

Curriculum Vitae

SIR RICHARD JOHN ROBERTS

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PERSONAL

Born on September 6, 1943, Derby, England

EDUCATION

1962-1965 University of Sheffield, Sheffield, England
B.Sc. in Chemistry
1966-1968 University of Sheffield, Sheffield, England
Ph.D. in Organic Chemistry

POSITIONS

2005- Chief Scientific Officer, New England Biolabs
1992-2005 Research Director, New England Biolabs
1986-92 Assistant Director for Research, Cold Spring Harbor
Laboratory
1972-86 Senior Staff Investigator, Cold Spring Harbor
Laboratory
1971-1972 Research Associate in Biochemistry, Harvard
University
1969-1970 Research Fellow, Harvard University

OUTSIDE ACTIVITIES

1974-1992 Consultant and Chairman of Scientific Advisory Board
New England Biolabs
1977-1985 Scientific Advisory Board, Genex Corp.
1977-1987 Editorial Board: Nucleic Acids Research
1979-1984 Editorial Board: Journal of Biological Chemistry
1982-1989 Member: National Advisory Committee of GENBANK
1984-1986 Member: National Advisory Committee of BIONET
1985-1988 Panel member: NIH Study Section in Biochemistry.
1985-2002 Editorial Board: Bioinformatics (formerly CABIOS)
1987-1990 Chairman: National Advisory Committee of BIONET
1987-2009 Senior Executive Editor: Nucleic Acids Research
1990-1992 Panel member: NCI Cancer Centers Support
Grant Review Committee
1993-1995 Panel member: NLM Study Section/Comp. Biol.
1994-2000 Scientific Advisory Board, Molecular Tool
1994- Patron of the Oxford International Biomedical Center
1996-1998 Visiting Professor, University of Bath, UK.
1996-2000 Chairman, NCI Board of Scientific Counselors
1996-1999 Scientific Advisory Board, Oxford Molecular Group
1997-2001 Editorial Board: Current Opinion Chem. Biol.

1998-2001	Chairman, Steering Committee on Genetics and Biotechnology, ICSU
1998-2002	Chairman, Scientific Advisory Board, Celera
1998-	Sci. Advisory Board, Conservation Law Foundation
1998-2004	Chairman, Scientific Advisory Board, Lynkeus Biotech
1998-2003	Board Member, Albert Schweitzer Academy of Medicine
2000-2003	Scientific Advisory Board, PubMed Central
2000-2003	Scientific Advisory Board, Orchid Biosciences
2000-	Advisor to the Director, NASA Astrobiology Program
2002-	Scientific Advisory Board, Center for Functional Genomics, SUNY, Albany
2002-2004	Trustee, Ocean Genome Legacy
2002-2004	Scientific Advisor to CIAR, Evolutionary Biology
2003-	Chairman of the Board, University of Sheffield in America
2003-	Honorary Member, The International Raoul Wallenberg Foundation
2003-	Vice-President, Albert Schweitzer Academy of Medicine
2003-2005	Scientific Advisory Board, Diversa Corporation
2003-	Vice-Chairman, Int. Science Adv. Bd. JDW Institute of Genome Sciences, Hangzhou, China
2003-	Distinguished Scientist and Research Scholar, Boston University
2004-	Scientific Advisory Board, PubChem
2004-	Scientific Advisory Board, RainDance Technologies
2004-	President, Ocean Genome Legacy Board of Trustees
2005-	Scientific Advisory Board, ICGEB
2006-2012	Board Member, Friends of the National Library of Medicine
2007-	Scientific Advisory Board, InVivo Therapeutics
2007-	Member, NRF Singapore International Evaluation Panel
2008	Knight Bachelor (UK)
2009-2011	Trustee of the Gaddafi International Charity and Development Foundation
2009-	InVivo Therapeutics, Director
2009	Fellow of the Science Museum (London, UK)
2009-	Scientific Advisory Board, Orwik
2010-	President's Council, New York Academy of Sciences.
2011-2013	National Park System Advisory Board
2011-	JGI Microbial Genomics & Metagenomics Advisory Board
2012-	Advisor to the city of Yixing, China
2012-	Honorary Citizen, Wuxi, China
2012-	Honorary President, Richard J. Roberts Institute of Biotechnology, Yixing, China
2013-	Scientific Advisory Board, Empiriko Corporation

RESEARCH INTERESTS

Restriction endonucleases, DNA methylases,
Computational molecular biology.

