CURRICULUM VITAE

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EDUCATION

1967	B.S. Biochemistry, State University of Leiden
1970	M.S. Physical Chemistry, State University of Leiden
1977	Ph.D. Molecular Biology, University of Wisconsin, Madison

PROFESSIONAL APPOINTMENTS

2004-	Professor, The Center for RNA Molecular Biology, Case Western Reserve University
2004-	Professor of Biochemistry, Case Western Reserve University, associate member
1997-2004	Professor of Biochemistry, Case Western Reserve University
1991-1997	Associate Professor of Biochemistry, Case Western Reserve University
1983-1991	Assistant Professor of Biochemistry, Case Western Reserve University
1982-1983	Postdoct. Res. Assoc. with Dr. M. Caruthers, Univ. of Colorado, Boulder
1980-1982	NIH Postdoct. Fellow with Dr. M. Caruthers, Univ. of Colorado, Boulder
1977-1980	Postdoct. Res. Assoc. with Dr. O. Uhlenbeck, Univ. of Illinois, Champaign/Urbana

PROFESSIONAL SOCIETIES

American Chemical Society
American Society for the Advancement of Science
American Society for Microbiology
American Society for Biology and Molecular Biology

RESEARCH SUPPORT

NSF 1050142	03-01-2011 to 03-28-2014 Interaction of E. coli RNA polymerase with promoter DNA to form an initiation-competent complex

PEER REVIEW

Committees:
NIH Microbial Genetics and Physiology (ad hoc member 1991, 1993, 1998, 2000, 2001, 2004)
NIH Biophysical Chemistry A (ad hoc member 1994, 1997, 2000)
NIH NIDDK Internal review panel 2005
NIH Special Study Section B for Members' Conflicts 2001
NIH Special Emphasis Panel 2005, 2006
NIH Program Project Review (1998)
American Heart Association, Northeast Ohio Affiliate (1988-1992)
MetroHealth Medical Center, Cleveland (ad hoc member 1993)
Glennan Teaching Fellowship, CWRU (ad hoc member 1995)

Journals:

1995-2000	Editorial Board, Journal of Biological Chemistry
2001-2009	Editorial Board, Journal of Bacteriology
2006-2011	Editorial Board, Journal of Biological Chemistry

Ad hoc reviewer for: Biochemistry, EMBO Journal, FEBS Journal, Gene, Journal of Biological Chemistry, Journal of Molecular Biology, Molecular Microbiology, Nucleic Acids Research, Proc. Natl. Acad. Sci. USA, Science

