

CURRICULUM VITAE

V. Ramakrishnan

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Education

1971	B.Sc.	Baroda University, India	Physics
1976	Ph.D.	Ohio University	Physics
1976-78	Graduate Student	University of California, San Diego	Biology

Experience

1978-82 Postdoctoral Fellow, Department of Chemistry, Yale University.

1983-95 Biology Department, Brookhaven National Laboratory: Assistant Biophysicist, 1983-85; Associate Biophysicist, 1985-88; Biophysicist, 1988-90; Biophysicist with tenure, 1990-94; Senior Biophysicist with tenure, 1994-95.

1995-99 Professor, Biochemistry Department, University of Utah. Member, Graduate Programs in Molecular Biology and Biological Chemistry

1999- MRC Laboratory of Molecular Biology, Cambridge, England.
Group Leader, 1999 - ; Joint Head, Structural Studies Division, 2006-

2008- Fellow, Trinity College, Cambridge.

Awards and Honors:

Guggenheim Fellowship, 1991-92
Member of EMBO (elected 2002)
Fellow of the Royal Society (elected 2003)
Member, National Academy of Sciences, USA (elected 2004)
Louis Jeantet Prize for Medicine, 2007
Datta Medal and Lecture, FEBS annual meeting, Vienna 2007
Heatley Medal, British Biochemical Society, 2008
Foreign Member, Indian National Science Academy (elected 2008)
Fellow, Trinity College, Cambridge (elected 2008)

Special lectures include:

Stetten Lecture, NIH, 2000
Dorcas Cummings Lecture, 60th Cold Spring Harbor Symposium on “The Ribosome,” 2001
Alkis Seraphim Lecture, Cambridge University, 2001
Joseph Black Lecture, Glasgow University, 2001
Mill Hill Lecture, NIMR, 2001
Randall Lecture, Kings College, 2001
Dahlem Lecture, Max Planck Institute, Berlin, 2001
Zurich Chemical Society Lecture, 2001
G.N. Ramachandran Memorial Lecture, India, 2002
Weissbach Lecture, Rockefeller University, 2002
EMBL Distinguished Visitor Lecture, 2002
Max Perutz Memorial Lecture, British Crystallography Association, York, 2003
Skirball Symposium on Molecular Machines, New York, 2003
EMBO Lecture, Symposium on Recognition, Heidelberg, 2003
Linné Lecture, Uppsala University, 2004
BSA Distinguished Lecture, Brookhaven National Laboratory, 2004
Kathleen Kendrick Memorial Lecture, Ohio State University, 2005
Marker Lectures, Pennsylvania State University, 2008
Simpson Lecture, SUNY Stony Brook, 2008
Dintzis Lecture, Johns Hopkins University (*to be given Feb 2009*)
Mendel Lecture, Brno, Czech Republic (*to be given May 2009*)

Other Professional Activities:

Reviewer for most major scientific journals (currently on editorial board of *Cell* and *PNAS*)
Reviewer in the past for NIH and NSF grants or study sections
Member, Scientific Advisory Committee of EMBL (2002-2006)
Member, Scientific Advisory Committee of IMP, Vienna (2008-)
Member, Scientific Advisory Board of Rib-X Pharmaceuticals

Research Interests:

Current interest: Structure and function of ribosomes. Action of antibiotics on ribosomes.
Past interests: Chromatin structure. X-ray crystallography, especially the use of anomalous scattering and MAD. Neutron scattering.

PUBLICATIONS

Weixlbaumer, A., Jin, H., Neubauer, C., Voorhees, R.M., Petry, S., Kelley, A.C., and Ramakrishnan, V. (2008). Insights into translational termination from the structure of RF2 bound to the ribosome. *Science* **322**, 953-956.

