CHEMICAL HERITAGE FOUNDATION

PAUL M. MACDONALD

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Steven J. Novak

at

Stanford University
Palo Alto, California

on

21, 22, and 23 February 1995

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.

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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. R950220

This Interview Agreement is made and entered into this 11th day of April, 1995 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 PAUL M. MACDONALD having an address at Stanford University, Department of Biological Sciences, Herrin Laboratories, 355, Stanford, California, 94305-5020, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about February 22, 1995, and tentatively entitled "Interview with Paul M. Macdonald". 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 Intellectual Property Administration
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Attention: Ms. Carli V. Rogers
Copyright Officer

If to Interviewee: Paul M. Macdonald
Stanford University
Department of Biological Sciences
Herrin Laboratories, 355
Stanford, California 94305-5020

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

INTERVIEWEE

(Signature)

Paul M. Macdonald
(Typed Name)

Department of Biological Sciences

Herrin Laboratories, 355

Stanford University
(Address)

Stanford, CA 94305-5020

Date 2/21/95

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

(Signature)

Carli V. Rogers
(Typed Name)

Copyright Officer
(Title)

(Address)

Date 11/15/95

Pew Scholars in the Biomedical Sciences

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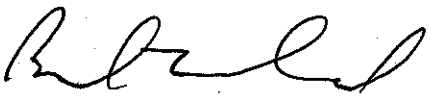

Paul M. Macdonald, Ph.D.

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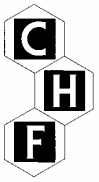

PAUL M. MACDONALD

1955	Born in Denver, Colorado on 12 November

Education

1978	B.S., Colorado State University
1980	M.S., Georgia Institute of Technology
1983	Ph.D., Vanderbilt University

Research Appointments

1984-1986	Postdoctoral Fellow, Harvard University
1987-1989	Postdoctoral Fellow, Columbia University

Professional Experience

1989-present	Assistant Professor, Department of Biological Sciences, Stanford University

Honors

1981-1983	Predoctoral Fellow, National Institutes of Health Cellular-Molecular Biology Graduate Training Program
1984-1986	Damon Runyon-Walter Winchell Postdoctoral Fellowship
1990-1993	Pew Scholar in the Biomedical Sciences
1990-1994	David and Lucile Packard Fellowship

Selected Publications

Macdonald, P.M. and G. Struhl, 1986. A molecular gradient in early *Drosophila* embryos and its role in specifying the body pattern. *Nature,* 324:537-45.

Macdonald, P.M. and G. Struhl, 1988. *Cis*-acting sequences responsible for anterior localization of *bicoid* mRNA in *Drosophila* embryos. *Nature,* 336:595-98.

Goto, T. et al., 1989. Early and late periodic patterns of *even skipped* expression are controlled by distinct regulatory elements that respond to different spatial cues. *Cell,* 57:413-22.

Struhl, G. et al., 1989. The gradient morphogen *bicoid* is a concentration-dependent

transcriptional activator. *Cell*, 57:1259-73.
Macdonald, P.M., 1990. *Bicoid* mRNA localization signal: Phylogenetic conservation of function and RNA secondary structure. *Development*, 110:161-71.
Kim-Ha, J. et al., 1991. *Oskar* mRNA is localized to the posterior pole of the *Drosophila* oocyte. *Cell*, 66:23-35.
Macdonald, P.M. et al., 1991. Protein encoded by the *exuperantia* gene is concentrated at sites of *bicoid* mRNA accumulation in *Drosophila* nurse cells, but not in oocytes or embryos. *Genes and Development*, 5:2455-66.
Smith, J.L. et al., 1992. Overexpression of *oskar* directs ectopic activation of *nanos* and presumptive pole cell formation in *Drosophila* embryos. *Cell*, 70:849-59.
Macdonald, P.M. et al., 1993. RNA regulatory element BLE1 directs the early steps of *bicoid* mRNA localization. *Development*, 118:1233-43.
Kim-Ha, J. et al., 1993. Multiple RNA regulatory elements mediate distinct steps in localization of *oskar* mRNA. *Development*, 119:169-78.
Webster, P.J. et al., 1994. *Drosophila virilis oskar* transgenes direct body patterning but not pole cell formation or maintenance of mRNA localization in *D. melanogaster*.*Development*, 120:2027-37.
Kim-Ha, J. et al., 1995. Translational regulation of *oskar* mRNA by bruno, an ovarian RNA binding protein, is essential. *Cell*, 81:403-12.
Macdonald, P.M. et al., 1995. Exl protein specifically binds BLE1, a *bicoid* mRNA localization element, and is required for one phase of its activity. *Proceedings of the National Academy of Sciences*, 92:10787-91.
Wilson, J.E. et al., 1996. *Aubergine* enhances *oskar* translation in the *Drosophila* ovary. *Development*, 122:1631-39.

