CHEMICAL HERITAGE FOUNDATION

CHRISTOPHER A. BRADFIELD

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Andrea R. Maestrejuan

at

McArdle Laboratory for Cancer Research
Madison, Wisconsin

on

2, 3, and 4 December 1997

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.

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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:

Holly Polish, Program Intern, Oral History, Chemical Heritage Foundation. B.A. History, American 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.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

Oral History Interview Agreement No. 971216

This Interview Agreement is made and entered into this 26th day of May, 1998 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 CHRISTOPHER A. BRADFIELD, having an address at McArdle Laboratory for Cancer Research, 1400 University Avenue, Madison, Wisconsin 53706, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about December 2, 1997, and tentatively entitled "Interview with Christopher A. Bradfield" 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 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:

Office of Research Administration
University of California, Los Angeles
P.O. Box 951406
Los Angeles, California 90095-1406

Attention: Ms. Carli V. Rogers
Copyright Officer

If to Interviewee:

Christopher A. Bradfield
McArdle Laboratory for Cancer Research
1400 University Avenue
Madison, Wisconsin 53706

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

INTERVIEWEE

(Signature)

Christopher A. Bradfield
(Typed Name)

McArdle Laboratory for Cancer Research

1400 University Avenue
(Address)

Madison, Wisconsin 53706

Date 12/2/97

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

(Signature)

Carli V. Rogers
(Typed Name)

Copyright Officer
(Title)

Date 5/26/98

Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
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CHRISTOPHER A. BRADFIELD

1958 Born in San Francisco, California, on 6 March

Education

1976 San Francisco State University
1979 A.A., Skyline College
1982 B.A., University of California, Davis
1986 Ph.D., University of California, Berkeley

Professional Experience

University of Wisconsin Medical School, Madison, Wisconsin
1986-1989 Postdoctoral Fellow, McArdle Laboratory for Cancer Research
1996-present Associate Professor of Oncology, McArdle Laboratory for Cancer Research

Northwestern University Medical School
1989-1994 Assistant Professor of Pharmacology
1994-1996 Associate Professor of Molecular Pharmacology and Biological Chemistry

Honors

1989 Cancer Research Foundation Young Investigator Award
1992-1996 Pew Scholar in the Biomedical Sciences
1996-2001 Burroughs-Wellcome Scholar in Toxicology

Selected Publications

Bradfield, C. and L. Bjeldanes, 1984. Effect of dietary indole-3-carbinol on intestinal and hepatic monooxygenase, glutathione S-transferase and epoxide hydrolase activities in the rat. *Food and Chemical Toxicology* 22:977-82.

Bradfield, C. et al., 1985. Effects of commonly consumed vegetables on hepatic xenobiotic-metabolizing enzymes in the mouse. *Food and Chemical Toxicology* 23:899-904.

Bradfield, C. and L. Bjeldanes, 1987. High performance liquid chromatographic analysis of anticarcinogenic indoles present in *Brassica oleracea. Journal of Agricultural and Food Chemistry* 25:46-49.

Bradfield, C. and L. Bjeldanes, 1987. Structure-activity relationships of dietary indoles: A

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Bradfield, C. and A. Poland, 1991. Purification of N-terminal amino acid sequence of the *Ah*-receptor from the C57BL/6J mouse. *Molecular Pharmacology* 39:13-19.

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Burbach, K. 1992. Cloning of the Ah-receptor cDNA reveals a novel ligand-activated transcription factor. *Proceedings of the National Academy of Sciences USA* 89:8185-89.

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Schmidt, J. et al., 1993. Molecular characterization of the murine *Ahr*-locus: Structural organization, promoter analysis and chromosome assignment. *Journal of Biological Chemistry* 268:22203-9.

Dolwick, K. et al., 1993. Cloning and expression of the human Ah-receptor cDNA: Comparison with a murine homologue. *Molecular Pharmacology* 44:911-17.

LeBeau, M. et al., 1994. Chromosomal mapping of the human AHR locus to 7p15-21. *Cytogenetics and Cell Genetics* 66:172-76.

Huang, Q. et al., 1994. Association of peroxisome proliferator-activated protein and Hsp72. *Journal of Biological Chemistry* 269:8493-97.

Carver, L. et al., 1994. Tissue specific expression of the rat Ah-receptor and ARNT mRNAs. *Nucleic Acids Research* 22:3038-44.

Chan, W. et al., 1994. Baculovirus expression of the Ah-receptor and ARNT: Evidence for additional DRE binding species and factors required for signaling. *Journal of Biological Chemistry* 269:26464-71.

Jain, S. et al., 1994. Localization of the transactivation domains of the Ah-receptor, ARNT and SIM to the C-termini. *Journal of Biological Chemistry* 269:31518-24.

Carver, L. 1994. A yeast expression system demonstrates that hsp90 is essential for Ah-receptor signaling *in vivo. Journal of Biological Chemistry* 269:30109-12.

