

CHEMICAL HERITAGE FOUNDATION

JOHN SONDEK

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Karen A. Frenkel

at

University of North Carolina, Chapel Hill
Chapel Hill, North Carolina

on

27, 28, and 29 March 2006

From the Original Collection of the University of California, Los Angeles

ACKNOWLEDGEMENT

This oral history is part of a series supported by a grant from the Pew Charitable Trusts based on the Pew Scholars Program in the Biomedical Sciences. This collection is an important resource for the history of biomedicine, recording the life and careers of young, distinguished biomedical scientists and of Pew Biomedical Scholar Advisory Committee members.

This oral history was completed under the auspices of the Oral History Project, University of California, Los Angeles (Copyright © 2007, The Regents of the University of California) and is made possible through the generosity of



**From the original collection at the Center for
Oral History Research, UCLA Library, UCLA.**

The following oral history, originally processed at the UCLA Center for Oral History Research, has been reformatted by the Chemical Heritage Foundation. The process involved reformatting the front matter, adding a new abstract, replacing the table of contents, and replacing the index. The paragraph spacing and font of the body of the transcript were altered to conform to the standards of the Oral History Program at the Chemical Heritage Foundation. The text of the oral history remains unaltered; any inadvertent spelling or factual errors in the original manuscript have not been modified. The reformatted version and digital copies of the interview recordings are housed at the Othmer Library, Chemical Heritage Foundation. The original version and research materials remain at the Darling Library, University of California, Los Angeles and at the Bancroft Library, University of California, Berkeley.

REFORMATTING:

Kim Phan, Program Intern, Oral History, Chemical Heritage Foundation. B.A. expected 2011, Anthropology, Cornell University.

David J. Caruso, Program Manager, Oral History, Chemical Heritage Foundation. B.A., History of Science, Medicine, and Technology, Johns Hopkins University; PhD., Science and Technology Studies, Cornell University.

B111307



In exchange for the UCLA Library's Center for Oral History Research conducting and recording the series of interviews with me beginning on or about March 27, 2006, I, John Sondek, do hereby give all right, title, and interest, including copyright, in and to those interviews to the Regents of the University of California and grant that they may be used for any research, educational, or other purpose that the University may deem appropriate. I understand that I may still use the information in the recordings myself without seeking permission from the University.

I have read and agree to the Center for Oral History Research's Use Policy, which outlines the current and likely future uses of interviews donated to the Center's collection.

I place the following restrictions on access to and use of the interviews:

The University must seal portions of the audio recording and transcript of the interviews determined by me and not make them available for public access until January 1, 2048.

This agreement supersedes any prior agreements between me and the University.

Interviewee (Signature)

John Sondek

(Typed Name)

Department of Pharmacology and Biochemistry & Biophysics, University of North Carolina, Chapel Hill, CB #7365, 1038, Mary Ellen Jones Building, Chapel Hill, NC 27599-7365

(Address)

919.966.7530

(Phone Number)

sondek@med.unc.edu

(E-mail Address)

10/29/07

(Date)

Signed on behalf of the Regents of the University of California:



Head, UCLA Library's Center for Oral History Research

Teresa Barnett

(Typed Name)

(310) 206-2454

(Phone Number)

t Barnett@library.ucla.edu

(E-mail Address)

11/13/07

(Date)

Pew Scholars in the Biomedical Sciences
Chemical Heritage Foundation Internet Posting Release Form

I, John Sondek, Ph.D., hereby request that my wishes be followed as per the checked selection below with regards to posting portions of the digital copy of the audio-taped interview of me and the related written transcript on the internet for non-commercial, educational use only.

Please check one:

a. _____

No restrictions for Internet Posting.

NOTE: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to obtain permission from Chemical Heritage Foundation, Philadelphia, Pennsylvania.

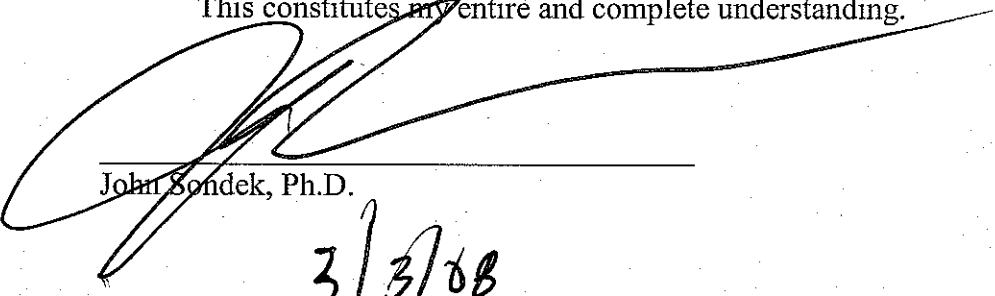
b. _____

Semi-restricted Internet Postings (My review of the material intended to post is required.)

c. _____

Restricted access. (Do not post.)