- Ramakrishnan, V. (2008). What we have learned from ribosome structures. (The Heatley Medal Lecture). *Biochem Soc Trans* **36**, 567-74.
- Weixlbaumer A, Petry S, Dunham CM, Selmer M, Kelley AC, Ramakrishnan V (2007). Crystal structure of the ribosome recycling factor bound to the ribosome. *Nat. Struct. Mol. Biol.* **14**, 733-737.
- Weixlbaumer, A., Murphy, F. V. 4th., Dziergowska, A., Malkiewicz, A., Vendeix, F. A., Agris, P. F., and Ramakrishnan, V. (2007). Mechanism for expanding the decoding capacity of transfer RNAs by modification of uridines. *Nat. Struct. Mol. Biol.* **14**, 498-502.
- Passmore, L. A., Schmeing, T. M., Maag, D., Applefield, D. J., Acker, M. G., Algire, M. A., Lorsch, J. R., and Ramakrishnan, V. (2007). The eukaryotic translation initiation factors eIF1 and eIF1A induce an open conformation of the 40S ribosome. *Mol Cell* **26**, 41-50.
- Dunham, C. M., Selmer, M., Phelps, S. S., Kelley, A. C., Suzuki, T., Joseph, S., and Ramakrishnan, V. (2007). Structures of tRNAs with an expanded anticodon loop in the decoding center of the 30S ribosomal subunit. *RNA* **13**, 817-823.
- Selmer, M., Dunham, C.M., Murphy, F.V. IV, Weixlbaumer, A., Petry, S., Kelley, A.C., Weir, J.R. and Ramakrishnan, V. (2006). Structure of the 70S ribosome complexed with mRNA and tRNA. *Science* **313**, 1935-1942.
- Petry, S., Brodersen, D.E, Murphy, F.V. IV, Dunham, C.M., Selmer, M., Tarry, M.J., Kelley, A.C., and Ramakrishnan, V. (2005). Crystal structures of the ribosome in complex with release factors RF1 and RF2 bound to a cognate stop codon. *Cell* **123**, 1255–1266.
- Ogle, J.M. and Ramakrishnan, V. (2005). Structural insights into translational fidelity. *Ann. Rev. Biochem.* **74**, 129-177.
- Murphy, F.V. IV and Ramakrishnan, V. (2004). Structure of a purine-purine wobble base pair in the decoding center of the ribosome. *Nat. Struct. Mol. Biol.* **11**, 1251-1252.
- Murphy, F.V. IV, Ramakrishnan, V., Malkiewicz, A. and Agris, P.F. (2004). The role of modifications in codon discrimination by tRNA^{Lys}^{UUU}. *Nat. Struct. Mol. Biol.* **11**, 1186-1191
- Ogle, J.M., Carter, A.P. and Ramakrishnan, V. (2003). Insights into the decoding mechanism from recent ribosome structures. *Trends Bioch. Sci.* **28**, 259-266.
- Valle, M., Gillet, R., Kaur, S., Henne, A., Ramakrishnan, V. and Frank, J. (2003). Visualizing tmRNA entry into a stalled ribosome. *Science* **300**, 127-30.
- Ogle, J.M., Murphy, F.V. IV, Tarry, M.J. and Ramakrishnan V. (2002). Selection of tRNA by the ribosome requires a transition from an open to a closed form. *Cell* **111**, 721-732.

- Ramakrishnan, V. (2002) Ribosome structure and the mechanism of translation. *Cell* **108**, 557-572.
- Brodersen, D. E., Clemons W. M. Jr., Carter, A. P., Wimberly, B. T., and Ramakrishnan, V. (2002). Crystal structure of the 30S ribosomal subunit from *Thermus thermophilus*. Proteins of the 30S subunit and their interactions with 16S RNA. *J. Mol. Biol.* **316**, 723 - 766.
- Brodersen, D.E., Carter, A.P., Clemons, W.M. Jr., Morgan-Warren, R. J., Murphy F.V. IV, Ogle, J. M., Tarry, M. J., Wimberly, B.T. and Ramakrishnan, V. (2001). Atomic structures of the 30S subunit and its complexes with ligands and antibiotics. *Cold Spring Harbor Symp. Quant. Biol.* **66**, 17-32.
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- Ramakrishnan, V. and Moore, P.B. (2001). Atomic structures at last: the ribosome in 2000. *Curr. Opin. Struct. Biol.* **11**, 144-154.
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- Brodersen, D.E., Clemons, W.M., Jr., Carter, A.P., Morgan-Warren, R.J., Wimberly, B.T. and Ramakrishnan, V. (2000). The structural basis for the action of the antibiotics tetracycline, pactamycin and hygromycin B on the 30S ribosomal subunit. *Cell* **103**, 1143-1154 (2000).
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Ramakrishnan, V., Capel, M.S., Clemons, W.M. Jr., May, J.L.C., and Wimberly, B.T. (2000). Progress towards the crystal structure of a bacterial 30S ribosomal subunit. In *The Ribosome. Structure, Function, Antibiotics and Cellular Interactions* (Garrett, R.A., Douthwaite, S.R., Liljas, A., Matheson, A.T., Moore, P.B. and Noller H.F., eds), ASM Press, Washington D.C.