HONORARY DEGREES

Honorary Doctor of Medicine, University of Uppsala (1992)
Honorary Doctor of Medicine, Bath University (1994)
Honorary Doctor of Science, Sheffield University (1994)
Honorary Doctor of Science, Derby University (1995)
Hon. Prof. 4th Military Medical University, Xian (2002)
Hon. Prof. Dalian Institute of Chemical Physics (2002)
Honorary Doctor of Science, Chinese University of Hong Kong (2005)
Honorary Professor, Chinese University of Hong Kong (2006)
Honorary Professor, Nankai University (2006)
Doctor Honoris Causa, University of Athens (2009)
Honorary Professor, Astana Medical University, Kazakhstan (2012)
Honorary Professor, Eurasian Economic Club of Scientists (2012)
Honorary Professor, Wuhan University, China (2012)
Honorary Professor, Jiang-Nan University, Wuxi, China (2012)
Doctor Honoris Causa, University of Lisbon (2012)

SOCIETY MEMBERSHIPS AND AWARDS

American Society for Microbiology
John Simon Guggenheim Fellow (1979-1980)
ASM Foundation Lecturer (1988-1989)
Miller Professor at UC Berkeley (1991)
Nobel Prize in Physiology or Medicine (1993)
Bourke Lecturer, Boston University (1994)
Dakin Lecturer, Adelphi University (1994)
Golden Plate Award, American Academy of Achievement (1994)
Convocation Award, Sheffield University (1994)
Faye Robiner Award, Ross University (1994)
Fellow of the Royal Society (1995)
Associate Member of EMBO (1995)
Foreign Fellow, Nat'l Academy of Medical Sciences, Pakistan (1996)
Ada Doisy Lecturer, Univ. Illinois, Urbana (1996)
Wei Lun Visiting Professor, Chinese University, Hong Kong (1996)
William Ferdinand Memorial Lecturer, Sheffield University (1997)
Proctor & Gamble Distinguished Lecturer, Purdue University (1997)
Fellow of the American Society of Arts and Sciences (1997)
Fellow of the American Academy of Microbiology (1997)
Steinberg/Wylie Lecture, University of Maryland (1997)
Knudson Lecture, Oregon State University (1997)
Medicus Magnus of the Polish Academy of Medicine (1998)
Robert Church Lecture in Biotechnology, Univ. Calgary (1998)
Albert Einstein Memorial Lecturer, Princeton (2000)
Sutton Lecture, U. Kansas Medical Center (2002)
Barry Berkowitz Lecture, Northeastern University (2003)
Robert Harris Lecture, MIT (2004)
Dan Nathans Lecture, Johns Hopkins (2006)
The Gabor Medal of the Royal Society (2007)
Knight Bachelor (UK) (2008)
Lester O. Krampitz Lecture, Case Western Reserve University (2009)

TIE Boston Legends and Leaders Award (2011)
Fellow of the AACR Academy (2013)
The Hans Krebs Medal of FEBS (2013)

