

CHEMICAL HERITAGE FOUNDATION

BRENDA L. BASS

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Andrea R. Maestrejuan

at

The University of Utah
Salt Lake City, UT

on

24, 25, 26 July 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 Pew Biomedical Scholar Advisory Committee members.

This oral history was completed under the auspices of the Oral History Project, University of California, Los Angeles (Copyright © 1996, The Regents of the University of California) and is made possible through the generosity of



**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. R950831

This Interview Agreement is made and entered into this 14th day of March, 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 BRENDA L. BASS having an address at University of Utah Medical Center, Department of Biochemistry, 50 North Medical Drive, Salt Lake City, Utah, 84132, hereinafter called "Interviewee." *CB*

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about July 24, 1995, and tentatively entitled "Interview with Brenda L. Bass". 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 her 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. University agrees to forward to Interviewee for written approval any requests received by University from any party for permission to quote from the Work, for the period of the Interviewee's lifetime. After such time, University will have the sole right to grant or refuse such requests.
4. Interviewee acknowledges that she will receive no remuneration or compensation for her participation in the interviews or for the rights assigned hereunder.
5. Interviewee will receive from University, free of charge, one bound copy of the typewritten manuscript of the interviews.
6. 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.

7. 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: Brenda L. Bass
University of Utah Medical Center
Department of Biochemistry
50 North Medical Drive
Salt Lake City, Utah 84132

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

INTERVIEWEE

Brenda L. Bass
(Signature)

Brenda L. Bass
(Typed Name)

University of Utah Medical Center

Department of Biochemistry

50 North Medical Drive
(Address)

Salt Lake City, UT 84132

Date 8/21/95

THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA

Carli V. Rogers
(Signature)

Carli V. Rogers
(Typed Name)

Copyright Officer
(Title)

(Address)

Date March 19, 1996

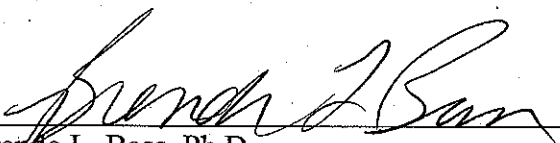
Pew Scholars in the Biomedical Sciences
Chemical Heritage Foundation Internet Posting Release Form

I, Brenda L. Bass, Ph.D., hereby grant permission to post 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 as per the checked selection below.

Please check one:

- a. _____ **No restrictions for Internet Posting.**
NOTE: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to obtain permission from Chemical Heritage Foundation, Philadelphia, Pennsylvania.
- b. _____ **Semi-restricted Internet Postings** (My review of the material intended to post is required.)
- c. _____ **Restricted access.** (Do not post.)

This constitutes my entire and complete understanding.


Brenda L. Bass, Ph.D.

1-24-08
Date

This interview has been designated as **semi-restricted**.

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.

Please contact CHF to request permission.



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



The Chemical Heritage Foundation (CHF) serves the community of the chemical and molecular sciences, and the wider public, by treasuring the past, educating the present, and inspiring the future. CHF maintains a world-class collection of materials that document the history and heritage of the chemical and molecular sciences, technologies, and industries; encourages research in CHF collections; and carries out a program of outreach and interpretation in order to advance an understanding of the role of the chemical and molecular sciences, technologies, and industries in shaping society.

BRENDA L. BASS

1955 Born in Fort Lauderdale, Florida on 5 October

Education

1977 B.A., Colorado College
1985 Ph.D., University of Colorado

Research Appointments

1977-1979 Rush University, Chicago
Research Technician, Rush Medical Center
1979-1980 Colorado College, Colorado
Teaching Assistant
1985-1988 Fred Hutchinson Cancer Research Center, Seattle
Postdoctoral Fellow

Professional Experience

1989-1995 University of Utah, Salt Lake City
Assistant Professor
1995-present University of Utah, Salt Lake City
Associate Professor
1994-present Howard Hughes Medical Institute
Assistant investigator

Honors

1983-1984 Achievement Rewards for College Scientists (ARCS) recipient
1985-1988 Damon Runyon-Walter Winchell Postdoctoral Fellowship
1990-1994 Pew Scholar in the Biomedical Sciences
1991-1996 David and Lucile Packard Foundation fellowship

Selected Publications

Bass, B.L. and T.R. Cech, 1984. Specific interaction between self-splicing RNA of Tetrahymena and its guanosine substrate: Implications for biological catalysis by RNA.