PUBLICATIONS

1. **Weisblum, B.** and **deHaseth, P.L.** 1972. Quinacrine, a chromosome stain for deoxyadenylate-deoxythymidylate-rich regions in DNA. Proc. Natl. Acad. Sci. USA **69**: 629-632.
2. **Weisblum, B.** and **deHaseth, P.L.** 1973. Nucleotide specificity of the Quinacrine staining reaction for chromosomes. Chromosomes Today **4**: 35-51.
3. **Stork, W.H.J., deHaseth, P.L., Schippers, W.B., Kormeling, C.M.** and **Mandel, M.** 1973. Interaction between crystal violet and poly-(methacrylic acid) in aqueous solutions. I. Results from spectroscopic measurements and dialysis. J. Phys. Chem. **77**: 1772-1777.
4. **Stork, W.H.J., deHaseth, P.L., Lippits, G.J.M.** and **Mandel, M.** 1973. Interaction between crystal violet and poly-(methacrylic acid) in aqueous solutions. II. Potentiometric and viscosimetric results. General Discussion. J. Phys. Chem. **77**: 1778-1982.
5. **Stork, W.H.J., van Boxsel, J.A.M., deGoey, A.F.P.M., deHaseth, P.L.** and **Mandel, M**. 1974. A dye-binding induced conformational transition of poly-(methacrylic acid) by auramine O in aqueous solution. I. Experimental results. Biophys. Chem. **2** 127-136.
6. **Record, M.T. Jr., Lohman, T.M.** and **deHaseth, P.** 1976. Ion effects on ligand-nucleic acid interactions. J. Mol. Biol. **107**: 145-158.
7. **deHaseth, P.L., Gross, C.A., Burgess, R.R.** and **Record, M.T. Jr.** 1977. Measurements of binding constants for protein-DNA interactions by DNA-cellulose chromatography. Biochemistry **16**: 4777-4783.
8. **deHaseth, P.L., Lohman, T.M.** and **Record, M.T. Jr.** 1977. Nonspecific interactions of lac repressor with DNA: An association reaction driven by counterion release. Biochemistry **16**: 4783-4790.
9. **Record, M.T.Jr., deHaseth, P.L.** and **Lohman, T.M.** 1977. Interpretation of monovalent and divalent cation effects on the lac repressor-operator interactions. Biochemistry **16**: 4791-4796.
10. **deHaseth, P.L., Lohman, T.M., Burgess, R.R.** and **Record, M.T. Jr.** 1978. Nonspecific interactions of *Escherichia coli* RNA polymerase with native and denatured DNA: Differences in the binding behavior of core and holoenzyme. Biochemistry **17**: 1612-1622.
11. **Lohman, T.M., deHaseth, P.L.** and **Record, M.T. Jr.** 1978. Theoretical considerations of the effects of ions on the kinetics of protein-nucleic acid interactions: Application to lac repressor-operator interactions. Biophys. Chem. **8**: 281-294.
12. **Lohman, T.M., deHaseth, P.L. and Record, M.T. Jr.** 1980. Pentalysine-DNA interactions: A model for the general effects of ion concentrations on the interaction of proteins with nucleic acids. Biochemistry **19**: 3522-3530.
13. **deHaseth, P.L.** and **Uhlenbeck, O.C**. 1980. Interactions of *E. coli* host factor protein with oligoriboadenylates. Biochemistry **19**: 6138-6146.
14. **deHaseth, P.L.** and **Uhlenbeck, O.C.** 1980. Interaction of *E. coli* host factor protein with Qβ RNA. Biochemistry **19**: 6146-6151.
15. **Krug, M., deHaseth, P.L.** and **Uhlenbeck, O.C.** 1982. Enzymatic synthesis of a coat protein binding RNA fragment from phage R17. Biochemistry **21**: 4713-4720.
16. **Caruthers, M.H., Beaucage, S.L., Becker, C., Efcavitch, W., Fisher, E.F., Galluppi, G., Goldman, R., deHaseth, P.L., Martin, F., Matteucci, M.D.** and **Stabinski, Y.** 1982. New methods for synthesizing deoxyoligonucleotides. Genetic Engineering **4**: 1-17.
17. **deHaseth, P.L., Goldman, R.A., Cech, C.L.** and **Caruthers, M.H**. 1983. Chemical synthesis and biochemical reactivity of bacteriophage lambda P_R promoter. Nucleic Acid Research **11**: 773-787.
18. **Carey, J., Cameron, V.A., deHaseth, P.L.** and **Uhlenbeck, O.C.** 1983. Sequence-specific interactions of R17 coat protein with its RNA binding site. Biochemistry **22**: 2601-2609.
19. **Caruthers, M.H., Beaucage, S.L., Becker, C., Efcavitch, W., Fisher, E.F., Galluppi, G., Goldman, R., deHaseth, P.L., Matteucci, M.D., McBride, L.** and **Stabinski, Y.** 1983. Deoxyoligo-nucleotide synthesis via the phosphoramidite method. In *Gene Amplification and Analysis*, II (T.S. Papas, M. Rosenberg and J. Chirikjian, eds.) Elsevier/North Holland, Amsterdam pp 1-23.
20. **Caruthers, M.H., Beaucage, S.L., Efcavitch, W., Fisher, E.F., Goldman, R., deHaseth, P.L., Mandecki, M., Matteucci, M.D., Rosendahl, M.S.** and **Stabinski, Y.** 1983. Chemical synthesis and biological studies on mutated gene control regions. Cold Spring Harbor Symposia on Quantitative Biology **XLVII**: 411-418.
21. **Carey, J., Cameron, V., Krug, M., deHaseth, P.L.** and **Uhlenbeck, O.C**. 1984. Failure of translational repression in the phage op3 mutant is not due to an altered coat protein-RNA interaction. J. Biol. Chem. **259**: 20-22.
22. **Skalka, A., Duyk, G., Longariu, M., deHaseth, P.L., Terry, R.** and **Leis, J**. 1984. Integrative recombination – A role for the retroviral reverse transcriptase. Cold Spring Harbor Symposia on Quantitative Biology **49**: 651-659.

