
BIOGRAPHICAL SKETCH

| NAME Roger Brent, Ph.D. | | POSITION TITLE President & Research Director | |
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| eRA COMMONS USER NAME rbrent | | | |
| EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i> | | | |
| INSTITUTION AND LOCATION | DEGREE <i>(if applicable)</i> | YEAR(s) | FIELD OF STUDY |
| University of Southern Mississippi | B.A. | 1973 | Mathematics and Computer Science |
| Harvard University | Ph.D. | 1982 | Biochemistry and Molecular Biology |

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

Positions

1981-present Reviewer, Cell and other journals
 1982-1985 Research Fellow, Harvard University, Dept. of Biochemistry and Molecular Biology
 1985-1990 Asst. Professor, Dept. of Genetics, HMS, Asst. Molecular Biologist, MGH
 1985-present Ad hoc reviewer and advisor for NIH, DOE, NSF, DoD, Wellcome Trust
 1986-1998 Instructor, HMS, Genetics 208, Course director, Genetics 205a and 205b, "Developmental Biology", and Instructor, Micro 230, "Methods and logic in Molecular Biology", and Micro 213, "Social issues in biology"
 1987-present Founder and Editor, Current Protocols in Molecular Biology
 1990-1998 Assoc. Prof., Dept. of Genetics, HMS, Assoc. Molecular Biologist, MGH
 1989-1997 Ad hoc member, then member, Virology and Molecular Genetics panel, ACS
 1997-2002 Editor, Molecular Cell
 1997-2000 Associate Director of Research, The Molecular Sciences Institute
 1999-present Wellcome Trust Functional Genomics Steering Committee
 1999-present Member, Program in Human Genetics, UCSF
 2000-present Professor (adjunct), Department of Biopharmaceutical Sciences, UCSF
 2003-2005 Instructor, UC Berkeley, Letters & Science 126, "Towards an Anthropology of Biology: Genomics and Citizenship", with Professor Paul Rabinow, UC Berkeley
 2000-present Research Director, The Molecular Sciences Institute
 2001-present President and CEO, The Molecular Sciences Institute
 2000-present Member standing USG advisory committee on defense
 2006-present Member evaluation committee, NIH Director's Pioneer Awards
 2007-present Member second standing USG advisory committee on defense
 2008-present Founder and Editor, Current Protocols Select

Honors

1970-1973 USM, full University Scholarship, Honors College, Stipend Award
 1973 National Merit Scholarship finalist
 1987-1991 Pew Scholar in Biomedical Sciences
 1991-1996 American Cancer Society Faculty Research Award
 1993-2002 Scientific Advisory Board, Genetics Institute, and GI/Wyeth-Ayerst Research
 2003 Gabbay Prize (shared with Stan Fields)
 2001-2005 Senior Scholar, Ellison Medical Foundation
 2003-2007 Member, Scientific Advisory Board, *Saccharomyces* Genome Database
 2004-present Member, Strategy Committee, Genes, molecules and cells, Wellcome Trust, London, England
 2004-present Member, Scientific Advisory Board, Pittsburgh Supercomputer Center

- 2006-present Chair, International Advisory Board, Manchester Centre for Integrative Systems Biology,
Manchester, England
2006-present Founder, member executive committee, International Society for Systems Biology