- Nature*, 308:820-26.
- Bass, B.L. and T.R. Cech, 1986. Ribozyme inhibitors: Deoxyguanosine and competitive inhibitors of self-splicing of the Tetrahymena ribosomal ribonucleic acid precursor. *Biochemistry*, 25:4473-77.
- Cech, T.R. and B.L. Bass, 1986. Biological catalysis by RNA. *Annual Review of Biochemistry*, 55:599-629.
- Bass, B.L. and H. Weintraub, 1987. A developmentally regulated activity that unwinds RNA duplexes. *Cell*, 48:607-13.
- Bass, B.L. and H. Weintraub, 1988. An unwinding activity that covalently modifies its double-stranded RNA substrate. *Cell*, 55:1089-98.
- Bass, B.L. et al., 1989. Biased hypermutation of viral RNA genomes could be due to unwinding/modification of double-stranded RNA. *Cell*, 56:331.
- Bass, B.L., 1991. RNA editing. Physarum-C the difference? *Nature*, 349: 370-71.
- Bass, B.L., 1991. RNA editing. Splicing: The new edition. *Nature*, 352: 283-84.
- Bass, B.L., 1992. The double-stranded RNA unwinding/modifying activity. in *Antisense RNA and DNA*, ed. J.A.H. Murray. New York: Wiley-Liss, 159-74.
- Bass, B.L., 1993. The dsRNA unwinding/modifying activity: Fact and fiction. in *Seminars in Developmental Biology*, ed. M. Wickens. London: Academy Press, 425-33.
- Bass, B.L., 1993. RNA editing: New uses for old players in the RNA world. In *The RNA World*, ed. R. Gesteland and J. Atkins. Cold Spring Harbor, New York: Cold Spring Harbor Laboratory Press, 383-418.
- Hough, R.F. and B.L. Bass, 1994. Purification of the *Xenopus laevis* double-stranded RNA adenosine deaminase. *Journal of Biological Chemistry*, 269: 9933-39.
- Bass, B.L. et al., 1994. Binding properties of newly identified *Xenopus* proteins containing dsRNA-binding motifs. *Current Biology*, 4: 301-14.
- Polson, A.G. and B.L. Bass, 1994. Preferential selection of adenosines for modification by double-stranded RNA adenosine deaminase. *EMBO Journal*, 13: 5701-11.
- Saccomano, L. and B.L. Bass, 1994. The cytoplasm of *Xenopus* oocytes contains a factor that protects double-stranded RNA from adenosine to inosine modification. *Molecular and Cellular Biology*, 14: 5425-32.
- Bass, B.L., 1995. An I for editing. *Current Biology*, 5:598-600.

ABSTRACT

Brenda L. Bass grew up in the 1960's in Fort Lauderdale, Florida. Her parents were young and had no opportunity to finish college, taking jobs as realtors. As a result, Bass was often cared for by her maternal grandmother, to whom she attributes her independence, her toughness, and her love of the truth. Severely asthmatic and allergic, Bass lived at the Children's Asthma Research Institute and Hospital in Denver, Colorado, from age eleven to age twelve and a half. Here she developed a love for the West and a very different perspective on social conditions in the South, determining that she would always want to live in the West. She returned to Florida to finish her junior high school and high school years. She then attended Emory University for a year, studying English. Dissatisfied with the program, she took a semester off and then transferred to Colorado College, where she planned to study nutritional chemistry. Interest in nutritional chemistry developed into interest in chemistry and ultimately into biochemistry. After obtaining her BA she remained uncertain as to what she wanted to do, and she applied to Rush Medical College in Chicago, Illinois. She walked out of a nutritional chemistry class when the teacher brought out plastic models of foods. She became a research technician at Rush, which she worked at for three years before returning to the University of Colorado, Boulder, to pursue a PhD in biochemistry. There she worked in Thomas R. Cech's lab, focusing on self-splicing RNA and its implications for biological catalysis. When she received her PhD, in 1985, she accepted a post-doc with Harold Weintraub in Seattle, Washington, where she worked at the Fred Hutchinson Cancer Research Center for four years. She then accepted an assistant professorship at the University of Utah, and from 1995 until the present she has been an associate professor there as well as an assistant investigator at Howard Hughes Medical Institute. She has published numerous papers; she is involved in conferences and committees; and her first love remains "the bench."