This constitutes my entire and complete understanding.



John Sondek, Ph.D.

Date

3/3/08

This interview has been designated as **Free Access**.

One may view, quote from, cite, or reproduce the oral history with the permission of CHF.

Please note: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to credit CHF using the format below:

John Sondek, interview by Karen A. Frenkel at the University of North Carolina, Chapel Hill, Chapel Hill, North Carolina, 27-29 March 2006 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0621).



Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106



The Chemical Heritage Foundation (CHF) serves the community of the chemical and molecular sciences, and the wider public, by treasuring the past, educating the present, and inspiring the future. CHF maintains a world-class collection of materials that document the history and heritage of the chemical and molecular sciences, technologies, and industries; encourages research in CHF collections; and carries out a program of outreach and interpretation in order to advance an understanding of the role of the chemical and molecular sciences, technologies, and industries in shaping society.

JOHN SONDEK

1963 Born in Niagara Falls, New York on 3 September

Education

1985 B.S., Biochemistry *cum laude*, University of Rochester

1992 Ph.D., Biochemistry and Cellular and Molecular Biology, Johns Hopkins University School of Medicine

Professional Experience

Yale University
1993-1996 Damon Runyon–Walter Winchell Fellow

University of North Carolina, Chapel Hill
1996-2002 Assistant Professor, Department of Pharmacology and Department of Biophysics and Biochemistry
2002-2006 Associate Professor, Department of Pharmacology and Department of Biophysics and Biochemistry
2006–present Professor, Department of Pharmacology and Department of Biophysics and Biochemistry

UNC Lineberger Comprehensive Cancer Center
1998-present Member

Honors

1981-1985 Regents Scholarship, State of New York
1981-1985 Centennial Prize Scholarship, University of Rochester
1985-1986 NIH Predoctoral Fellowship, The Johns Hopkins University
1989-1992 Predoctoral Fellowship, Institute for Biophysical Research on Macromolecular Assemblies, The Johns Hopkins University
1991-1992 Institutional Research Grant, The Johns Hopkins University
1993-1996 Damon Runyon-Walter Winchell Fellowship
1999-2003 Pew Scholar in the Biomedical Sciences

