

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

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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."

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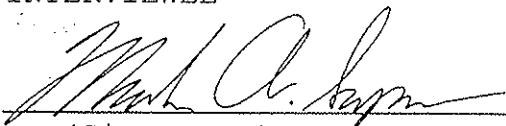
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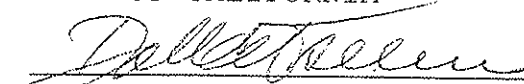
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Director, Oral History Program
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Date October 22, 1999

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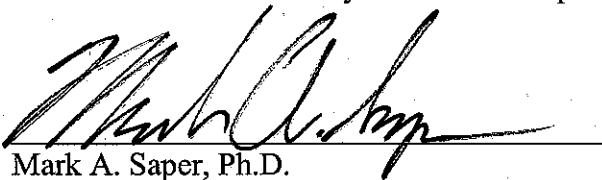
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MARK A. SAPER

1954 Born in Brooklyn, New York on 29 September

Education

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

Professional Experience

1987-1990 Harvard University, Howard Hughes Medical Institute
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 stearothermophilus*. *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.
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- Brown, J.H. et al., 1988. A hypothetical model of the foreign antigen binding site of class II histocompatibility molecules. *Nature* 332:845-50.

- 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* 219:277-319.
- 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 Quioco'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 Quioco'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 Downingtown, Pennsylvania, 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.

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