PUBLICATIONS

1. Gregson, M., Kurosawa, K., Ollis, W.D., Redman, B.T., Roberts, R.J. and Sutherland, I.O. (1968) The natural occurrence of cis- and trans-cinnamylphenols. *Chemical Communications* **22**: 1390-1392.
2. Ollis, W.D., Redman, B.T., Roberts, R.J. and Sutherland, I.O. (1968) New neoflavanoids from *Machaerium kuhlmanii* and *Machaerium nictitans* and the recognition of a new neoflavanoid type, the neoflavenes. *Chemical Communications* **22**: 1392-1393.
3. Mageswaran, S., Ollis, W.D., Roberts, R.J. and Sutherland, I.O. (1969) Biogenetic models for the formation of natural cinnamylphenols and neoflavanoids. *Tetrahedron Letters* **34**: 2897-2900.
4. Ollis, W.D., Ormand, K.L., Redman, B.T., Roberts, R.J. and Sutherland, I.O. (1970) The oxidative rearrangement of olefins by thallium (III) acetate. Part II. Synthesis of isoflavones. *J. Chem. Soc. (C)*, 125-128.
5. Gottlieb, O.R., Mageswaran, S., Ollis, W.D., Roberts, R.J. and Sutherland, I.O. (1970) Recent developments in neoflavanoid chemistry. *Ann. Acad. Brasil. Cienc.* **42**: 417-423, Suppl.
6. Stewart, T.S., Roberts, R.J. and Strominger, J.L. (1971) Novel species of tRNA. *Nature* **230**: 36-38.
7. Lovinger, G.G. and Roberts, R.J. (1971) A comparison of two glycyl- tRNAs from *Staphylococcus epidermidis*. *Fed. Proc.* **30**: 1217.
8. Roberts, R.J. (1972) Comparative studies of the staphylococcal glycyl- tRNAs which are non-functional in protein synthesis. *Fed. Proc.* **31**: 422.
9. Roberts, R.J. (1972) Structures of two glycyl-tRNAs from *Staphylococcus epidermidis*. *Nature New Biol.* **237**: 44-45.
10. Linnett, P.E., Roberts, R.J. and Strominger, J.L. (1974) Biosynthesis and cross-linking of the gamma-glutamyl glycine containing peptidoglycan of vegetative cells of *Sporosarcina ureae*. *J. Biol. Chem.* **249**: 2497-2506.
11. Allet, B., Roberts, R.J., Gesteland, R.F. and Solem, R. (1974) Class of promoter sites for *Escherichia coli* DNA-dependent RNA polymerase. *Nature* **249**: 217-221.
12. Roberts, R.J., Lovinger, G.G., Tamura, T. and Strominger, J.L. (1974) Staphylococcal transfer ribonucleic acids. I. Isolation and purification of the isoaccepting glycine transfer ribonucleic acids from *Staphylococcus epidermidis* Texas 26. *J. Biol. Chem.* **249**: 4781-4786.

13. Roberts, R.J. (1974) Staphylococcal transfer ribonucleic acids. II. Sequence analysis of tRNAGly/IA and tRNAGly/IB from *Staphylococcus epidermidis* Texas 26. *J. Biol. Chem.* **249**: 4787-4796.
14. Roberts, R.J., Arrand, J.R. and Keller, W. (1974) The length of the terminal repetition in adenovirus 2 DNA. *Proc. Natl. Acad. Sci. USA* **71**: 3829-3833. PMID: PMC434277
15. Mulder, C., Arrand, J.R., Delius, H., Keller, W., Pettersson, U., Roberts, R.J. and Sharp, P.A. (1974) Cleavage maps of DNA from adenovirus types 2 and 5 by restriction endonuclease *EcoRI* and *HpaI*. *Cold Spring Harbor Symp. Quant. Biol.* **39**: 397-400.
16. Arrand, J.R., Keller, W. and Roberts, R.J. (1974) Extent of terminal repetition in adenovirus-2 DNA. *Cold Spring Harbor Symp. Quant. Biol.* **39**: 401-407.
17. Roberts, R.J., Breitmeyer, J.B., Tabachnik, N.F. and Myers, P.A. (1975) A second specific endonuclease from *Haemophilus aegyptius*. *J. Mol. Biol.* **91**: 121-123.
18. Steenbergh, P.H., Sussenbach, J.S., Roberts, R.J. and Jansz, H.S. (1975) The 3'-terminal nucleotide sequences of adenovirus types 2 and 5 DNA. *J. Virol.* **15**: 268-272.
19. Sugden, B., DeTroy, B., Roberts, R.J. and Sambrook, J. (1975) Agarose slab gel electrophoresis equipment. *Anal. Biochem.* **68**: 36-46. PMID: PMC354449
20. Roberts, R.J., Myers, P.A., Morrison, A. and Murray, K. (1976) A new specific endonuclease from *Arthrobacter luteus*. *J. Mol. Biol.* **102**: 157-165.
21. Roberts, R.J., Myers, P.A., Morrison, A. and Murray, K. (1976) A specific endonuclease from *Haemophilus haemolyticus*. *J. Mol. Biol.* **103**: 199-208.
22. Godson, G.N. and Roberts, R.J. (1976) A catalogue of cleavages of Φ X174, S13, G4 and ST1 DNA by 26 different restriction endonucleases. *Virology* **73**: 561-567.
23. Roberts, R.J. (1976) Restriction and modification enzymes and their recognition sequences. In *Handbook of Biochemistry and Molecular Biology*, 3rd Edition, Nucleic Acids. Vol. II. 532-535.
24. Roberts, R.J. (1976) Restriction endonucleases. *CRC Critical Reviews in Biochemistry*, **4**: 123-164.
25. Burton, W.G., Roberts, R.J., Myers, P.A. and Sager, R. (1976) A eukaryotic endonuclease with non-random cleavage specificity. *Fed. Proc.* **35**: 1588.
26. Roberts, R.J., Wilson, G.A. and Young, F.E. (1977) Recognition sequence of specific endonuclease *BamHI* from *Bacillus amyloliquefaciens* H. *Nature* **265**: 82-84.
27. Roberts, R.J. (1977) The role of restriction endonucleases in genetic engineering. In, *Recombinant Molecules: Impact on Science and Society*: (eds. R.F. Beers, Jr. and E.G. Barrett). Raven Press, New York, pp. 21-32.