B. Selected publications (from more than 110)

1. Brent, R. and Ptashne, M. The wild type *lexA* gene product represses its own promoter. PNAS USA 1980; 77: 1932-1938
2. Brent, R. and Ptashne, M. Mechanism of action of the *lexA* gene product. PNAS USA 1981; 78: 4204-4208
3. Brent, R. and Ptashne, M. A bacterial repressor protein or a yeast transcriptional terminator can block upstream activation of a yeast gene. Nature 1984; 312:612-615.
4. Brent, R. Repression of transcription in yeast. Cell 1985, 42, 3-4.
5. Brent, R. and Ptashne, M. A eukaryotic transcriptional activator bearing the DNA specificity of a prokaryotic repressor. Cell 1985; 43: 729-736.
6. Brent, R. How to run a very small factory. Cell 1986; 47: 329-330.
7. Lech, K., Anderson, K., and Brent, R. DNA-bound Fos proteins activate transcription in yeast. Cell 1988; 53: 179-184.
8. Samson M-L, Jackson-Grusby L, Brent R. Gene activation and DNA binding by Drosophila Ubx and abd-A proteins. Cell 1989; 57: 1045-1052.
9. Hanes, S. and Brent, R. DNA specificity of the Bicoid activator protein is determined by the homeodomain recognition helix residue 9. Cell 1989; 57: 1275-1283.
10. Hanes, S. and Brent, R. A genetic model for the interaction of the homeodomain recognition helix with DNA. Science 1991; 251: 426-430.
11. Golemis, E. and Brent, R. Fused protein domains inhibit DNA binding by LexA. MCB 1992; 12: 3006-3014.
12. Zervos, A., Gyuris, J., and Brent, R. Mxi1, a protein that specifically interacts with Max to bind Myc/Max recognition sites. Cell 1993; 72: 223-232.
13. Gyuris, J., Golemis, E., Chertkov, H., and Brent R. Cdi1, a human tyrosine phosphatase that specifically associates with the Cdk2 protein kinase during the G1 to S transition. Cell 1993; 75:791-803.
14. Hanes, S., Riddehough, G., Ish-Horowicz D., and Brent, R. Specific DNA recognition and intersite spacing are critical for action of the Bicoid morphogen in Drosophila.. MCB 1994; 14:3364-3375.
15. Cuomo, C., Kirch, S., Gyuris, J., Brent, R., and Oettinger, M.A. Rch1, a protein that specifically interacts with RAG-1 and effects V(D)J recombination. PNAS USA. 1994; 91:6156-6160.
16. Parroush Z, Finley R, Brent R., and Ish-Horowitz, D. Interactions between Groucho and bHLH proteins mediate transcription repression during Drosophila neurogenesis, segmentation, and sex-determination. Cell 1994; 79:805-816.
17. Hanes, S. D. and Brent, R. Backwards Bicoid? Structure, 1994: 2:894-895.
18. Finley R and Brent R. Binary and ternary interactions between Drosophila cell cycle regulators. PNAS USA 1994, 91:12980-12984.
19. Finley, R. and Brent, R. The interaction trap. In DNA cloning - expression systems: a practical approach. (ed. D. Glover and B.D. Hames) Oxford University Press, Oxford, England. 1995.
20. Lee, J.W., Choi, H-K., Gyuris, J., Brent, R., and Moore, D.D. Two classes of proteins dependent on either the presence or absence of thyroid hormone for interaction with the thyroid hormone receptor. Mol. Endocrinology 1995, 9:243-254.
21. Khazak, V., Sadhale, P., Woychikc, N. A., Brent, R., and Golemis, E. A. Human RNA polymerase II subunit hsRPB7 functions in yeast and influences stress survival and cell morphology. Mol. Biol. Cell 1995, 6:759-775.
22. Su, L-K., Burrell M. Hill, D.E. Gyuris, J., Brent R., Wiltshire, R., Trent, J., Vogelstein, B., and Kinzler, K. W. APC binds to the novel protein, EB1. Cancer Research 1995, 55:2972-2977 T.
23. Estojak, J. Brent, R., and Golemis, E. Correlation of two-hybrid data with affinity measurements. Mol. Cell. Biol. 1995, 15, 5820-5829.