Selected Publications

- Chhatiwala, M.K., Betts, L., Worthylake, D.K. and Sondek, J. (2007) The DH and PH Domains of Trio Coordinately Engage Rho GTPases for their Efficient Activation. *J. Mol. Biol.* 368, 1307-1320.
- Desveaux, D., Singer, A.U., Wu, A.J., McNulty, B.C., Musselwhite, L., Nimchuk, Z., Sondek, J. and Dangl, J.L. (2007) Type III Effector Activation via Nucleotide Binding, Phosphorylation, and Host Target Interaction. *PLoS Pathog.* 3, e48.
- Yohe, M.E., Rossman, K.L., Gardner, O.S., Karnoub, A.E., Snyder, J.T., Gershburg, S., Graves, L.M., Der, C.J. and Sondek, J. (2007) Auto-inhibition of the Dbl Family Protein Tim by an N-terminal Helical Motif. *J. Biol. Chem.* 282, 13813-13823.
- Baumeister, M.A., Rossman, K.L., Sondek, J. and Lemmon, M.A. (2006). The Dbs PH domain contributes independently to membrane targeting and regulation of guanine nucleotide-exchange activity. *Biochem. J.* 400(3): 563- 72.
- Jezyk, M.R., Snyder, J.T., Gershberg, S., Worthylake, D.K., Harden, T.K. and Sondek, J. (2006). Crystal structure of Rac1 bound to its effector phospholipase C-f32. *Nat. Struct. Mol. Biol.* 13(12): 1135-40.
- Zhou, Y., Wing, M.R., Sondek, J. and Harden, T.K. (2005). Molecular cloning and characterization of phospholipase C-12. *Biochem. J.* 391, 667-676.
- Smith, W.J., Hamel, B., Yohe, M.E., Sondek, J., Cerione, R.A. and Snyder, J.T. (2005). A Cdc42 mutant specifically activated by intersectin. *Biochemistry* 44, 13282-90.
- Johnston, C.A., Willard, F.S., Jezyk, M.R., Fredericks, Z., Bodor, E.T., Jones, M.B., Blaesius, R., Watts, V.J., Harden, T.K., Sondek, J., Ramer, J.K. and Siderovski, D.P. (2005). Structure of G*β*i1 bound to a GDP-selective peptide provides insight into guanine nucleotide exchange. *Structure (Camb)* 13,1069- 80.
- Kim, H. S., Desveaux, D., Singer, A.U., Patel, P., Sondek J. and Dangl, J.L. (2005). The *Pseudomonas syringae* effector AvrRpt2 cleaves its C-terminally acylated target, RIN4, from *Arabidopsis* membranes to block RPM1 activation. *Proc. Natl. Acad. Sci. U.S.A.* 102, 6496-6501.
- Lu M., Kinchen J.M., Rossman K.L., Grimsley C., Hall M., Sondek J., Hengartner M.O., Yajnik V., and Ravichandran K.S. (2005) A Steric Inhibition Model for Regulation of Nucleotide Exchange via the Dock1 80 Family of GEFs. *Current Biology* 15, 371-377.
- Gentry H.R., Singer A.U., Betts L., Yang C., Ferrara J.D., Sondek J., and Parise L.V. (2005) Structural and biochemical characterization of CIB 1 delineates a new family of EF-hand containing proteins. *J. Biol. Chem.* 280, 8407-8415.
- Singh A., Karnoub A.E., Palmby T.R., Lengyel E., Sondek J., and Der C.J. (2004). Rac1b, a tumor associated, constitutively active Rac1 splice variant, promotes cellular transformation. *Oncogene* 23, 9369-93 80.
- deBakker C.D., Haney L.B., Kinchen J.M., Grimsley C., Lu M., Klingele D., Hsu P.K., Chou B.K., Cheng L.C., Blangy A., Sondek J., Hengartner M.O., Wu Y.C., and Ravichandran K.S. (2004). Phagocytosis of apoptotic cells is regulated by a UNC-73/TRIO-MIG-2/RhoG signaling module and armadillo repeats of CED-12/ELMO. *Curr Biol.* 14, 2208-2216.
- Seifert J.P., Wing M.R., Snyder J.T., Gershburg S., Sondek J. and Harden T.K. (2004). RhoA activates purified phospholipase C-E by a guanine nucleotide-dependent mechanism. *J. Biol. Chem.* 279, 47992-47997.

- Singer, A.U., Desveaux, D., Betts, L., Chang, J.H., Nimchuk, N., Grant, S.R., Dangel, J.L. and Sondek, J. (2004). Crystal structure of a type III effector and its chaperone reveal residues required for both pathogen virulence and host resistance. *Structure*, 12, 1669-1681.
- Lu M., Kinchen J.M., Rossman K.L., Grimsley C., deBakker C., Brugnera E., Tosello-Trampont A.C., Haney L.B., Klingele D., Sondek J., Hengartner M.O. and Ravichandran K.S. (2004). PH domain of ELMO functions in trans to regulate Rac activation via Dock180. *Nat. Struct. Mol. Biol.* 11, 756-762.
- Worthylake, D.K., Rossman, K.L. and Sondek, J. (2004). Crystal structure of the DH/PH fragment of Dbs without bound GTPase. *Structure*, 12, 1-8.
- Solski P.A., Wilder R.S., Rossman K.L., Sondek, J., Cox A.D., Campbell S.L. and Der C.J. (2004). Requirement for C-terminal sequences in regulation of Ect2 guanine nucleotide exchange specificity and transformation. *J. Biol. Chem.* 279:25226-33.
- Chen Y., Vallee S., Wu J., Vu D., Sondek J. and Ghosh G. (2004). Inhibition of NF- κ B activity by I κ B3 in association with κ B-Ras. *Mol. Cell. Biol.* 24, 3048- 3056.
- Salazar M.A., Kwiatkowski A.V., Pellegrini L., Cestra G., Butler M.H., Rossman K.L., Serna D.M., Sondek J., Gertler F.B. and De Camilli P. (2003). Tuba, a novel protein containing bin/amphiphysin/Rvs and Dbl homology domains, links dynamin to regulation of the actin cytoskeleton. *J. Biol. Chem.* 278, 49031-49043.
- Wing, M.R., Snyder, J.T., Sondek, J. and Harden, T.K. (2003). Direct activation of phospholipase C-epsilon by Rho. *J. Bio. Chem.* 278, 41253-41258.
- Snyder, J.T., Singer, A.U., Wing, M.R., Harden, T.K. and Sondek, J. (2003). The PH domain of PLC- β 2 as an effector site for Rac. *J. Biol. Chem.* 278, 21099-21104.
- Pruitt W.M., Karnoub A.E., Rakauskas A.C., Guipponi M., Antonarakis S.E., Kurakin A., Kay B.K., Sondek J., Siderovski D.P. and Der C.J. (2003). Role of the pleckstrin homology domain in intersectin-L Dbl homology domain activation of Cdc42 and signaling. *Biochim Biophys Acta.* 1640, 61-68.
- Rossman, K.L., Cheng, L., Mahon, G.M., Rojas, R.J., Snyder, J.T., Whitehead, I.P. and Sondek, J. (2003). Multifunctional roles for the PH domain of Dbs in regulating cellular signaling and transformation. *J. Biol. Chem.* 278, 18393- 18400.
- Baumeister M.A., Martinu L., Rossman K.L., Sondek J., Lemmon M.A. and Chou M.M. (2003). Loss of PtdIns-3-P binding by the C-terminal Tiam-1 pleckstrin homology (PH) domain prevents in vivo Rac1 activation without affecting membrane targeting. *J Biol. Chem.* 278, 11457-11464.
- Rossman, K.L., Worthylake, D.K., Snyder, J.T., Cheng, L., Whitehead, I.P. and Sondek, J. (2002). Functional analysis of Cdc42 residues required for guanine nucleotide exchange. *J. Biol. Chem.* 277, 50893-50898.
- Barry, T.W., Boudignon-Proudhon, C., Shock, D., MacFadden, A., Weiss, J.M., Sondek, J. and Parise, L.V. (2002). Molecular basis of CIB binding to the integrin α IIb cytoplasmic domain. *J. Biol. Chem.* 277, 28877-28883.
- Cheng, L., Rossman, K.L., Mahon, G.M., Worthylake, D.K., Korus, M., Sondek, J. and Whitehead, I.P. (2002). RhoGEF specificity mutants implicate RhoA as a target for Dbs transforming activity. *Mol. Cell. Bio.* 22, 6895-6905.
- Kimple M.E. and Sondek J. (2002). Affinity tag for protein purification and detection based on the disulfide-linked complex of InaD and NorpA. *Biotechniques* 33, 578, 580, 584-8 passim.
- Lambert, J.M., Lambert, Q.T., Reuther, G.W., Malliri, A, Siderovski, D.P., Sondek, J., Collard,

