

CURRICULUM VITAE

Robert C. Angerer

Education:

- 1973-1977 Postdoctoral Fellow, Division of Biology, California Institute of Technology, Pasadena, California
- 1973 Ph.D., Department of Biology, The Johns Hopkins University, Baltimore, Maryland
- 1966 B.S., Biological Sciences, The Ohio State University, Columbus, Ohio

Honors:

Phi Beta Kappa
 B.Sc. *summa cum laude* and with distinction in Zoology
 Dean's list (12/13 quarters)
 Phi Eta Sigma (freshman men's honorary)
 Sigma Xi
 President's Scholarship Award 1963-1966
 NSF Undergraduate Research Program (12/64-8/65)
 NIH Predoctoral Fellowship (8/70-12/72)
 American Cancer Society Postdoctoral Fellow (7/73-7/75)
 American Cancer Society (California Division) Postdoctoral Fellow (7/75-7/77)
 Edward Peck Curtis Award for Excellence in Undergraduate Teaching (1983)
 NIH Research Career Development Award (8/84-7/89)
 Goergen Award for Curriculum Development (to the 1994 College Curriculum Committee) (1997)

Research and Professional Experience:

- 10/04-Present Scientific Director, Division of Intramural Research, National Institute of Dental and Craniofacial Research, National Institutes of Health
- 7/97-6/03 Chair, Biology Department, University of Rochester
- 1/91-8/04 Professor of Pediatrics in Hematology and Oncology
- 7/89-8/04 Professor, Biology Department, University of Rochester
- 7/84-7/89 Associate Professor (tenured), Biology Department, University of Rochester
- 1/78-6/84 Assistant Professor, Biology Department, University of Rochester

- 6/75-12/77 American Cancer Society (California Division) Postdoctoral Fellow, Division of Biology, California Institute of Technology (Dr. Eric H. Davidson, sponsor)
- 6/73-6/75 American Cancer Society Postdoctoral Fellow, Division of Biology, California Institute of Technology (Dr. Roy J. Britten, sponsor)
- 9/67-6/73 Predoctoral Student (NIH Predoctoral Fellow 8/70-12/72) Department of Biology, The Johns Hopkins University (Dr. Kirby D. Smith, sponsor)
- 1967 (summer) Trainee, Fertilization and Gamete Physiology Training Program, Marine Biological Laboratory, Woods Hole, Massachusetts

Professional Activities:

- Grant review panels: National Institute of Aging Molecular Neurobiology, *ad hoc* review panel (6/84). Guest member, Molecular Biology Study Section, NIH (10/82; 6/85; 6/90). NCI *ad hoc* site visit committee, Dr. Paul Ts'o, Johns Hopkins University School of Medicine (4/7-9/86, 3/1-3/89). NIH-NICHD special review committee for an RFA on pre-implantation development (7/21-22/86). Special reviewer, NIH Molecular Cytology study section (10/9-11/86). Permanent member, Mol. Biol. Study Section, NIH 9/91--6/94. NIH Reviewer reserve (6/94-). External reviewer of grants: NSF, USDA, NIMH, NIH-MBY DOE, North Carolina Biotechnology Center, U.S.-Israel Binational Science Foundation, Natural Sciences and Engineering Research Council of Canada. NIH Site visit Review, 1 P01 HD37105-01; California Institute of Technology 8/16-17, 1998. NIH CBY-1 Study Section, *ad hoc* reviewer 2/2-3/99. NIH CDF-4 Study Section, *ad hoc* reviewer 2/2/00. NHGRI Special emphasis panel, 11/8-9/01 and 11/7-8/02 (review of center grants)
- Editorial Board, CRC Year Book of Developmental Biology, 1990-92.
- Reviewer of manuscripts: Science, Radiation Research, Cell, Developmental Biology, Molecular and Cellular Biology, Proc. Natl. Acad. Sci. (USA), J. Cell Biol., Nucleic Acids Res., Biophysical J., Laboratory Investigations, J. Histochem. and Cytochem., Development, Analytical Biochemistry, Neurobiology of Aging, J. Cell Sci., Mol. Repro. Devel., Arch. Biochem. Biophys., Roux's Archivs of Developmental Biology, Amer. J. Pathology, Biotechniques, Mol. Cell. Biol., BioEssays, Biotechniques, DNA and Cell Biol., Gene, Experimental Cell Research, J. Biological Chemistry, Comp. Biochem. and Physiol. Mechanisms of Development, Development, Developmental Cell
- External reviewer, Biology Department, College of Staten Island (5/6/87).
- Symposia: Co-organizer (with L. Angerer) of Symposium on use of in situ hybridization to study gene expression at the cellular level. Eighth International Congress of Histochemistry and Cytochemistry, Washington D.C. (8/29-9/2, 1988). Chairman, Session on "Lineages", Symposium on the Developmental Biology of the Sea Urchin Embryo - V. Woods Hole, MA, (8/29-9/2, 1988). Co-organizer (with D. Epel), Symposium on the Developmental Biology of the Sea Urchin Embryo - VI. Asilomar, CA, (1/90) Co-organizer (with L. Angerer, L. Jaffe and J. Rast) Developmental Biology of the Sea Urchin Embryo XV) Woods Hole, MA, 9/24-28/03).
- Invited participant: Workshop on Developing Guidelines for Choosing New Genomic Sequencing Targets, National Human Genome Research Institute, 7/9-10/01
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Publications:

1. **Angerer, R.C.** An analysis of the repeated DNA sequences transcribing RNA in mouse liver. Ph.D. thesis, The Johns Hopkins University, Baltimore, MD (1973).
 - 2*. Davidson, E.H., Galau, G.A., **Angerer, R.C.** and Britten, R.J. Comparative aspects of DNA organization in metazoa. *Chromosoma* 51:253-259 (1975).
 - 3*. **Angerer, R.C.**, Davidson, E.H. and Britten, R.J. DNA sequence organization in the mollusc, *Aplysia californica*. *Cell* 6:29-39 (1975).
 - 4*. **Angerer, R.C.**, Davidson, E.H. and Britten, R.J. Single copy DNA and structural gene sequence relationships among four sea urchin species. *Chromosoma* 56:213-266 (1976).
 5. Davidson, E.H., Klein, W.H., Smith, M.J., Galau, G.A., Crain, W.R. **Angerer, R.C.**, Wold, B.J., Davis, M.M. and Britten, R.J. In *Organization and Expression of the Eukaryotic Genome*. Tehran Symposium in Molecular Biology, 2-6 May, 1976. University of Tehran, Iran.
 6. **Angerer, R.C.** and Hough-Evans, B.R. Sequence organization of eukaryotic DNA. In *Receptors and Hormone Action*, Vol. I. B.W. O'Malley and L. Birnbaumer (eds.), Academic Press (1977).
 7. **Angerer, R.C.**, Crain, W.R., Galau, G.A., Klein, W.H., Davis, M.M. Wold, B.J., Britten, R.J., and Davidson, E.H. Sequence organization and structural gene expression in animals. In *Molecular Biology of the Mammalian Genetic Apparatus*, Part A, P. Ts'o, ed. (1977).
 - 8*. Lev, Z., Thomas, T.L., Lee, A.S., **Angerer, R.C.** Britten, R.J. and Davidson, E.H. Developmental expression of two cloned sequences coding for rare sea urchin embryo messages. *Dev. Biol.* 76:322-340 (1980).
 - 9*. Venezky, D.L., Angerer, L.M. and **Angerer, R.C.** Accumulation of histone repeat transcripts in the sea urchin egg pronucleus. *Cell* 24:385-391 (1981).
 - 10*. Angerer, L.M. and **Angerer, R.C.** Detection of poly A⁺ RNA in sea urchin eggs and embryos by quantitative *in situ* hybridization. *Nucl. Acids Res.* 9:2819-2840 (1981).
 - 11*. Calzone, F.J., **Angerer, R.C.** and Gorovsky, M.A. Regulation of protein synthesis in *Tetrahymena*: isolation and characterization of polysomes by gel filtration and precipitation at pH 5.3. *Nucl. Acids Res.* 10:2145-2161 (1982).
 - 12*. Calzone, F.J., **Angerer, R.C.** and Gorovsky, M.A. Regulation of protein synthesis in *Tetrahymena*: Quantitative estimates of the parameters determining the rates of protein synthesis in growing, starved and starved-deciliated cells. *J. Biol. Chem.* 258:6887-6898 (1983).
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- 13*. Calzone, F.J., Gorovsky, M.A. and **Angerer, R.C.** Regulation of protein synthesis in *Tetrahymena*: RNA sequence sets of growing and starved cells, *J. Biol. Chem.* 258:6899-6905 (1983).
 - 14*. Lynn, D.A., Angerer, L.M. Bruskin, A.M., Klein, W.H. and **Angerer, R.C.** Localization of a family of mRNAs in a single cell type and its precursors in sea urchin embryos. *Proc. Natl. Acad. Sci., U.S.A.* 80:2656-2660 (1983).
 15. **Angerer, R.C.** and Angerer, L.A. RNA localization in sea urchin embryos. In *Time, Space and Pattern*, W. J. Jeffrey and R. A. Raff, eds., Alan R. Liss Inc., New York (1983).
 16. Angerer, L.M., Cox, K.H., DeLeon, D.V. and **Angerer, R.C.** Spatial aspects of histone gene expression in sea urchin embryos. In *Histone Genes and Histone Gene Expression*, G. Stein, J. Stein and W. Marzluff, eds. John Wiley and Sons, Inc., New York (1984).
 - 17*. DeLeon, D.V., Cox, K.H., Angerer, L.M. and **Angerer, R.C.** Most early variant histone mRNA is contained in the pronucleus of sea urchin eggs. *Dev. Biol.* 100:197-206 (1983).