28. Wu, M., Roberts, R.J. and Davidson, N. (1977) Structure of the inverted terminal repetition of adenovirus-2 DNA. *J. Virol.* **21**: 766-777. PMID: PMC353878
29. Subramanian, K.N., Zain, B.S., Roberts, R.J. and Weissman, S.M. (1977) Mapping of the *HhaI* and *Hinfl* cleavage sites on simian virus 40 DNA. *J. Mol. Biol.* **110**: 297-318.
30. Endow, S.A. and Roberts, R.J. (1977) Two restriction-like enzymes from *Xanthomonas malvacearum*. *J. Mol. Biol.* **112**: 521-529.
31. Gelinas, R.E., Myers, P.A. and Roberts, R.J. (1977) Two sequence-specific endonucleases from *Moraxella bovis*. *J. Mol. Biol.* **114**: 169-179.
32. Gelinas, R.E., Myers, P.A., Weiss, G.A., Roberts, R.J. and Murray, K. (1977) A specific endonuclease from *Brevibacterium albidum*. *J. Mol. Biol.* **114**: 433-440.
33. Zain, B.S. and Roberts, R.J. (1977) A new specific endonuclease from *Xanthomonas badrii*. *J. Mol. Biol.* **115**: 249-255.
34. Gelinas, R.E. and Roberts, R.J. (1977) One predominant 5'-undecanucleotide in adenovirus 2 late messenger RNAs. *Cell* **11**: 533-544.
35. Gelinas, R.E., Chow, L.T., Roberts, R.J., Broker, T.R. and Klessig, D.F. (1977) The structure of late adenovirus type 2 messenger RNA's. In Brookhaven Symposium in Genetic Interaction and Gene Transfer, Brookhaven Symposium in Biology **29**: 345-347.
36. Kamp, D., Kahmann, R., Zipser, D. and Roberts, R.J. (1977) Mapping of restriction sites in the attachment site region of bacteriophage lambda. *Mol. Gen. Genet.* **154**: 231-248.
37. Burton, W.G., Roberts, R.J., Myers, P.A. and Sager, R. (1977) A site-specific single strand endonuclease from the eukaryote *Chlamydomonas*. *Proc. Natl. Acad. Sci. USA* **74**: 2687-2691. PMID: PMC431246
38. Chow, L.T., Gelinas, R.E., Broker, T.R. and Roberts, R.J. (1977) An amazing sequence arrangement at the 5' ends of adenovirus 2 messenger RNA. *Cell* **12**: 1-8.
39. Roberts, R.J. (1977) Restriction and modification enzymes and their recognition sequences. In DNA Insertion Elements, Plasmids and Episomes, (eds. A.I. Bukhari, J.A. Shapiro and S.L. Adhya), Cold Spring Harbor Laboratory, pp. 757-768.
40. Gingeras, T.R., Myers, P.A. and Roberts, R.J. (1978) A new specific endonuclease present in *Xanthomonas holcicola*, *Xanthomonas papavericola* and *Brevibacterium luteum*. *J. Mol. Biol.* **118**: 113-122.
41. Arrand, J.R., Myers, P.A. and Roberts, R.J. (1978) A new restriction endonuclease from *Streptomyces albus* G. *J. Mol. Biol.* **118**: 127-135.
42. Zain, B.S. and Roberts, R.J. (1978) Characterization and sequence analysis of a recombination site in the hybrid virus Ad2+ND1. *J. Mol. Biol.* **120**: 13-31.