- J.G. and Der, C.J. (2002). Tiam1 mediates Ras activation of Rac by a PI(3)K-independent mechanism. *Nature Cell Bio.* 4, 62 1-625.
- Kimple, R.A., Kimple, M.E., Betts, L., Sondek, J. and Siderovski, D.P. (2002). Structural determinants for GoLoco-induced inhibition of Gá nucleotide release. *Nature* 416, 878-881.
- Snyder, J.T., Worthylake, D.K., Rossman, K.L., Betts, L., Pruitt, W.M., Siderovski, D.P., Der, C.J. and Sondek, J. (2002). Structural basis for the selective activation of Rho GTPases by Dbl exchange factors. *Nature Struct. Bio.* 9, 468-475.
- Rossmann, K.L., Worthylake, D.K., Snyder, J.T., Siderovski, D.P., Campbell, S.L. and Sondek, J. (2002). Crystal structure of Dbs in complex with Cdc42: PH domain-assisted guanine nucleotide exchange. *EMBO J.* 21, 13 15-1326.
- Singer, A.U., Waldo, G.L., Harden, T.K. and Sondek J. (2002). A unique fold of phospholipase C-â mediates dimerization and interaction with Gáq. *Nature Struct. Biol.* 9, 32-36.
- Karnoub, A.E., Worthylake, D.K., Rossman, K.L., Pruitt, W.M., Campbell, S.L., Sondek, J. and Der, C.J. (2001). Molecular basis for Rac1 recognition by guanine nucleotide exchange factors. *Nature Struct. Bio.* 8, 1037 - 1041.
- Snyder J.T., Rossman K.L., Baumeister M.A., Pruitt W.M., Siderovski D.P., Der C.J., Lemmon M.A. and Sondek J. (2001). Quantitative analysis of the effect of phosphoinositide interactions on the function of Dbl family proteins. *J. Biol. Chem.* 276, 45868-45875.
- Kimple, M.E., Siderovski, D.P., and Sondek, J. (2001). Functional relevance of the disulfide-linked complex of the N-terminal PDZ domain of InaD with NorpA. *EMBO J.* 20, 44 14-4422.
- Reuther, G.W., Lambert, Q.T., Booden, M.A., Wennerberg, K., Becknell, B., Marcucci, G., Sondek, J., Caligiuri, M.A., and Der, C.J. (2001). Leukemia-associated Rho guanine nucleotide exchange factor, a Dbl family protein found mutated in leukemia, causes transformation by activation of RhoA. *J. Biol. Chem.* 276, 27145-2715 1.
- Worthylake, D.K., Rossman, K.L. and Sondek, J. (2000). Crystal structure of Rac 1 in complex with the guanine nucleotide exchange region of Tiam1. *Nature* 408, 682-688.
- Shock, D.D., Naik, U.P., Brittain, J.E., Alahari, S.K, Sondek, J. and Parise, L.V. (1999). Calcium-dependent properties of CIB binding to the integrin α IIb cytoplasmic domain and translocation to the platelet cytoskeleton. *Biochem. J.* 342, 729-735.
- Snow, B.E., Betts, L., Mangion, J., Sondek, J., Siderovski, D.P. (1999). Fidelity of G protein fr-subunit association by the G protein γ -subunit-like domains of RGS6, RGS7, and RGS11. *Proc. Natl. Acad. Sci. U.S.A.* 96, 6489-6494.
- Lambright, D.G., Sondek, J., Bohm, A., Skiba, N.P., Hamm, H.E. and Sigler, P.B. (1996). The 2.0 Å crystal structure of a heterotrimeric G protein. *Nature*, 379, 311-319.
- Slepak, V.Z., Artemyev, N.O., Zhu, Y., Dumke, C.L., Sabacan, L., Sondek, J., Hamm, H.E., Bownds, M.D. and Arshavsky, V.Y. (1995). An effector site that stimulates G protein GTPase in photoreceptors. *J. Biol. Chem.* 270, 143 19- 14324.
- Sondek, J., Lambright, D.G., Noel, J.P., Hamm, H.E. and Sigler, P.B. (1994). GTPase mechanism of G proteins from the 1.7 Å crystal structure of transducin α •GDP•AlF₄⁻. *Nature* 372, 276-279.
- Sondek, J., Bohm, A., Lambright, D.G., Hamm, H.E. and Sigler, P.B. (1996). The 2.1 Å crystal structure of a G protein dimer. *Nature*, 379, 369-374.
- Keefe, L.J., Quirk, S., Gittis, A., Sondek, J. and Lattman, E.E. (1994). Accommodation of insertion mutations on the surface and in the interior of staphylococcal nuclease. *Protein*

