CHEMICAL HERITAGE FOUNDATION

JAMES U. BOWIE

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Helene L. Cohen

at

University of California, Los Angeles
Los Angeles, California

on

5, 14, and 19 May 1999

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.

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:

Laurent Delavaux, Program Intern, Biomedical Sciences and Technologies, Chemical Heritage Foundation. B.S Molecular Biology, Lehigh University.

David J. Caruso, Program Manager, Biomedical Sciences and Technologies, 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. _____

This Interview Agreement is made and entered into this _____ day of _____, 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 JAMES U. BOWIE, having an address at UCLA Department of Chemistry and Biochemistry, Room 655 Molecular Biology Institute, Los Angeles, California 90095-1569, hereinafter called "Interviewee." This interview agreement supersedes any previous agreements regarding "the Work" described below.

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about May 5, 1999, and tentatively entitled "Interview with James U. Bowie". 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 forth 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. University agrees that portions of the Work, to be determined by Interviewee, will be sealed and will not be available for public access until January 1, 2025, or during the interviewee's lifetime, whichever is the earlier.

4. By virtue of the assignment specified in Article 1, University shall have the right to use the unsealed portions of the Work for any research, educational, or other purpose, including electronic reproduction, that University may deem appropriate At the end of the period specified in Article 3, University shall have the right to use the entire Work for any research, educational, or other purpose, including electronic reproduction, that University may deem appropriate.

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

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

7. 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.

8. 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: James U. Bowie
UCLA Department of Chemistry and Biochemistry
Room 655 Molecular Biology Institute
Los Angeles, California 90095-1569

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

INTERVIEWEE

(Signature)

James U. Bowie
(Typed Name)

Room 655 Molecular Biology Institute
(Address)

Los Angeles, CA 90095-1569

Date 11/19/99

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

(Signature)

Dale E. Treleven
(Typed Name)

Director, Oral History Program
(Title)

Date 12/20/99

This interview has been designated as **Semi Restricted Access**.

One may view the oral history with the permission of CHF.
However, the permission of the interviewee is required to quote from, cite, or reproduce the oral history.

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

JAMES U. BOWIE

1959 Born in Rochester, Minnesota on June 26

Education

1981 B.A., Carleton College
1989 Ph.D., Massachusetts Institute of Technology

Professional Experience

University of California, Los Angeles
1989-1993 Postdoctoral Fellow, Department of Chemistry and Biochemistry
1993-present Assistant Professor, Department of Chemistry and Biochemistry

Honors

1994-1998 Pew Scholar in the Biomedical Sciences
1994 National Science Foundation Young Investigator
1998 McCoy Award in Chemistry

Selected Publications

Bowie, J.U. and R.T. Sauer, 1989. Identification of C-terminal extensions that protect proteins from proteolysis. *Journal of Biological Chemistry* 264:7596-602.

Bowie, J.U. and R.T. Sauer, 1989. Identifying determinants of structure and stability for a protein of unknown structure. *Proceedings of the National Academy of Sciences USA* 86:2152-56.

Bowie, J.U. et al., 1990. Identification of protein folds: Matching hydrophobicity patterns of sequence sets with solvent accessibility patterns of known structures. *Proteins* 7:257-64.

Bowie, J.U. et al., 1990. Deciphering the message in protein sequences: Tolerance to amino acid substitutions. *Science* 247:1306-10.

Bowie, J.U. et al., 1991. A method to identify protein sequences that fold into a known three-dimensional structure. *Science* 253:164-70.

Luthy, R. et al., 1992. Assessment of protein models with three-dimensional profiles. *Nature* 356:84-85.

Wen, J. et al., 1996. Exploring the allowed sequence space of a membrane protein. *Nature* Structural Biology 3:141-48.

Bowie, J.U., 1997. Helix packing in membrane proteins. *Journal of Molecular Biology* 272:780-

89.
Bowie, J.U., 1997. Helix packing preferences. *Nature Structural Biology* 4:915-17.
Zhou, Y. et al., 1997. A passive transmembrane helix. *Nature Structural Biology* 4:986-90.
Thanos, C.T. et al., 1999. Oligomeric structure of the human EphB2 receptor SAM domain. *Science* 283:833-36.
Lau, F. et al, 1999. Single side-chain alterations can greatly improve the resistance of a membrane protein to irreversible inactivation. *Journal of Molecular Biology* 290:559-64.

ABSTRACT

James U. Bowie was born in Rochester, Minnesota, in 1959; the youngest of four siblings. Bowie's father, E.J. Walter Bowie, was a doctor originally from England who met Bowie's Swiss mother, Gertrud Ülrich, while she was on summer vacation in England. The family eventually moved to Canada, where they lived for a while until Bowie's father began working at the Mayo Clinic, and then they moved to Minnesota. Bowie went through school with relative ease and regularly got into trouble until he traveled to Switzerland with his mother and decided to change his approach to life. He first discovered biology and proteins while working for one of his father's colleagues in a laboratory at the Mayo Clinic. From that point on he knew that he wanted to pursue Biology.

Bowie received his B.A. from Carleton College in 1981 and credits one professor in particular with making molecular biology interesting. He was an avid skier in college and met his wife during his sophomore year. Bowie was accepted into medical school for the following year, but instead elected to defer for one year. During this period he worked as a lab technician; an experience that pushed him to decide against medical school. After a subsequent year of applications to graduate school programs, he matriculated into the Massachusetts Institute of Technology, where he earned his Ph.D. in 1989.

In 1989 Bowie accepted a postdoctoral fellowship in the Department of Chemistry and Biochemistry at the University of California at Los Angeles, where he began learning crystallography in David S. Eisenberg's Lab. He and Eisenberg focused on analyzing the sequence and structure of proteins through computational biology and on the use of novel computer programming to predict protein structure. During this period Bowie also developed a specific interest in characterizing the structure, function, and regulation of cell membrane proteins, a field with widespread medical and pharmaceutical applications. Bowie was appointed assistant professor in the Department of Chemistry and Biochemistry at the University of California at Los Angeles in 1993. His major area of research there still centers on identifying the structure and function of key cell membrane proteins.

Throughout his oral history Bowie explains how fortunate he has been to have had such an easy childhood and so many opportunities to succeed. He has received several grants, including a fellowship, a National Science Foundation Young Investigator award, a McCoy Award in Chemistry, and most notably a Pew Scholars Program in the Biomedical Sciences grant, which he discusses in the oral history interview.

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: Bowie's office, UCLA.

Dates, length of sessions: May 5, 1999 (96 minutes); May 14, 1999 (73) ; May 19, 1999 (71).

Total number of recorded hours: 4

Persons present during interview: Bowie 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' 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 personal preinterview conversation with Bowie 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 his 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, CA: 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*, *Nature* and *Cell*.

The interview is organized chronologically, beginning with Bowie's childhood in Rochester, Minnesota, and continuing through his undergraduate education at Carleton College, his graduate work at Massachusetts Institute of Technology, and his postdoc and career as a principal investigator at UCLA. Major topics discussed include Bowie's studies of the Arc repressor protein, his computer programs designed to match protein structures and sequences, his ongoing study of cell membrane proteins, and his lab management style.

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.

Bowie reviewed the transcript. He verified proper names and made minor corrections and additions.

William Van Benschoten, editor, prepared the table of contents and the index. Kwon assembled the biographical summary and interview history.

SUPPORTING DOCUMENTS:

The original tape recordings of the interview are in the university archives and are available under the regulations governing the use of permanent noncurrent records of the university. Records relating to the interview are located in the office of the UCLA Oral History Program.

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