43. Broker, T.R., Chow, L.T., Dunn, A.R., Gelinas, R.E., Hassell, J.A., Klessig, D.F., Lewis, J.B., Roberts, R.J. and Zain, B.S. (1977) Adenovirus-2 messengers--an example of baroque molecular architecture. *Cold Spring Harbor Symp. Quant. Biol.* **42**: 531-553.
44. Roberts, R.J. (1978) Restriction endonucleases. In, *Microbiology*, (D. Schlessinger, Ed.), American Society for Microbiology, Washington. p. 5-9.
45. Bingham, A.H.A., Atkinson, T., Sciaky, D. and Roberts, R.J. (1978) A specific endonuclease from *Bacillus caldolyticus*. *Nucl. Acids Res.* **5**: 3457-3467. PMID: PMC342687
46. Tomassini, J., Roychoudhury, R., Wu, R. and Roberts, R.J. (1978) Recognition sequence of restriction endonuclease *KpnI* from *Klebsiella pneumoniae*. *Nucl. Acids Res.* **5**: 4055-4064. PMID: PMC342733
47. Gingeras, T.R., Milazzo, J.P. and Roberts, R.J. (1978) A computer assisted method for the determination of restriction enzyme recognition sites. *Nucl. Acids Res.* **5**: 4105-4127. PMID: PMC342737
48. Roberts, R.J. (1978) Restriction and modification enzymes and their recognition sequences. *Gene* **4**: 183-193.
49. Roberts, R.J., Klessig, D.F., Manley, J. and Zain, B.S. (1978) The spliced messenger RNA's of adenovirus-2. *FEBS Symposium* **51**: 245-253.
50. Roberts, R.J. (1978) Restriction endonucleases: A new role in vivo? *Nature* **271**: 502.
51. Roberts, R.J. (1978) Intervening sequences excised in vitro. *Nature* **274**: 530.
52. Roberts, R.J. (1978) The Nobel Prizewinners, 1978, in Medicine. *Nature* **275**: 689-690.
53. Ito, J. and Roberts, R.J. (1979) Unusual base sequence arrangement in Φ 29 DNA. *Gene* **5**: 1-7.
54. Arrand, J.R. and Roberts, R.J. (1979) The nucleotide sequences at the termini of adenovirus-2 DNA. *J. Mol. Biol.* **128**: 577-594.
55. Zain, B.S. and Roberts, R.J. (1979) Sequences from the beginning of the fiber mRNA of adenovirus-2. *J. Mol. Biol.* **131**: 341-352.
56. Zain, B.S., Sambrook, J., Roberts, R.J., Keller, W., Fried, M. and Dunn, A.R. (1979) Nucleotide sequence analysis of the leader segments in cloned copy adenovirus-2 fiber mRNA. *Cell* **16**: 851-861.
57. Zabeau, M. and Roberts, R.J. (1979) The role of restriction endonucleases in molecular genetics. In *Molecular Genetics*, ed. J.H. Taylor, III, 1-63.
58. Baumstark, B.R., Roberts, R.J. and RajBhandary, U.L. (1979) Use of short synthetic DNA duplexes as substrates for the restriction endonucleases *HpaII* and *Mnol*. *J. Biol. Chem.* **254**: 8943-8950.