24. Reymond, A. and Brent, R. p16 from human tumors shows diminished interaction with Cdk4. *Oncogene* 1995, 11, 1173-1178.
25. Zervos A, Faccio, L., Gatto, J., Kyriakis, J., and Brent R. Mxi2, a mitogen-activated protein kinase that recognizes and phosphorylates Max protein. *PNAS USA* 1995, 92:10531-10534.
26. Clemens, K., E., Brent, R., Gyuris, J., and Munger, K., Dimerization of the human papillovirus E7 oncoprotein in vivo. *Virology* 1995, 214:289-293.
27. Finley, R. Thomas, B. J., Zipursky, L., and Brent, R. Isolation of *Drosophila* Cyclin D, whose expression in the morphogenetic furrow precedes entry into S. *PNAS USA* 1995, 93:3011-1015.
28. Colas, P. Cohen, B., Jessen, T., Grishina, I., McCoy, J., and Brent, R., Genetic selection of peptide aptamers that recognize and inhibit Cyclin-dependent kinase 2. *Nature* 1996; 380:548-550.
29. Reymond, A., Meroni, G., Borsani, G., Ballabio, A., and Brent, R. Repression by Rox, a novel bHLH-Zip protein expressed in quiescent cells that heterodimerizes with Max, binds a non-canonical E box and acts as a transcriptional repressor. *EMBO* 1997, 16(10):2892-2906.
30. Brent, Roger. Looms to weave genomic nets. *Nature Genetics* 1997, 16:216-217.
31. Finley, R. and Brent, R., Use of two hybrid methods to probe genetic networks. In "The Yeast Two-Hybrid System", Bartel, P. and Fields, S. eds. 1997 Oxford University Press, London.
32. Xu, C., Mendelsohn, A., and Brent, R. Cells that register logical relationships among proteins. *PNAS USA*, 1997 94:12473-12478.
33. Finley, R. and Brent, R. Studying gene and allele function with two-hybrid methods. *Ann Rev Gen* 1997, 31:663-704.
34. Thomas, B. J., Zavitz, K. H., Dong, X., Lane, M. E., Weigman, K., Finley, R., Brent, R., Lehner, C. F. and Zipursky, L. roughex downregulates G2 cyclins in G1. *Genes and Dev.* 1997, 10:1289-1298
35. Mendelsohn A.R. and Brent R "Postgenomic protein analysis: the next bend in the river." *Nature Biotechnology* 1998 16:520-521.
36. Colas, P. and Brent, R. "The impact of two-hybrid and related methods on biotechnology". *Trends in Biotechnology*, 1998, 16:355-363
37. Cohen, B. A., Colas, P., and Brent, R. A novel cell cycle inhibitor from a combinatorial library. *PNAS USA* 1998 95, 14272-14277
38. Makris, A. Lin, J.-H., McMahon, C., Bear, S. E., Patriotis, C., Prasad, Y. R., Brent, R., Golemis, E., and Tsiolis, P. N. "Ankyrin repeat Raf-1 interacting protein-1 (Arp-1) is a novel substrate and regulator of Raf-1". *JBC* 1999, 274:14706-14715
39. Brent, R. "Functional genomics: learning to think about gene expression data", *Curr Biology*, 1999, 9:338-341.
40. Brent, R. and Carlson, R. "Double stranded DNA chips: next steps in the surface campaign", *Nature Biotech*, 1999, 17:536-7.
41. Mendelsohn, A.R. and Brent, R. "Protein interaction technology: envisioning the end game", *Science*, 1999, 284, 1948-50.
42. Geyer, R., Colman-Lerner, A., Chin, T., and Brent, R. Dominant peptide aptamers identify genetic network components and pathway connections. *PNAS USA*, 1999, 96:8567-8572
43. Fabbriozio, E., Le Cam, L., Polanowska, J., Kakzoreck, M., Lamb, N., Brent, R., and Sardet, C. Inhibition of mammalian cell proliferation by genetically selected peptide aptamers that antagonize E2F activity. *Oncogene* 1999, 18:4357-4363.
44. Brent, R. *Genomic Biology*. *Cell* 2000, 100:169-183.
45. Brent, R., Kodadek, T. Interaction, assembly & processing: life on an interface. *Curr Op Chem Bio* 2000, 4:13-15.
46. Colas, P. Ko Ferrigno, P., Silver, P.A., and Brent, R. Targeted modification and transportation of cellular proteins. *PNAS USA*, December 5, 2000. 97:25 13720-13725.
47. Geyer, C.R. and Brent, R. Selection of genetic agents from random peptide aptamer expression libraries. *Methods in Enzymology*, 2000, 328: 171-208.
48. Colman-Lerner, A. and Brent, R. Using peptide aptamers to analyze the proteome. In "New technologies for the life sciences: a Trends Guide" supplement to *Trends in Cell Biology*, 2000: 56-61.
49. Endy, D. and Brent, R. Modeling cellular behavior. *Nature* 2001, 409: 391-395