23. **Duyk, G., Longariu, M., Cobrinik, D., Kowal, R., deHaseth, P.L., Skalka, A.M.** and **Leis, J**. 1985. Circles with two tandem LTRs are specifically cleaved by the ASLV *pol* gene associated endonuclease. Nucleotide sequences required for site specific cleavage. J. Virol. **56**: 589-599.
24. **Auble, D.T., Allen, T.L.** and **deHaseth, P.L.** 1986. Promoter recognition by *E. coli* RNA polymerase. Effects of substitutions in the spacer DNA separating the –10 and -35 regions. J. Biol. Chem. **261**: 11202-11206.
25. **Caruthers, M.H., Dubendorff, J.W., deHaseth, P.L., Tang, J.-Y., Prosser, K.** and **Rosendahl, M.S**. 1987. Protein DNA recognition: The interaction of lacR, cI and *E. coli* RNA polymerase with operators and promoters. In *Chemical Synthesis in Molecular Biology - Biological Macromolecules and Natural and Modified Monomer Units. GBF Monographs* **8** (H. Blocker, R. Frank and H.-J. Fritz, eds.) VCH, Weinheim, Germany, pp 2-12.
26. **Dubendorff, J.W., deHaseth, P.L., Rosendahl, M.S.** and **Caruthers, M.H.** 1987. DNA functional groups required for formation of open complexes between *E. coli* RNA polymerase and the lambda P_R promoter: Identification via base analog substitutions. J. Biol. Chem. **262**: 892-898.
27. **Bruzik, J.P., Auble, D.T.** and **deHaseth, P.L.** 1987. Specific activation of transcription initiation by the sequence-specific DNA-binding agents, distamycinA and netropsin. Biochemistry **26**: 950-956.
28. **Szoke, P.S., Allen, T.L.** and **deHaseth, P.L.** 1987. Promoter recognition by *E. coli* RNA polymerase: Effects of base substitutions in the –10 and –35 regions. Biochemistry **26**: 6188-6194.
29. **Auble, D.T.** and **deHaseth, P.L.** 1988. Promoter recognition by *E. coli* RNA polymerase: Influence of DNA structure in the DNA separating the –10 and –35 regions. J. Mol. Biol. **202**: 407-482.
30. **Ayers, D.G., Auble, D.T.** and **deHaseth, P.L**. 1989. Promoter recognition by *E. coli* RNA polymerase: Role of the spacer DNA in functional complex formation. J. Mol. Biol. **207**: 749-756.
31. **Martello, P.A., Bruzik, J.P., deHaseth, P.L., Youngquist, R.S.** and **Dervan, P.B.** 1989. Specific activation of open complex formation at an *E. coli* promoter by oligo (N-methylpyrrole-carboxamide)s: Effects of peptide length and identification of DNA target sites. Biochemistry **28**: 4455-4461.
32. **Karpen, M.E., deHaseth, P.L.** and **Neet, K.E.** 1989. Comparing short protein substructures by a method based on backbone torsion angles. PROTEINS, Structure, Function, Genetics **6**: 155-167.
33. **Gaal, T., Barkei, J., Dickson, R.R., deBoer, H.A., deHaseth, P.L., Alavi, H.** and **Gourse, R.L.** 1989. Saturation mutagenesis of an *E. coli* rRNA promoter and initial characterization of promoter variants. J. Bact. **171**: 4852-4861.
34. **Dickson, R.R., Gaal, T., deBoer, H.A., deHaseth, P.L.** and **Gourse, R.L.** 1989. Identification of promoter mutants defective in growth rate dependent regulation of rRNA transcription in *Escherichia coli*. J. Bact. **171**: 4862-4870.
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36. **Kincade, J. M.** and **deHaseth, P. L.** 1991. Bacteriophage lambda promoters pL and pR: sequence determinants of in vivo activity and of sensitivity to the DNA gyrase inhibitor, coumermycin. Gene **97:**7-12.
37. **Hershberger, P. A.** and **deHaseth, P. L.** 1991. RNA polymerase bound to the P_R promoter of bacteriophage lambda inhibits open complex formation at the divergently transcribed P_{RM} promoter: implications for an indirect mechanism of transcriptional activation by lambda repressor. J. Mol. Biol **222:**479-494.
38. **Karpen, M. E., deHaseth, P. L.** and **Neet, K. E.** 1992. Differences in amino acid distributions of 3_{10} helices and α helices. Protein Science **1:**1333-1342.
39. **Hershberger, P. A., Mita, B. C., Tripatara, A.** and **deHaseth, P. L.** 1993. Interference by P_R-bound RNA polymerase with P_{RM} function in vitro. Modulation by the bacteriophage lambda cI protein. J. Biol. Chem. **268:** 8943-8948.
40. **Warne, S. E.** and **deHaseth, P. L.** 1993. Promoter recognition by *Escherichia coli* RNA polymerase. Effects of single base pair deletions and insertions in the spacer DNA separating the -10 and -35 regions are dependent on spacer DNA sequence. Biochemistry **32:** 6134-6140.
41. **Tripatara, A.** and **deHaseth, P.** 1993. A new start site for *Escherichia coli* RNA polymerase at an engineered short region of non-complementarity in double-stranded DNA. J. Mol. Biol. **233:** 349-358.
42. **Aiyar, S. E., Helmann, J. D.** and **deHaseth, P. L.** 1994. A mismatch bubble in double-stranded DNA suffices to direct precise transcription initiation by *Escherichia coli* RNA polymerase. J. Biol. Chem. **269:** 13179-13184.
43. **Timm, D. E., deHaseth, P. L.** and **Neet, K. E.** 1994. Comparative equilibrium denaturation studies of the neurotrophins: Nerve Growth Factor, Brain-Derived Neurotrophic Factor, Neurotrophin-3 and Neurotrophin 4/5. Biochemistry **33:** 4667-4676.
44. **Aiyar, S. E., Juang, Y.-L., Helmann, J. D.** and **deHaseth, P. L.** 1994. Mutations in sigma factor that affect the temperature dependence of transcription from a promoter, but not from a mismatch bubble in double-stranded DNA. Biochemistry **33**: 11501-11507.
45. **deHaseth, P. L.** and **Helmann, J. D.** 1995. Open complex formation by *Escherichia coli* RNA polymerase: the mechanism of polymerase-induced strand separation of double helical DNA. Mol. Microbiol. **16**: 817-824.
46. **Mita, B. C., Tang, Y.** and **deHaseth, P. L.** 1995. Interference of P_R-bound RNA polymerase with open complex formation at P_{RM} is relieved by a 10-base pair deletion between the two promoters. J. Biol. Chem. **270:** 30428-30433.

