CHEMICAL HERITAGE FOUNDATION

MARK A. SAPER

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Helene L. Cohen

at

The University of Michigan
Ann Arbor, Michigan

on

22-24 September 1999

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 the Pew Scholars Program in the Biomedical Sciences Advisory Committee members.

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:

Marnie Berkowitz, Consultant to the Chemical Heritage Foundation. B.A., Classical Languages and Literatures, University of Minnesota; Ford Foundation Fellowship, Classical Languages and Literatures, University of Chicago.

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.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

Oral History Interview Agreement No. I102/1998

This Interview Agreement is made and entered into this 22nd day of October, 1999 by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, on behalf of the Oral History Program at the UCLA campus, hereinafter called "University," and MARK A. SAPER, havir an address at Biophysics Research Division, University of Michigan, 3040 Chemistry, 930 N. University Avenue, Ann Arbor, MI 48109-1055, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about September 22, 1999, and tentatively entitled "Interview with Mark A. Saper". This Agreement relates to any and all materials originating from the interviews, namely the tape recordings of the interviews and a written manuscript prepared from the tapes hereinafter collectively called "the Work."

In consideration of the mutual covenants, conditions, and terms set fort below, the parties hereto hereby agree as follows:

1. Interviewee irrevocably assigns to University all his copyright, title and interest in and to the Work. This assignment applies to University, its successors, and assigns, for and during the existence of the copyright and all renewals and extensions thereof.

2. By virtue of this assignment, University will have the right to use the Work for any research, educational, or other purpose, including electronic reproduction, that University may deem appropriate.

3. Interviewee acknowledges that he will receive no remuneration or compensation for his participation in the interviews or for the rights assigned hereunder.

4. Interviewee will receive from University, free of charge, one bound copy of the typewritten manuscript of the interviews.

5. To insure against substantive error or misquotation, Interviewee will have the right to review the manuscript before it is put into final form. University therefore will send Interviewee a copy of the edited transcript for review and comment. Interviewee will return transcript and comments to University within 30 days of receipt of the transcript. In the event that Interviewee does not respond within 30 days, University will assume that Interviewee has given full approval of the transcript.

6. All notices and other official correspondence concerning this Agreement will be sent to the following:

If to University: Oral History Program
University of California, Los Angeles
Box 951575
Los Angeles, California 90095-1575

Attention: Director

If to Interviewee: Mark A. Saper
Biophysics Research Division
University of Michigan
930 N. University Avenue
Ann Arbor, MI 48109-1055

University and Interviewee have executed this Agreement on the date firs written above.

INTERVIEWEE

X Mark A. Saper
(Signature)

Mark A. Saper
(Typed Name)

University of Michigan
(Address)

Ann Arbor, MI 48109-1055

X Date Sep 22, 1999

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Dale E. Treleven
(Signature)

Dale E. Treleven
(Typed Name)

Director, Oral History Program
(Title)

Date October 22, 1999

Pew Scholars in the Biomedical Sciences

Chemical Heritage Foundation Internet Posting Release Form

I, Mark A. Saper, 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.**
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b. X **Semi-restricted Internet Postings** (My review of the material intended to post is required.)

There is one section that I might not want on web.

c. _____ **Restricted access.** (Do not post.)

This constitutes my entire and complete understanding.

Mark A. Saper, Ph.D.

3/6/08
Date

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

MARK A. SAPER

1954 Born in Brooklyn, New York on 29 September

Education

1976 B.S., University of Connecticut
1983 Ph.D., Rice University

Professional Experience

Harvard University, Howard Hughes Medical Institute
1987-1990 Research Associate

University of Michigan
1990-1997 Assistant Professor, Department of Biological Chemistry
1990-1997 Assistant Research Scientist, Biophysics Research Division
1997-present Associate Professor, Department of Biological Chemistry
1997-present Associate Research Scientist, Biophysics Research Division

Honors

1979-1983 Robert A. Welch Foundation Award
1984 European Molecular Biology Organization Award
1985 Fulbright Foundation Scholarship
1993-1997 Pew Scholar in the Biomedical Sciences

Selected Publications

Varga, J. et al., 1976. Nonrandom distribution of receptors for melanocyte-stimulating hormone on the surface of mouse melanoma cells. *Journal of Supramolecular Structure* 4:45-49.

Yonath, A. et al., 1986. Characterization of single crystals of the large ribosomal particles from a mutant of *Bacillus stearothermophillus. Journal of Molecular Biology* 192:161-67.

Bjorkman, P.J. et al., 1987. Structure of the human class I histocompatibility antigen. *Nature* 329:506-12.

Bjorkman, P.J. et al., 1987. The foreign antigen binding site and T cell recognition regions of class I histocompatibility antigens. *Nature* 329:512-18.

Brown, J.H. et al., 1988. A hypothetical model of the foreign antigen binding site of class II histocompatibility molecules. *Nature* 3 32:845-50.