50. Colman-Lerner, A. Chin, T. and Brent, R. Yeast Cbk1 kinase activates distinct daughter-specific genetic programs that induce asymmetric cell fates. *Cell* 2001, 107: 739-750.
51. Mendelsohn, A. R., Wang, Z. B., and Brent, R. Cyclin D3 interacts with Caspase 3, sensitizing cells to apoptotic stimuli and connecting cell proliferation and cell death. *PNAS USA* 2002, 99: 6871-6876.
52. Brent, R. A partnership between biology and engineering. *Nature Biotechnology* 2004, 22:1211-1214.
53. Burbulis, I., Yamaguchi, K., Carlson, R., and Brent, R. Using protein-DNA chimeras to detect and count small numbers of molecules. *Nature Methods* 2005, 2:31-37.
54. Lok, L. and Brent, R. Automatic generation of cellular reaction networks with MolecuLizer 1.0. *Nature Biotechnology* 2005, 23:131-136.
55. Brent, R., Lok, L. A fishing buddy for hypothesis generators. *Science*. 2005, 22:308(5721):504-6.
56. Colman-Lerner A, Gordon A, Serra E, Chin T, Resnekov O, Endy D, Pesce CG, Brent R. Regulated cell-to-cell variation in a cell-fate decision system. *Nature*. 2005 437, 699-706.
57. Brent R, Bruck J. 2020 computing: can computers help to explain biology? *Nature*. 2006. 440:416-7.
58. Brent. R. In the valley of the shadow of death (2005) MIT Synthetic Biology Archive <http://hdl.handle.net/1721.1/34914>, DOI: 1721.1/34914
59. Brent, R. Power and responsibility. (2005) MIT Synthetic Biology Archive <http://hdl.handle.net/1721.1/34913>, DOI: 1721.1/34913.
60. Gordon, A., Colman-Lerner, A., Chin, T.E., Benjamin, K.R., Brent, R. Single-cell quantification of molecules and rates using open source microscope based cytometry. *Nature Methods* 2007. 4, 175-181.
61. Burbulis, I., Yamaguchi, K., Yu., R., Resnekov, O., and Brent, R. Quantifying small numbers of antibodies with a 'near-universal' protein-DNA chimera. *Nature Methods* 2007. 4, 1011-3.
62. Yu, RC. et al. The Alpha project, a model system for systems biology research. *IET Systems Biol.* 2008. 2:222-233.
63. Yu, R.C., Pesce, G., Colman-Lerner, A., Lok, L., Pincus, D., Serra, E., Holl, M., Benjamin, K.R., Gordon, A., and Brent, R. Negative feedback that improves information transmission in yeast pheromone response. *Nature* 2008. In press.
64. Thomson, T. M., Benjamin, K. R. Love, T., Yu, R., Gordon, A., Colman-Lerner, A., Endy, D. and Brent, R. Low abundance of yeast MAPK scaffold suggests tradeoff between system output and dynamic range *Molecular Systems Biology*. Submitted.
65. Maxwell, R. Resnekov, O., Pincus, D., Ryan, C. and Brent R. Functional phosphoproteome analysis of yeast pheromone system reveals loci of feedforward and feedback control. *Cell, solicited, in preparation*.
66. Pesce, C. G., Colman-Lerner, A., Rockwell, D. and Brent, R. Single gene mutations in *Saccharomyces cerevisiae* define fundamental axes of quantitative system behavior. *In preparation*.
67. Brent, R. Benjamin, K. R, and Yu, R. On switches and amplifiers in biological circuits. *In preparation*.

C. Research Support (pending applications not listed)

Ongoing Research Support

- 1) R33 CA 114306-01A1, NIH/NCI, "Tadpole Assays for the Molecular Assessment of Cancer" 02/23/06–11/30/09, PI
- 2) P50HG2370, NIH/NHGRI "Center for Genomic Experimentation and Computation", 07/22/02–06/30/09, PI

Research support completed in last 3 years

- 1) NASA Ames Research Center, "Yeast-based radiation measurement", 09/01/04 – 08/30/05, PI
- 2) Ellison Medical Foundation senior scholar award, Identification of protein regulators of self-renewal, differentiation, and senescence in embryonic stem cells, 1/1/01-1/1/05, PI
- 3) Japan Science and Technology Foundation, Liaison with Keio E-cell project, 06/01/07- 05/31/08, PI