- Science* 3, 391-401.
- Keefe, L.J., Sondek, J., Shortle, D. and Lattman, E.E. (1993). The a aneurysm: A structural motif revealed in an insertion mutant of staphylococcal nuclease. *Proc. Natl. Acad. Sci. U.S.A.* 90, 3275-3279.
- Thomas, P.J., Shenbagamurthi, P., Sondek, J., Hullihen, J. and Pedersen, P.L. (1992). The cystic fibrosis transmembrane conductance regulator: Effects of the most common cystic fibrosis-causing mutation on the secondary structure and stability of a synthetic peptide. *J. Biol. Chem.* 267, 5727-5730.
- Sondek, J. and Shortle, D. (1992) Structural and energetic differences between insertions and substitutions in staphylococcal nuclease. *Proteins: Struct., Func., and Gen.* 13, 132-140.
- Sondek, J. and Shortle, D. (1992). A general strategy for random insertion and substitution mutagenesis: Sub stoichiometric coupling of trinucleotide phosphoramidites. *Proc. Natl. Acad. Sci. U.S.A.* 89, 3581-3585.
- Sondek, J. and Shortle, D. (1990). Accommodation of single amino acid insertions by the native state of staphylococcal nuclease. *Proteins: Struct., Func., and Gen.* 7, 299-305.
- Harden, T. K. & Sondek, J. (2006). Regulation of phospholipase C isozymes by ras superfamily GTPases. *Annu Rev Pharmacol Toxicol* 46, 355-379.
- Snyder, J. T., Jezyk, M. R., Gershburg, S., Harden, T. K. & Sondek, J. (2006). Regulation of PLC-3 isoforms by Rac. *Methods Enzymol.* 406, 272-280.
- Bourdon, D. M., Wing, M. R., Edwards, E. B., Sondek, J. & Harden, T. K. (2006). Quantification of isozyme-specific activation of phospholipase C-32 by Rac GTPases and phospholipase C-E by Rho GTPases in an intact cell assay system. *Methods Enzymol.* 406, 489-499.
- Rossmann, K.L. and Sondek J. (2005). Larger than Dbl: New structural insights into RhoA activation. *Trends Biochem Sci.* 30, 163-165.
- Rossmann, K.L., Der, C.J. and Sondek, J. (2005). GEF means GO: Turning on Rho GTPase with guanine nucleotide exchange factors. *Nat. Rev. Mol. Cell. Biol.*, 6: 167-180.
- Rojas, R.J., Kimple, R.J., Rossmann, K.L., Siderovski, D.P. and Sondek, J. (2003). Established and emerging fluorescence-based assays for G-protein function: Ras-superfamily GTPases. *Comb. Chem. High Throughput Screen.* 6, 409-418.
- Siderovski, D.P., Snow, B.E., Chung, S., Brothers, G.M., Sondek, J. and Betts, L. (2002). Assays of complex formation between RGS protein G- γ subunit-like (GGL) domains and G-3 subunits. *Methods Enzymol.* 344, 702-723.
- Sondek, J. and Siderovski, D. P. (2001). G- γ like (GGL) domains: New frontiers in G protein signaling and β -propeller scaffolding. *Biochem. Pharmacol.* 61, 1329-1337.
- Shortle, D. and Sondek, J. (1995). The emerging role of insertions and deletions in protein engineering. *Current Opinion in Biotech.* 6, 3 87-393.