47. **Tang, Y., Murakami, K., Ishihama, A.** and **deHaseth, P. L.** 1996. Upstream interactions at the lambda P_{RM} promoter are sequence nonspecific and activate the promoter to a lesser extent than an introduced UP element of an rRNA promoter. J. Bacteriol. **178:** 6945-6951.
48. **Sullivan, J. J., Bjornson, K. P., Sowers, L. C.** and **deHaseth, P. L.** 1997. Spectroscopic determination of open complex formation at promoters for *Escherichia coli* RNA polymerase. Biochemistry **36:**8005-8012.
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50. **deHaseth, P. L., Zupancic, M.** and **Record Jr., M. T.** 1998. RNA polymerase-promoter interaction: the comings and goings of RNA polymerase. J. Bact. **180:** 3019-3025.
51. **Strainic Jr., M. G., Sullivan, J. J., Velevis, A.,** and **deHaseth, P. L.** 1998. Promoter recognition by *Escherichia coli* RNA polymerase: Effects of the UP element on open complex formation and promoter clearance. Biochemistry **37**: 18074-18080.
52. **deHaseth, P. L.** and **Setzer, D. R.** 1999. Promoter, pp 1969-1975; **deHaseth, P.L.** and **Maurer, R.A.** 1999. Lysogeny; pp 1418-1421; **Maurer, R.A.** and **deHaseth, P.L.** 1999. Bacteriophage lambda, pp 1363-1366. Contributions to "Encyclopedia of Molecular Biology", T.E. Creighton, Editor-in-Chief.
53. **Helmann, J.D**. and **deHaseth, P.L**. 1999. Protein-nucleic acid interactions during open complex formation investigated by systematic alteration of the protein and DNA binding partners. Biochemistry **38**: 5959-5967.
54**. Strainic Jr., M. G., Sullivan, J. J., J. Collado-Vides** and **deHaseth, P. L.** 2000. Promoter interference in a bacteriophage lambda control region: Effects of a range of inter-promoter distances. J. Bact. **182**: 216-220.
55. **Lissemore, J.L., Jankowski, J.T., Thomas, C.B., Mascotti, D.P.** and **deHaseth, P.L.** 2000. Green fluorescent protein as a quantitative reporter of relative promoter activity in *E. coli*. BioTechniques **28**: 82-89.
56. **Panaghie, G., Aiyar, S.E., Bobb, K.L., Hayward, R.S.** and **deHaseth, P.L**. 2000. Aromatic amino acids in region 2.3 of *Escherichia coli* sigma 70 participate collectively in the formation of an RNA polymerase-promoter open complex. J. Mol. Biol. **299**: 1217-1230.
57. **Tomsic, M., Tsujikawa, L., Panaghie. G., Wang, Y., Azok, J.** and **deHaseth, P.L.** 2001. Different roles for basic and aromatic amino acids in conserved region 2 of *E. coli* σ^{70} in the nucleation and maintenance of the single stranded DNA bubble in open RNA polymerase-promoter complexes. J. Biol. Chem. **276**, 31891-31896.
58. **Auble, D.T.** and **deHaseth, P.L.** 2002. Transcription. Contribution to "Encyclopedia of Genetics", R. Robinson, editor. Macmillan Reference USA, New York.
59. **Tsujikawa,L., Tsodikov, O.V.** and **deHaseth, P.L.** 2002. Interaction of RNA polymerase with forked DNA: evidence for two kinetically significant intermediates on the pathway to the final complex. Proc. Natl. Acad. Sci. USA **99**, 3493-3498.
60. **Tsujikawa, L., Strainic, M.G., Wathrob, H., Barkley, M.D.** and **deHaseth, P.L**. 2002. RNA polymerase alters the mobility of an A-residue crucial to polymerase-induced melting of promoter DNA. Biochemistry **41**, 15334-15341.