ABSTRACT

Paul M. Macdonald was born in Denver, Colorado, to a forensic psychologist from New Zealand and an American nurse. He has an older sister, who is a dean at William and Mary College, and a younger brother. He grew up as much outdoors as he could manage; uninterested in school and preferring skiing, bicycling, backpacking, and rock climbing to studying, he decided to attend Colorado State University's forestry school. During summers he worked for the Youth Conservation Corps in Colorado and then in California. Continuing his uninspired high-school pattern, he remained a poor and undirected student until his last year, when he had a class with Larry Hopwood in radiation biology. He loved the class and asked to work in a lab. Because of his excellent GRE scores and his lab work he was a candidate for graduate school. He went to Georgia Tech partly because it had faculty who interested him and because he wanted to distance himself from his usual outdoor distractions. He worked on bacteriophage mutant in Dwight H. Hall's lab to finish his Master's degree. Then he applied to Vanderbilt for a Ph.D. in molecular bio techniques under Gisela Mosig; Lee Rowen taught him recombinant DNA techniques, and he finished his Ph.D. He accepted a postdoc at Harvard, working in Tom Maniatis's lab. He worked with Gary Struhl there, identifying proteins involved in *adh* gene expression and with molecular gradient in drosophila embryos. He went to Colulmbia as a postdoc with Struhl. From there he accepted a faculty position at Stanford University. His work included studying how molecules that control patterning are localized; comparing RNA sequences from different *Drosophila* species; redundancy of information in *Drosophila* RNA, and the role of chance in his *mRNA oskar* research. Macdonald has published many articles, continues at Stanford to run and work in his lab, teaches, and attempts to balance all this with his life at home with his wife and infant son.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Steven J. Novak, Senior Editor, UCLA Oral History Program. B.A., History, University of Colorado; Ph.D., History, University of California, Berkeley; M.B.A., UCLA Graduate School of Management.

TIME AND SETTING OF INTERVIEW:

Place: Macdonald's office, Stanford University, Palo Alto, California.

Dates, length of sessions: February 21, 1995 (125 minutes); February 22, 1995 (127); February 23, 1995 (70).

Total number of recorded hours: 5.35

Persons present during interview: Macdonald and Novak.

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 consultants developed a topic outline. In preparing for this interview, Novak held a preinterview telephone conversation with Macdonald to obtain written background information (curriculum vitae, copies of published articles, etc.) and to agree on an interviewing schedule. He also reviewed prior Pew scholars' interviews and the documentation in Macdonald'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, Novak 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.* 3d ed. New York: Garland,1994. The interview is organized chronologically, beginning with Macdonald's childhood in Denver and continuing through his undergraduate and graduate education, his postdocs at Harvard University and Columbia University, and the establishment of his own lab at Stanford University. Major topics discussed include the demonstration of a molecular gradient in *Drosophila* embryos, localization and translational regulation in *Drosophila*, lab management, and scientific funding and publishing.

ORIGINAL EDITING:

Kristian London, assistant editor, 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.

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

London prepared the table of contents, biographical summary, and interview history. Rebecca Stone, oral history assistant, compiled the index.

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