ABSTRACT

John Sondek grew up in Lewiston, New York, the fourth of five children. His father owned a grocery store, and his mother was a homemaker. Sondek worked hard on his schoolwork and liked all kinds of classes. He particularly remembers his chemistry and biology teachers as being enthusiastic and good. He took his first biochemistry class in high school and became fascinated with DNA manipulation. He also played football in high school.

Sondek's first research experience occurred during college at the University of Rochester, where he worked for Michael Hampsey in Fred Sherman's lab. Becoming more interested in biochemistry, he decided to pursue science as a career, and spent some time in the interview reflecting on the Sherman laboratory and Sondek's own early research experience.

He attended graduate school at Johns Hopkins University, where he rotated into David Shortle's laboratory to work on protein folding. Wanting to work on heterotrimeric proteins, Sondek accepted a postdoctoral fellowship with Paul Sigler at Yale University. He found that Shortle and Sigler had different mentoring styles, both of which influenced his own style of working with students in lab.

After his postdoc, Sondek accepted a position at University of North Carolina in Chapel Hill, North Carolina. He continued his current research in signal transduction systems controlled by heterotrimeric G protein and he collaborated with T. Kendall Harden. During his time at Chapel Hill, Sondek received the Pew Scholars Program in the Biomedical Sciences grant, which had a large influence on his work, and about which he characterizes the process of funding individual research grants from the National Institutes of Health.

As the interview concludes, Sondek gives his views on his obligation to provide service to his professional community and to promote the national science agenda. He goes into greater detail about his current research in the structural biology of signal transduction; the wider context of his work; and practical applications of his research. He describes what he likes best about being a principal investigator; the qualities of a good scientist; and the process of writing journal articles. He answers the interviewer's questions about the issue of patents, his in particular; gender issues in science; science and religion; politics and science; the role of the scientist in educating the public about science; and ethical questions in science. The interview ends with a discussion of Sondek's leisure activities; his professional and personal goals; and the difficulty of balancing family life and work life.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Karen A. Frenkel, Interviewer, UCLA Oral History Program; B.A., Hampshire College, 1978; M.S., Boston University, 1982

TIME AND SETTING OF INTERVIEW:

Place: Sondek's office at University of North Carolina, Chapel Hill, NC.

Date: March 27, 28, and 29, 2006

Total number of recorded hours: 6.0

Persons present during interview: Sondek and Frenkel.

CONDUCT OF INTERVIEW:

This interview is one in a series with Pew Scholars in the Biomedical Sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts' Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships since 1988.

To provide an overall framework for project interviews, the director of the UCLA Oral History Program and three UCLA faculty project consultants developed a topic outline. In preparing for this interview, Frenkel held a telephone pre-interview conversation with Sondek to obtain written background information (curriculum vitae, website address, copies of published articles, etc.) and agree on an interviewing schedule. She also reviewed the documentation in Sondek's file at the Pew Scholars Program office in San Francisco, including his proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members.

ORIGINAL EDITING

Carol Squires edited the interview. She edited for punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Sondek reviewed the transcript. He verified proper names and made a number of corrections and additions.