 18. **Angerer, R.C.**, Cox, K.H., DeLeon, D.V., Lynn, D.A. and Angerer, L.M. mRNA distribution in sea urchin embryos. In *Molecular Aspects of Early Development*, G. Malacinski and W. Klein, eds., Plenum Publishing Company, New York, pp. 87-107 (1984).
 - 19*. Cox, K.H., DeLeon, D.V., **Angerer, R.C.** Detection of mRNAs in sea urchin embryos by in situ hybridization using asymmetric RNA probes. *Dev. Biol.* 101:485-502 (1984).
 - 20*. Angerer, L.M., DeLeon, D.V., **Angerer, R.C.**, Showman, R.M., Wells, D.E. and Raff, R.A. Delayed accumulation of maternal histone mRNA during sea urchin oogenesis. *Dev. Biol.* 101:477-484 (1984).
 - 21*. **Angerer, R.C.** and Davidson, E.H. Molecular indices of cell lineage specification in the sea urchin embryo. *Science* 226:1153-1160 (1984).
 22. **Angerer, R.C.**, Cox, K.H. and Angerer, L.M. In situ hybridization to cellular RNAs. *Genetic Engineering*, vol. 7, pp. 43-65 (1985).
 - 23*. Angerer, L.M. DeLeon, D.V., Maxson, R., Kedes, L.H. Kaumeyer, J., Weinberg, E., and **Angerer, R.C.** Simultaneous expression of early and late histone genes in individual cells of developing sea urchin embryos. *Dev. Biol.*, 112:157-166 (1985).
 - 24*. Lee, J.J., Calzone, F.J., Britten, R.J., **Angerer, R.C.** and Davidson, E.H. Activation of sea urchin actin genes during embryogenesis: Measurement of transcript accumulation from five different genes. *J. Mol. Biol.* 188:173-183 (1986).
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 - 26*. Angerer, L.M., Kawczynski, G., Wilkinson, D., Nemer, M. and **Angerer, R.C.** Spatial patterns of expression of metallothionein mRNA in sea urchin embryos. *Dev. Biol.* 116:543-547 (1986)
 - 27*. Stoler, M.H., Eskin, T.A., Benn, S., **Angerer, R.C.** and Angerer, L.M. Human T Lymphotropic virus infection of the central nervous system: A preliminary in situ analysis. *J. Amer. Med. Assoc.* 256:2360-2364 (1986).
 28. Angerer, L.M., Stoler, M.H. and **Angerer, R.C.** *In situ* hybridization with RNA probes - An annotated recipe. In *In situ Hybridization-Applications to Neurobiology*, K.L. Valentino, J.H. Eberwine and J.D. Barchas, eds., Oxford Press, pp 42-71 (1987).
 - 29*. Nash, M.A., Kozak, S.W., Angerer, L.M., **Angerer, R.C.**, Schatten, H., Schatten, G. and Marzluff, W.F. Maternal and embryonic U1RNAs are spatially segregated in sea urchin embryos. *J. Cell. Biol.* 104:1133-1142 (1987).
 30. Angerer, L.M., Cox, K.H. and **Angerer, R.C.** Identification of tissue-specific gene expression by in situ hybridization. In "*Methods in Enzymology, Guide to Molecular Cloning Techniques.*" S. Berger and A. Kimmel, eds, Academic Press, Inc. New York, vol. 152, pp 649-661 (1987).
 - 31*. Eldon, E.D., Angerer, L.M., **Angerer, R.C.** and Klein, W.H. Spec 3: Embryonic expression of a sea urchin gene whose product is involved in ectodermal ciliogenesis. *Genes Devel.* 1:1280-1292 (1988).
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 - 33*. Hardin, P.E., Angerer, L.M., Hardin, S.H., **Angerer, R.C.** and Klein, W.H. The Spec2 genes of *Strongylocentrotus purpuratus*: Structure and differential expression in embryonic aboral ectoderm cells. *J. Mol. Biol.* 202:417-431 (1988).
 - 34*. Lieber, T., Angerer, L.M., **Angerer, R.C.** and Childs, G. A histone H1 protein in sea urchins is encoded by a poly(A)⁺ mRNA. *Proc. Natl. Acad. Sci. (U.S.A.)* 85:4123-4127 (1988).
 - 35*. Angerer, L.M., Dolecki, G.J., Gagnon, M.L., Lum, R., Yang, Q., Humphreys, T. and **Angerer, R.C.** Progressively restricted expression of a homeo box gene within aboral ectoderm of developing sea urchin embryos. *Genes Devel.* 3:370-383 (1989).