Ajitkumar, P. et al., 1988. Evidence that multiple residues on both the α-helices of the class I MHC molecule are simultaneously recognized by the T cell receptor. *Cell* 54:47-56.
Garrett, T.P.J. et al., 1989. Specificity pockets for the side chains of peptide antigens in HLA-Aw68. *Nature* 342:692-96.
Saper, M.A. et al., 1991. Refined structure of the human histocompatibility antigen HLA-A2 at 2.6 Å resolution. *Journal of Molecular Biology* 219:277-3 19.
Latron, F. et al., 1992. A critical role for conserved residues in the cleft of HLA-A2 in presentation of a nonapeptide to T cells. *Science* 257:964-67.
Stuckey, J.A. et al., 1994. Crystal structure of *Yersinia* protein tyrosine phosphatase at 2.5 Å and the complex with tungstate. *Nature* 370:571-75.
Denu, J.M. et al., 1996. Visualization of intermediate and transition-state structures in protein tyrosine phosphatase catalysis. *Proceedings of the National Academy of Sciences, USA* 93:2493-98.

ABSTRACT

Mark A. Saper was born in New York City, where he lived for several years. His family moved to Connecticut when his father, an electronic engineer, took a job there. His mother had a degree in accounting but stayed home with the children (Mark and his two younger brothers) while they were still young. Then she went back to school and eventually began work as a data processor at Yale University. During this his father took a job in New Jersey, so Saper had responsibilities at home in addition to his schoolwork and Hebrew School. He manifested an early interest in and talent for mathematics, but his brother surpassed him, even becoming a mathematics professor. In high school Saper became a drum major, very interested in music, joining the marching band. He also liked biology, writing an exceptional paper on protein biosynthesis. After graduation from high school Saper used his bar mitzvah money to spend seven weeks in Israel.

Looking for a school with a good marching band and music program, Saper matriculated at the University of Connecticut. His freshman advisor was a professor of biophysics who steered him into chemistry; organic chemistry sparked his interest in biology. He worked one summer at his uncle's engineering firm and a later summer in Janos Varga's laboratory. After Saper and the University marching band visited Europe during his sophomore year, Saper found that he had to give up the serious pursuit of music to focus on science. He discovered crystallography in a biophysics class and decided to go to graduate school rather than medical school. He chose Rice University, where he studied the structure of sterols in Florante Quiocho's lab. He was also very interested in computers and graphics software, which he used to trace the polypeptide chain. He went again to Israel to present two papers.

Saper spent another year in Quiocho's lab until a Weizmann fellowship came through; then he went to Rehovot, Israel. His wife to be found a program in Jerusalem, so they were able to see each other enough to become engaged; they then returned to Houston to be married and then went back to Israel to finish Saper's postdoc. There and in Germany he worked on ribosomal crystallography in Joel Sussman's and Ada Yonath's labs. Next Saper accepted a position in Don Wiley's lab at the Howard Hughes Medical Institute at Harvard, where he was attempting to develop software to study human leukocyte antigen (HLA), working with Pamela Bjorkman.

He accepted an assistant professorship at the University of Michigan, where he remains today, teaching; working in his lab; publishing; working on the structure of protein tyrosine phosphatases and protein secretion in *Yersenia*; and balancing his work with life with his wife, Cindy, and his three sons.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Helene L. Cohen, Interviewer, UCLA Oral History Program. B.S., Nursing, UCLA; P.N.P., University of California, San Diego/UCLA; M.A., Theater, San Diego State University.

TIME AND SETTING OF INTERVIEW:

Place: Saper's office, Biophysics Research Division, University of Michigan.

Dates, length of sessions: September 22, 1999 (124 minutes); September 23, 1999 (158); September 24, 1999 (165).

Total number of recorded hours: 7.5

Persons present during interview: Saper and Cohen.

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's 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, Cohen held a telephone preinterview conversation with Saper to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. She also reviewed prior Pew scholars' interviews and the documentation in Saper'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. For technical background, Cohen consulted J.D. Watson et al., *Molecular Biology of the Gene.* 4th ed. Menlo Park, California: Benjamin/Cummings, 1987; Bruce Alberts et al., *Molecular Biology of the Cell.* 3rd ed. New York: Garland, 1994; Horace F. Judson, *The Eighth Day of Creation.* New York: Simon and Schuster, 1979; and recent issues of *Science* and *Nature.*

The interview is organized chronologically, beginning with Saper's childhood in Queens, New York, and Downington, Pennsylvannia, and continuing through his undergraduate work at University of Connecticut, his graduate work at Rice University, his postdoc work at Rice University and the Weizmann Institute of Science, and the establishment of his own lab at University of Michigan. Major topics discussed include his interest in music, his postdoctoral stay in Israel, the challenges of running a laboratory, and his many collaborations with other scientists.

ORIGINAL EDITING:

Ji Young Kwon, editorial assistant, edited the interview. She checked the verbatim transcript of the interview against the original tape recordings, edited for punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Saper did not review the transcript and therefore some names have not been verified.

William Van Benschoten, editor, prepared the table of contents. Kwon assembled the biographical summary and interview history. Deborah Truitt, editorial assistant, compiled the index.

TABLE OF CONTENTS

INDEX