Swanson, H. and C. Bradfield, 1995. DNA binding specificity and pairing rules of the Ah-receptor, Arnt and Sim. *Journal of Biological Chemistry* 270:26292-302.

Schmidt, J. et al., 1996. The Ah receptor is essential for normal liver growth and development. *Proceedings of the National Academy of Sciences USA* 93:6731-36.

Hogenesch, J. 1997. Characterization of a subset of the basic helix loop helix PAS superfamily that interact with components of the dioxin signaling pathway. *Journal of Biological Chemistry* 272:8581-93.

Maltepe, E. et al., 1997. Arnt is essential for responses to oxygen, glucose deprivation and developmental angiogenesis in the mouse. *Nature* 386:403-7.

ABSTRACT

Christopher Bradfield grew up in the San Francisco, California, area. His early schooling was in Daly City, California, and he attended high school in Half Moon Bay. He has an older brother and a younger sister. His father obtained his PhD in psychology from University of California, Berkeley, during years of social upheaval, and Bradfield can remember being on campus during those times. Bradfield's mother suffered from cancer for several years during Bradfield's early adolescence, dying when he was in high school. He finished his schooling intending to become a soccer coach.

Bradfield applied to college because his father was a professor and expected his children to go to college. Finally, calling himself a late bloomer, he began to see the value in learning and displayed an aptitude for sciences, which a biology teacher at his community college encouraged Bradfield to pursue. He particularly admires the elegance of scientific solutions. He received a two-year degree from Skyline College and his BA from University of California, Davis. Bradfield ponders the questions of whether scientists are born or made; the role of serendipity in science; and types of intelligence.

Bradfield decided to get a master's degree from University of California, Berkeley and he entered Leonard F. Bjeldanes' lab, where his research involved indentifying indoles; he became so involved in his project that he finished a PhD instead of a master's degree. By then, he had realized that environmental and nutritional issues must be dealt with in the political arena, not simply the laboratory.

Bradfield decided to accept a postdoc in Alan P. Poland's lab at the University of Wisconsin. Under Alan Poland's influence Bradfield flourished, beginning work on the AH purifying proteins. He then accepted an assistant professorship at Northwestern University, where he was unable to do the work he had anticipated, so he moved to McArdle Laboratory for Cancer Research at University of Wisconsin.

Bradfield discusses his concern about the lack of creativity in most science; differences between good and great scientists; his love of laboratory work; his frustration with scientific journals; the status of the "scientific method" in current research. He explains how he decides what research projects the lab should pursue; the present status of his dioxin research and unpublished work on the relationship between dioxin and hypoxia; and doing research at McArdle. He puts forth his views on the best way to structure research institutions and compares the funding of science at McArdle and at Northwestern University.

Bradfield then reverts to the personal, talking about his own funding, his reasons for becoming a scientist; the advantages of not leading research in one's own field; keeping his lab afloat financially; the goals of his dioxin research; his patents; and the impact of his winning the Pew Scholars in the Biomedical Sciences award. Back to the larger picture, he talks about possible breakthroughs in gene therapy and disease intervention; his thoughts on the training of future M.D.'s; dangers of government policy masquerading as science. He finishes with a discussion of his family life.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Andrea R. Maestrejuan, Interviewer, UCLA Oral History Program; B.A., History, University of California, Irvine, 1988; B.S., Biological Sciences, University of California, Irvine, 1988; C.Phil., History, University of California, Riverside.

TIME AND SETTING OF INTERVIEW:

Place: Bradfield's office, McArdle Laboratory for Cancer Research.

Dates, length of sessions: December 2, 1997 (76 minutes); December 3, 1997 (137) ; December 4, 1997 (136).

Total number of recorded hours: 5.8

Persons present during interview: Bradfield and Maestrejuan.

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, Maestrejuan held a telephone pre interview conversation with Bradfield to obtain written background information (curriculum vitae, copies of published articles, etc.) and to agree on an interviewing schedule. She also reviewed prior Pew scholars' interviews and the documentation in Bradfield'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 general background on the recent history of the biological sciences, Maestrejuan consulted J.D. Watson et al., *Molecular Biology of the Gene,* 4th ed. Menlo Park, CA: Benjamin/Cummings, 1987, and Bruce Alberts et al., *Molecular Biology of the Cell.* 3rd ed. New York: Garland, 1994.

The interview is organized chronologically, beginning with Bradfield's childhood in the San Francisco area and continuing through his education at the University of California, Berkeley, his postdoctoral work at the McArdle Laboratory for Cancer Research, University of Wisconsin Medical School, and the establishment of his labs at the Northwestern University Medical School and at the McArdle Laboratory. Major topics discussed include the role of creativity in science research, Bradfield's work on dioxin toxicity, and funding in the sciences.

ORIGINAL EDITING:

Gregory M.D. Beyrer, editorial assistant, edited the interview. He 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.

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

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

Ödül Bozkurt, editorial assistant, compiled the index.

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