61. **Wang, Y.** and **deHaseth, P.L.** 2003. Sigma 32-dependent promoter activity *in vivo*. Sequence determinants of the GroE promoter. J. Bact. **185**, 5800-5806.
62. **deHaseth, P.L.** and **Tsujikawa, L.** 2003. Role of region 2.3 of *E. coli* σ^{70} in the nucleation and maintenance of the single stranded DNA bubble in RNA polymerase-promoter open complexes. Methods in Enzymology **370**, 553-567.
63 **deHaseth, P.L.** and **Nilsen, T.W.** 2004. When a part is as good as the whole. Science **303**, 1307-1308. (commentary)
64. **Sun, L., Dove, S.L., Panaghie, G., deHaseth, P.L.,** and **Hochschild, A.** 2004. An RNA polymerase mutant deficient in DNA melting facilitates study of activation mechanism: Application to an artificial activator of transcription. J. Mol. Biol. **343**, 1171-1182 (2004).
65. **Schroeder, L.A.** and **deHaseth, P.L.** 2005. Mechanistic differences in promoter DNA melting by *Thermus aquaticus* and *Escherichia coli* RNA polymerases. J. Biol. Chem **280**, 17422-17429.
66. **Kourennaia, O.V., Tsujikawa, L.** and **deHaseth, P.L.** 2005. Mutational analysis of *Escherichia coli* heat shock transcription factor sigma 32 reveals similarities with sigma 70 in recognition of the -35 promoter element and differences in promoter DNA melting and -10 recognition. J. Bact. **187**, 6762-6769.
67. **Schroeder, L.A., Choi, A.-J.** and **deHaseth, P.L.** 2007. The –11A of promoter DNA and two conserved amino acids in the melting region of σ^{70} both directly affect the rate limiting step in formation of the stable RNA polymerase-promoter complex, but they do not necessarily interact. Nucleic Acids Research **35**, 4141-4153.
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69. **Kourennaia, O.V.** and **deHaseth, P.L.** 2007. Substitution of a highly conserved histidine in the *Escherichia coli* heat shock transcription factor, σ^{32}, affects promoter utilization in vitro and leads to overexpression of the biofilm-associated Flu protein in vivo. J. Bact. **189**, 8430-8436.
70. **Schroeder, L.A.** and **deHaseth, P.L.** 2008. Threonine 429 of *E. coli* σ^{70} is a key participant in promoter DNA melting by RNA polymerase. J. Mol. Biol. **376**, 153-165.

71. **Schroeder, L.A., Gries T.J., Saecker, R.M., Record, Jr., M.T., Harris, M.E. and deHaseth, P.L.** 2009. Evidence for a tyrosine-adenine stacking interaction and for a short-lived open intermediate subsequent to initial binding of *Escherichia coli* RNA polymerase to promoter DNA. J. Mol. Biol. **385**, 339-349. PMCID: PMC2677906

72**. Koo, B.-M., Rhodius, V.A., Nonaka, deHaseth, P.L.** and **Gross, C.A.** 2009. Reduced capacity of alternative sigmas to melt promoters ensures stringent promoter recognition. Genes & Dev. **23**, 2426-2436. PMCID: PMC2764494

73. **deHaseth, P.L., Gott, J.M.** 2010. Conformational flexibility of σ^{70} in anti-terminator loading. Mol. Microbiol. **75**, 543-546. (commentary).

74. **Saecker, R.M., Record, Jr., M.T. and deHaseth, P.L.** 2011. Mechanism of bacterial transcription initiation: RNA polymerase-promoter binding, isomerization to initiation-competent complex, and initiation of RNA synthesis. J. Mol. Biol. **412**, 754-771.