of TAR in complex with variant TBP6.7 suggests a minimal lab-evolved β2-β3 peptide is sufficient for binding. We will optimize this peptide, followed by testing for anti-viral activity. We will also work to identify other novel peptides that bind TAR based on our TBP library. The results should provide new compounds that block viral infectivity, leading to a functional cure.
Role: PI

R01 GM63162 Wedekind (PI) 07/01/17 – 06/30/21
NIH/NIGMS
Mechanisms of Action of Non-Coding RNA Molecules
Goals: The major goal of this project is to elucidate riboswitch signal-transduction pathways for the family of translational preQ$_1$ riboswitches. We will use: (*i*) crystallography and calorimetry to characterize on-path mutants, (*ii*) an innovative live-cell chemical modification analysis coupled to a GFP reporter assay, and (*iii*) single-molecule kinetic analysis of RNA transient structure (SiM-KARTS) to probe Shine-Dalgarno sequence accessibility. The results will reveal unprecedented structure-function relationships that integrate atomic-resolution structural and biophysical information with effector-mediated RNA conformational changes in live cells.
Role: PI

3R01GM063162-15S1 Wedekind (PI) 09/01/19 – 08/31/20
NIH/NIGMS
Mechanisms of Action of Non-Coding RNA Molecules
Goals: This equipment supplement was awarded to support the acquisition of a Sorvall LYNX 6000 superspeed centrifuge with six accompanying carbon fiber and titanium rotors.
Role: PI

T32AI049815 Wedekind (PI) 07/01/11 – 06/30/21
NIH/NIAID
Training in HIV Replication and Pathogenesis
Major Goal: This program seeks to train predoctoral students for careers as outstanding research scientists in the field of HIV/AIDS.
Role: PI

PUBLICATIONS
78 Total (71 manuscripts + 7 book chapters https://www.urmc.rochester.edu/people/23504899-joseph-e-wedekind/publications)
h-index = 34; i10 = 61 (https://scholar.google.com/citations?user=-FWrFpoAAAAJ&hl=en)

Selected Publications
SS Chavali, R Bonn-Breach, JE Wedekind* (2019) Face-time with TAR: Portraits of an HIV-1 RNA with diverse modes of effector recognition relevant for drug discovery. *J. Biol. Chem.* **294**, 9326-9341. [featured in JBC Reviews roundup].

IA Belashov, DW Crawford, CE Cavender, P Dai, PC Beardslee, DH Mathews, BL Pentelute, BR McNaughton, JE Wedekind* (2018) Structure of HIV TAR in complex with a Lab-Evolved RRM provides insight into duplex RNA recognition and synthesis of a constrained peptide that impairs transcription. *Nucl. Acids Res.* **46**, 6401-6415. [*Breakthrough article & cover*].

JA Liberman, KC Suddala, A Aytenfisu, D Chan, IA Belashov, M Salim, DH Mathews, RC Spitale, NG Walter, JE Wedekind* (2015) Structural analysis of a class III preQ$_1$ riboswitch reveals an aptamer distant from a ribosome-binding site regulated by fast dynamics. *Proc. Nat'l Acad. Sci.* **112**, E3485-E3494. [*PNAS Plus manuscript*]

JA Liberman, M Salim, J Krucinska, JE Wedekind* (2013) Structure of a class II preQ$_1$ riboswitch reveals ligand recognition by a new fold. *Nat. Chem. Biol*. **9**, 353-355. [*cover art*]

M Guo, RC Spitale, R Volpini, J Krucinska, G Cristalli, PR Carey, JE Wedekind* (2009) Direct Raman Measurement of an Elevated Base pK_a in the Active Site of a Small Ribozyme in a Precatalytic Conformation. *J. Am. Chem. Soc*. **131**, 12908-12909 [*C&E News Highlight*].

JE Wedekind*, R Gillilan, A Janda, J Krucinska, JD Salter, RP Bennett, J Raina, HC Smith (2006) Nanostructures of APOBEC3G support a hierarchical assembly model of high molecular mass ribonucleoprotein particles from dimeric subunits. *J. Biol. Chem*. **281**, 38122-38126. [*accelerated publication*].

AK Ghosh, PR Sridhar, S Leshchenko, AK Hussain, J Li, AY Kovalevsky, DE Walters, JE Wedekind, V Grum-Tokars, D Das, Y Koh, K Maeda, H Gatanaga, IT Weber, H Mitsuya (2006) Structure-based design of novel HIV-1 protease inhibitors to combat drug resistance. *J. Med. Chem*. **49**, 5252-5261.

K Xie, MP Sowden, GSC Dance, AT Torelli, HC Smith, JE Wedekind* (2004) The structure of a yeast RNA-editing deaminase provides insight into the fold and function of activation-induced deaminase and APOBEC-1. *Proc. Nat'l Acad. Sci.* **101**, 8114-8119.

JE Wedekind, DB McKay (1999) Crystal structure of a lead-dependent ribozyme revealing metal binding sites relevant to catalysis. *Nat. Struct. Molec Biol*. **6**, 261-268. [*commentary by E. Westhof*].

PC Babbitt, MS Hasson, JE Wedekind, DRJ Palmer, WC Barrett, GH Reed, I Rayment, G D Ringe, GL Kenyon, JA Gerlt (1996) The enolase superfamily: a general strategy for enzyme-catalyzed abstraction of the α-protons of carboxylic acids. *Biochemistry* **35**, 16489-16501.

JE Wedekind, PA Frey, I Rayment (1996) The Structure of Nucleotidylated Histidine-166 of Galactose-1-phosphate Uridylyltransferase Provides Insight into Phosphoryl Group Transfer, *Biochemistry* **35**, 11560-11569.