TABLE OF CONTENTS

Childhood, College, and Graduate School	1
Family background. Childhood experiences. Religion. Interests as a young man. Influential teachers. Attending high school in Lewiston, New York. Extracurricular activities. Parental expectations. Meets yeast geneticist Fred Sherman. First research experience working for Michael Hampsey during college. Interest in biochemistry. Attends the University of Rochester. College experiences. Decision to pursue science. Sherman's laboratory. Writing journal articles. Attends graduate school at Johns Hopkins University. Rotations in graduate program at Johns Hopkins. Work on protein folding in David Shortle's laboratory. Patents.	
Postdoctoral Work and Becoming a Principal Investigator	37
Postdoctoral fellowship with Paul B. Sigler at Yale University. Reasons for wanting to work in the Sigler lab. Shortle's mentoring style. Sigler's mentoring style. Competition in science. Mentoring style. Funding history. Accepts a position at University of North Carolina, Chapel Hill. Current research in signal transduction systems controlled by heterotrimeric G proteins. Collaboration with T. Kendall Harden. Reasons for becoming a principal investigator. Practical applications of research. Setting up lab. Reasons for accepting the position at University of North Carolina, Chapel Hill. Pew Scholars Program in the Biomedical Sciences. Role in educating the public about science. Process of funding individual research grants from the National Institutes of Health. Service to professional community. National science agenda.	
Current Research and Reflections on Science	64
More on current research in the structural biology of signal transduction. Wider context of work. Qualities of a good scientist. Writing journal articles. Patents. Gender. Science and religion. Politics and science. Role of the scientist in educating the public about science. Ethical questions in science. Peer-review system for journal articles. Balancing family and career. Leisure activities. Professional and personal goals.	
Index	104

INDEX

A

acquired immunodeficiency syndrome, 88
Adirondack Mountains, 7
Agard, David, 39
AIDS. *See* acquired immunodeficiency syndrome
American Cancer Society, 46, 53, 62, 63
Amzel, L. Mario, 25, 27
APC-stimulated exchange factor, 99
Applied Biosystems, 89

B

Balon, Frank (paternal uncle-in-law), 9
Balon, Helen (paternal aunt), 9
Baltimore, Maryland, 39
Berg, Jeremy M., 60, 64, 66, 90, 91
Bohm, Andrew, 43, 63
Botstein, David, 27
Burroughs Wellcome Trust, 48
Bush, President George W., 87, 93

C

California, 34, 94
Canada, 33, 55, 94
Cdc42, 99
Cell, 29, 44
Centers for Disease Control and Prevention, 88
Chapel Hill, North Carolina, 34, 47, 64, 80, 81, 86
Cheevers, Matthew, 46, 85
Chhatriwala, Maria, 46
Chomsky, Noam, 93
Clinton, President William J., 36, 93
collaboration, 40, 41
crystallography, 25, 38, 39, 44, 46, 50, 51, 55
cytochrome c, 22, 25

D

Department of Homeland Security, 94
Devreotes, Peter, 25, 26, 27, 47
Dictyostelium, 25, 27, 47
DNA, 10, 11, 12, 22, 28, 32, 48, 66, 89
Dover, Pennsylvania, 87
Duke University, 24, 47
Dunn, Teresa M., 29

E

E. coli, 10
European Union, 83

F

faciogenital dysplasia, 74
Ferguson, Kathryn M., 41
Florida, 53, 59
Freischlag, Scott, 6

G

G protein, 27, 40, 48, 49, 67, 68, 69, 70, 73, 77
G protein-coupled receptor, 47, 68
Germany, 20
Gilman, Alfred, 27
GPCR. *See* G protein-coupled receptor
grants/funding, 31, 35, 43, 44, 45, 46, 48, 55, 57, 58, 59, 60, 61, 63, 64, 65, 66, 83, 91, 93, 94, 103
guanosine triphosphatase, 49, 99
guanosine triphosphate, 71

H

Hamel, Brant, 46
Hamilton College, 13
Hampsey, Michael, 11, 19, 20, 24, 31
Harden, T. Kendall, 31, 47, 48, 49, 55, 56, 67, 71, 75, 79
Harris, Celia, 63
Harvard University, 47, 79, 85

Hendrickson, Wayne A., 47
heterotrimeric proteins, 40, 47, 48, 49, 50,
68, 70, 77
Hicks, Stephanie, 46
Hogan, Michael, 13, 14
Holzschu, Don, 21
Hood, Leroy, 89
Howard Hughes Medical Institute, 26, 28,
40, 43, 44
Human Genome Project, 89
human papillomavirus, 88

I

Ignatz, Mr., 5
inositol triphosphate, 73

J

Japan, 33, 83
Jezyk, Mark R., 79
Johns Hopkins University, 24, 25, 26, 27,
28, 34, 38, 57, 80
Juliano, Rudolph L., 55, 56, 64

K

Klein, Peter, 26
Korea, 23
Kuliopulos, Athan, 29, 57
Kyoto Protocols, 94

L

Lambright, David G., 40, 43
Lattman, Edward E., 38
Lemmon, Mark A., 41
Lewiston, New York, 3
Louisiana State University, 20, 65