59. Rosenberg, A.H., Simon, M.N., Studier, F.W. and Roberts, R.J. (1979) Survey and mapping of restriction endonuclease cleavage sites in bacteriophage T7 DNA. *J. Mol. Biol.* **135**: 907-915.
60. Gingeras, T.R., Milazzo, J.P., Sciaky, D. and Roberts, R.J. (1979) Computer programs for the assembly of DNA sequences. *Nucl. Acids Res.* **7**: 529-545. PMID: PMC328034
61. Roberts, R.J. (1980) A directory of restriction endonucleases. "Methods in Enzymology", (Grossman, L. and Moldave, K. Eds.), Academic Press, Vol. 65, p. 1-15.
62. Roberts, R.J. (1979) Directory of Restriction Endonucleases. *Meth. Enzymol.* **68**: 27-41.
63. Roberts, R.J. (1980) Small RNA's and splicing. *Nature* **283**: 132-133.
64. Roberts, R.J. (1980) Restriction and modification enzymes and their recognition sequences. *Nucl. Acids Res.* **8**: r63-r80. PMID: PMC6243774
65. Roberts, R.J. (1980) Restriction and modification enzymes and their recognition sequences. *Gene* **8**: 329-343.
66. Gingeras, T.R. and Roberts, R.J. (1980) Steps towards a programmed analysis of nucleic acid sequences. *Science* **209**: 1322-1328.
67. Gingeras, T.R., Greenough, L., Schildkraut, I. and Roberts, R.J. (1981) Two new restriction endonucleases from *Proteus vulgaris*. *Nucl. Acids Res.* **9**: 4525-4536. PMID: PMC327455
68. Roberts, R.J. (1981) Restriction and modification enzymes and their recognition sequences. *Nucl. Acids Res.* **9**: r75-r96. PMID: PMC326683
69. Roberts, R.J. (1981) Restriction endonucleases, DNA sequencing and Computers. In, *Developmental biology using purified genes*, (ed. D.D. Brown), Academic Press, New York. 621-634.
70. Gingeras, T.R. and Roberts, R.J. (1981) Computer assisted methods for nucleic acid sequencing. In, *Genetic Engineering, Principles and Methods*, Vol. III, (ed. J.K. Setlow and A. Hollaender) Plenum Press, New York. 319-338.
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73. Brooks, J.E. and Roberts, R.J. (1982) Modification profiles of bacterial genomes. *Nucl. Acids Res.* **10**: 913-934. PMID: PMC326211
74. Gingeras, T.R., Sciaky, D., Gelinas, R.E., Bing-Dong, J., Yen, C., Kelly, M.M., Bullock, P.A., Parsons, B.L., O'Neill, K.E. and Roberts, R.J. (1982) Nucleotide sequences from the adenovirus-2 genome. *J. Biol. Chem.* **257**: 13475-13491.