White, S.W., Clemons, W.M., Davies, C., Ramakrishnan, V. and Wimberly, B.T. (2000). Structure of bacterial ribosomal proteins: High resolution probes of the architecture and mechanism of the ribosome. In *The Ribosome. Structure, Function, Antibiotics and Cellular Interactions* (Garrett, R.A., Douthwaite, S.R., Liljas, A., Matheson, A.T., Moore, P.B. and Noller H.F., eds), ASM Press, Washington D.C.

Clemons, W. M. Jr., May, J. L. C., Wimberly, B. T., McCutcheon, J. P., Capel, M. S., and Ramakrishnan, V. (1999). Structure of a bacterial 30S ribosomal subunit at 5.5 Å resolution. *Nature* **400**, 833-840.

Wimberly, B.T., Guymon, R., McCutcheon, J.P., White, S.W. and Ramakrishnan, V. (1999). A detailed view of a ribosomal active site: the structure of the L11-RNA complex. *Cell* **97**, 491-502.

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Clemons, W.M. Jr., Gowda, K., Black, S.D., Zwieb, C. and Ramakrishnan, V. (1999) Crystal Structure of the Conserved Subdomain of Human Protein SRP54M at 2.1 Å Resolution: Evidence for the Mechanism of Signal Peptide Binding. *J. Mol. Biol.* **292**, 697-705.

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Dutnall R.N., Tafrov S.T., Sternglanz, R., Ramakrishnan, V. (1999). Structure of the yeast histone acetyltransferase Hat1: insights into substrate specificity and implications for the Gcn5-related N-acetyltransferase superfamily. *Cold Spring Harb Symp Quant Biol* **63**, 501-507.

Ramakrishnan, V. and White, S.W. (1998). Ribosomal protein structures: insights into the architecture, machinery and evolution of the ribosome. *Trends Biochem Sci.* **23**, 208-212.

Dutnall, R.N., Tafrov, S.T., Sternglanz, R. and Ramakrishnan, V. (1998). Crystal structure of the yeast histone acetyltransferase Hat1. *Cell* **94**, 427-438.

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the N-terminal helix in the structure of ribosomal protein S15. *Structure* **6**, 429-438.

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Ramakrishnan, V. and Biou, V. (1997). Treatment of multiwavelength anomalous diffraction data as a special case of multiple isomorphous replacement. *Meth. Enzymol.* **276**, 538-557.

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Ramakrishnan, V., Davies, C., Gerchman, S.E., Golden, B.L., Hoffmann, D.W., Jaishree, T.N., Kycia, J.H., Porter, S. and White, S.W. (1995). Structures of Prokaryotic Ribosomal Proteins: Implications for RNA-Binding and Evolution *Biochem. Cell Biol.* **73**, 979-986. (invited symposium paper).

Kycia, J.H., Biou, V., Shu, F., Gerchman, S.E., Graziano, V. and Ramakrishnan, V. (1995). Prokaryotic translation initiation factor IF3 is an elongated protein consisting of two crystallizable domains. *Biochemistry* **34**, 6183-6187.

Davies, C., Gerchman, S.E., Kycia, J.H., McGee, K., Ramakrishnan, V. and White, S.W. (1994). Crystallization and preliminary X-ray diffraction studies of bacterial ribosomal protein L14. *Acta Cryst D* **50**, 790-792.

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Hoffmann, D.W., Davies, C., Gerchman, S.E., Kycia, J.H., Porter, S.J., White, S.W. and Ramakrishnan, V. (1994). Prokaryotic ribosomal protein L9: A bi-lobed RNA binding protein. *EMBO J.* **13**, 205-212.

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Cerf, C., Lippens, G., Muyldermans, S., Segers, A., Ramakrishnan, V., Wodak, S.J., Hallenga, K. and Wyns, L. (1993). Homo- and heteronuclear 2D NMR studies of the globular domain of H1: Sequential assignment and secondary structure. *Biochemistry* **32**, 11345-11351.

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Ramakrishnan, V., Gerchman, S.E., Golden, B.L., Hoffmann, D.W., Kycia, J.H., Porter, S.J. and White, S.W. (1993). Structural studies on prokaryotic ribosomal proteins. In *The Translational Apparatus* (eds. K. Nierhaus, F. Franceschi, A.R. Subramanian, V.A. Erdmann, and B. Wittmann-Liebold), pp 533-544, Plenum Press, New York.

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Mangel, W.F., Lin, B. and Ramakrishnan, V. (1991). Conformation of one- and two-chain high molecular weight urokinase by small-angle neutron scattering and vacuum ultraviolet circular dichroism. *J. Biol. Chem.* **266**, 9408-9412.

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