M

McKay, David, 39
Meeker, Alan K., 28, 29
Mildvan, Albert S., 29
Moffitt Cancer Center, 59
MorphoSys AG, 34, 79
Mt. Sinai Medical Center, 55
Mt. Sinai School of Medicine, 47

N

Nardone, William, 13
Nathans, Jeremy, 27, 28
National Academy of Sciences, 29, 43
National Cancer Institute, 60
National Collaborative Drug Discovery
Group, 59
National Eye Institute, 60
National Institute of General Medical
Sciences, 60, 64
National Institutes of Health, 28, 35, 46, 58,
62, 63, 64, 65, 82, 89, 90, 91, 92, 93
National Science Foundation, 46
Nature, 40, 44, 76
neutrophil, 54, 55, 70, 74
New York, 14
New Yorker, 88
Niagara Falls, New York, 1, 2, 3, 9
NIH. *See* National Institutes of Health
NMR. *See* nuclear magnetic resonance
Nobel Prize, 27, 57
Noel, Joseph P., 40, 47, 48
nuclear magnetic resonance, 31, 39, 50, 51,
55

P

Pabo, Carl, 25
Paschke, Scott, 7
patent, 32, 33, 34, 35, 36, 38, 79, 80, 81, 82,
83, 84
Pennsylvania State University, 48
Pew Scholars Program in the Biomedical
Sciences, 1, 29, 38, 48, 56, 57, 58, 67, 85,
86, 87
phospholipase, 48, 71, 73, 77
 phospholipase C-beta, 48
phospholipase C, 48, 49, 54, 71, 72, 73, 77
Poland, 8
Powell, Secretary Colin, 93
protein folding, 23, 25
publish/publication, 22, 23, 54, 67, 77, 83,
84, 96, 97, 98, 99, 100

Q

Quaye, Jackie, 81, 82

R

Rac, 54, 99

Rac1, 99

Ras, 49, 77

religion, 2, 3, 4, 87

Christianity, 87

Jew/Jewish/Judaism, 21

Roman Catholic, 3, 4

rhodopsin, 67, 68

RNA

mRNA, 65

Rojas, Rafael, 45, 85, 103

Rossmann, Kent L., 46

Rust Belt, 1

S

Salk Institute for Biological Studies, 40

San Francisco, California, 39

Santarosa, Rick, 13, 14, 18

Schatten, Gerald, 22, 23

Schlessinger, Yossi, 41

Schulman, Brenda A., 58

Science, 44, 47, 98

Seattle, Washington, 89

Sebt, Said, 59

Shapiro, Lawrence, 47

Sherman, Fred, 11, 19, 20, 25

Shortle, David, 25, 27, 28, 29, 30, 31, 33,
36, 38, 39, 41, 44, 51, 52

Sigler, Paul, 28, 31, 40, 42, 43, 44, 46, 47,
50, 71

Singer, Alex, 46, 55

Slep, Kevin C., 40

Smith, Hamilton O., 27, 28, 65

Sondek, Anne Marie (sister), 1, 2, 16

Sondek, Emil F., Jr. (brother), 1

Sondek, Emil F., Sr. (father), 1, 2, 16, 67

Sondek, Emilia (paternal grandmother), 16

Sondek, JoAnne (sister), 1, 2, 16

Sondek, Terry (sister), 1, 2, 16

Specter, Michael, 88

spectroscopy, 39, 51, 55

Stamps, Leanne, 85, 103

Stanford University, 27, 39

staphylococcal, 38

Steffan, Shirley (mother), 2, 17

Steitz, Thomas, 47

Strong Memorial Hospital, 11, 19

Summers, Lawrence, 85

synthons, 32, 33

Syracuse University, 13

T

Talalay, Paul, 29

Tufts University, 29

U

U.S. Congress, 89

UNC. *See* University of North Carolina

Uniformed Services University of the
Health Sciences, 29

Union Carbide Corporation, 9

United Nations, 93

United States of America, 9, 83, 87, 88, 94,
95

University of California, Berkeley, 39

University of California, San Francisco, 39

University of Chicago, 24, 44

University of North Carolina, 34, 47, 48, 59,
64, 80, 81

University of Pennsylvania, 26, 41, 48

University of Pittsburgh, 23

University of Rochester, 13, 14, 18, 24, 25,
55

Upstate Biotechnologies, 7

V

Venter, J. Craig, 28, 65, 66

W

Washington, D.C., 29

World War I, 8

Worthylak, David, 65

Y

Yale University, 46, 47, 59

Yates, Doc, 5, 12

Yohe, Marielle, 46, 86