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 - 37*. Yang, Q., Angerer, L.M. and **Angerer, R.C.**, Structure and tissue-specific developmental expression of a sea urchin arylsulfatase gene. *Dev. Biol.* 135:53-65 (1989).
 - 38*. Yang, Q., Angerer, L.M., and **Angerer, R.C.** Unusual pattern of accumulation of mRNA encoding EGF-related protein in sea urchin embryos. *Science* 246:806-808 (1989).
 39. Angerer, L.M. and **Angerer, R.C.** In situ hybridization with ³⁵S-labeled RNA probes. *Biotech Update* Vol. 4, No. 5, p. 1-6 (1989).
 40. **Angerer, R.C.**, Reynolds, S.D., Grimwade, J., Hurley, D.L., Yang, Q., Kingsley, P., Gagnon, M.L., Palis, J. and Angerer, L.M. Contributions of the spatial analysis of gene expression to the study of sea urchin development. *SEB Seminar Series, Vol. 43*, N. Harris and D. Wilkinson, eds. Cambridge University Press (1990).
 - 41*. **Angerer, R.C.** "Pumpkin Rye Bread." *Gourmet*, November, 1990, p. 33-34.
 - 42*. Grimwade, J.E., Gagnon, M.L., Yang, Q., **Angerer, R.C.** and Angerer, L.M. Expression of two mRNAs encoding EGF-related proteins identifies subregions of sea urchin embryonic ectoderm. *Dev. Biol.* 143:44-57 (1991).
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 44. Angerer, L.M. and **Angerer, R.C.** (1991) Localization of mRNAs by in situ hybridization. In *Methods in Cell Biology, Functional Organization of the Nucleus--A Laboratory Guide.* , pp. 38-68 S. Elgin and B. Hamkalo, eds.
 45. Angerer, L.M. and **Angerer, R.C.** (1991) In situ hybridization to cellular RNA with radiolabelled RNA probes. In *In situ hybridization, a Practical Approach.*, pp. 15-32. D. Wilkinson, ed. IRL Press, Oxford.
 - 46*. Angerer, L.M., Yang, Q., Liesveld, J., Kingsley, P.D. and **Angerer, R.C.** (1992) Spatially regulated accumulation of ribosomal protein gene products precedes growth of the sea urchin pluteus larva. *Dev. Biol.* 149:27-40.
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 - 48*. Reynolds, S.D., Angerer, L.M., Palis, J., Nasir, A. and **Angerer, R.C.** (1992) Early mRNAs, spatially restricted along the animal-vegetal axis of sea urchin embryos, include one encoding a protein related to tolloid and BMP-1. *Development* 114:769-86.
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- 55*. Nasir, A., Reynolds, S.D., Angerer, L.M. and **Angerer, R.C.** (1995) VEB4: Early zygotic mRNA expressed asymmetrically along the animal-vegetal axis of the sea urchin embryo. *Development, Growth & Differentiation.* 37, 57-68.
56. Angerer, L.M., Reynolds, S.D., Kozlowski, D.J., Wei, Z., Gagnon, M.L., Nasir, A., Marchant, J.K. and **Angerer, R.C.** (1995) Regulation of genes encoding proteins related to astacin, collagenase and TGF- β along the animal-vegetal axis of early sea urchin embryos. In *The Astacins*, eds. Zwilling and Stocker, Springer-Verlag, Heidelberg, Germany.
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- 61*. Wei, Z., Angerer, L.M., and **Angerer, R.C.** (1997). Multiple positive *cis*-elements regulate the asymmetric expression of the *SpHE* gene along the sea urchin embryo animal-vegetal axis. *Dev. Biol.* 187, 71-78.
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- 83.* Dunn, E. W., Moy, V.N., Angerer, L.M., **Angerer, R.C.**, Morris, R.L. and Peterson, K.J. (2007) Molecular paleoecology: using gene regulatory analysis to address the origins of complex life cycles in the late Precambrian. *Evol. & Devel.* 9, 10-24.
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