75. Roberts, R.J. (1982) Restriction and modification enzymes and their recognition sequences. *Nucl. Acids Res.* **10**: r117-r144. PMID: PMC320569
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78. Gingeras, T.R., Blumenthal, R.M., Roberts, R.J. and Brooks, J.E. (1982) The isolation and characterization of the *E. coli* dam methylase gene. In, *Metabolism and Enzymology of Nucleic Acids*, (eds. J. Zelinka and J. Balan), Publishing House of the Slovak Academy of Sciences. p329-340.
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80. Roberts, R.J. (1982) Restriction Endonucleases. In, *Nucleases*, (ed. S.A. Linn and R.J. Roberts), p. 311-340. Cold Spring Harbor Laboratory.
81. Roberts, R.J., Gingeras, T.R., Sciaky, D., Gelinis, R.E., Bing-Dong, J., Yen, C., Kelly, M.M., Bullock, P.A., Parsons, B.L., O'Neill, K.E. (1982) Information Content of the Adenovirus-2 Genome. *Cold Spring Harbor Symp. Quant. Biol.* **47**: 1025-1037.
82. Roberts, R.J. (1983) Restriction and modification enzymes and their recognition sequences. *Nucl. Acids Res.* **11**: r135-r167. PMID: PMC325705
83. Keller, C., Corcoran, M. and Roberts, R.J. (1984) Computer programs for handling nucleic acid sequences. *Nucl. Acids Res.* **12**: 379-386. PMID: PMC321011
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85. Roberts, R.J. (1984) Restriction and modification enzymes and their recognition sequences. *Nucl. Acids Res.* **12**: r167-r204. PMID: PMC320008
86. Roberts, R.J. Restriction endonucleases, DNA sequencing and Computers. In, *Physics and Contemporary Needs*, (eds. A.M. Khan, S. Riazuddin, A. Qadir and M.N. Qazi), Plenum, New York. Volume 6, 305-316 (1984).
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97. The applications of computers to research on nucleic acids III. (Soll, D. and Roberts, R.J., Eds.). 619 pp. IRL Press, Oxford and Washington, D.C. (1986).
98. Bhagwat, A.S., Sohail, A. and Roberts, R.J. (1986) Cloning and characterization of the DCM locus of *Escherichia coli* strain K-12. *J. Bacteriol.* **166**: 751-755. PMID: PMC215190
99. Pettersson, U. and Roberts, R.J. (1986) Adenovirus gene expression and replication. A historic review. In *DNA Tumor Virus: Control of Gene Expression and Replication*. *Cancer Cells* **4**. Cold Spring Harbor Laboratory, 37-57.
100. Roberts, R.J. Restriction and modification enzymes and their recognition sequences. In: *Gene Amplification and Analysis*, Vol. **5**. (Chirikjian, J.G., Ed.), 1-49 (1987).
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Dr. Richard J. Roberts is the Chief Scientific Officer at New England Biolabs, Beverly, Massachusetts. He was educated in England, attending St. Stephen's School and the City of Bath Boys' School in Bath before moving to the University of Sheffield where he obtained a B.Sc. in Chemistry in 1965 and a Ph.D. in Organic Chemistry in 1968. His postdoctoral research was carried out in Professor J.L. Strominger's laboratory at Harvard, where he studied the tRNAs that are involved in the biosynthesis of bacterial cell walls. From 1972 to 1992, he worked at Cold Spring Harbor Laboratory, reaching the position of Assistant Director for Research under Dr. J.D. Watson. He began work on the newly discovered Type II restriction enzymes in 1972 and in the next few years more than 100 such enzymes were discovered and characterized in Dr. Roberts' laboratory. His laboratory has cloned the genes for several restriction enzymes and their cognate methylases and studies of these enzymes has been a major research theme. Dr. Roberts has also been involved in studies of Adenovirus-2 beginning with studies of transcription that led to the discovery of split genes and mRNA splicing in 1977. This was followed by efforts to deduce the DNA sequence of the Adenovirus-2 genome and a complete sequence of 35,937 nucleotides was obtained. This latter project required the extensive use of computer methods, both for the assembly of the sequence and its subsequent analysis. His laboratory pioneered the application of computers in this area and the further development of computer methods of protein and nucleic acid sequence analysis continues to be a major research focus. The field of DNA methyltransferases is also an area of active research interest and crystal structures for the *HhaI* methyltransferase both alone and in complex with DNA have been obtained in collaboration with Dr. X. Cheng. The latter complex is quite remarkable as

the protein causes the target cytosine base to flip completely out of the helix so that it is accessible for chemical reaction. This extreme, but elegant, distortion of the double helix had not been seen previously. A major interest at present is the semi-automatic identification of restriction enzyme and methylase genes within the GenBank database and the development of rapid methods to assay function. Already several new specificities have been found and it is clear that there are many more restriction enzyme genes in Nature than had been previously suspected. Most recently, he is one of the leaders of the COMBREX project that is concerned with the functional annotation of prokaryotic genomes.