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: Bass's office, University of Utah.

Dates, length of sessions: July 24, 1995 (83 minutes); July 25, 1995 (81); July 26, 1995 (88).

Total number of recorded hours: 4.2

Persons present during interview: Bass 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 preinterview conversation with Bass 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 Bass's file at the Pew Scholars Program office in San Francisco, including her proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members. For technical background, 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*. 3d ed. New York: Garland, 1994.

The interview is organized chronologically, beginning with Bass's childhood in Florida and continuing through her education at Colorado College, her graduate work at University of Colorado, her postdoc at Fred Hutchinson Cancer Research Center, and the establishment of her lab at University of Utah. Major topics discussed include biological catalysis by RNA, the discovery of covalent modification of double-stranded RNA substrate during double-stranded RNA unwinding, and Bass's style of research and lab management.

ORIGINAL EDITING:

Vimala Jayanti, editor, 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.

Bass reviewed the transcript. She verified proper names and made minor corrections.

Kristian London, assistant editor, prepared the table of contents, biographical summary, and interview history.

Gregory M. Beyrer, editorial assistant, compiled the index.

TABLE OF CONTENTS

Childhood and Family Background	1
Growing up in Florida. Severe asthma and allergies. Social climate of Florida in the sixties. Education in public schools. Racial tensions in high school. Interest in music and writing. Views on religion, especially with regard to Mormons at University of Utah	
College Education	21
Attends Emory University, intending to study English. Transfer to Colorado College. Interest in nutrition prompts Bass to study chemistry. Preference for living in the West. Sexism and gender issues. Becomes lab tech at Rush Medical College. Interest in biochemistry.	
Graduate School	38
Teaching Assistant at Colorado College. Working in Thomas R. Cech's lab. Discovers that RNA itself can catalyze a splicing reaction. Bass's own research projects. Postdoctoral research with Harold Weintraub at Fred Hutchinson Cancer Research Center in Seattle, Washington. Discovers covalent modification of double-stranded RNA substrate during dsRNA unwinding. Variety of projects in Weintraub's lab.	
Further Career	63
Assistant professorship at University of Utah; then associate professorship. Assistant investigator at Howard Hughes Medical Institute. Differences between Cech and Weintraub as scientists. Studying antisense in Weintraub's lab—Bass's field of study expands from double-stranded RNA adenosine deaminase to dsRNA-binding proteins in general.	
Philosophy of and Difficulties of Practicing Science	67
Funding concerns in the scientific community. Relative merits of large and small labs. Need to avoid focusing on competitors' results. Bass's teaching responsibilities and training style. Importance of being involved in conferences and committees—Future research plans—Risks and benefits of collaboration. Love of “the bench”. Good science as a combination of instinct, luck, and persistence.	
Index	79

INDEX

A

Abelson, John N., 48
adenosines, 58
AIDS, 8
Alberts, Bruce M., 61
allergies, 6, 18, 19, 24
Altman, Sidney, 44, 55
Anderson, Kenning M., 36
Angier, Natalie, 7
antisense, 49, 57, 60, 61, 75
asthma, 6, 16, 18, 19
Asthma Research Institute. *See* Children's
Asthma Research Institute and Hospital
autoradiogram, 49, 50, 63

B

Baptist, 10
base pair, 49, 70
Bass, Brett (brother), 3, 6, 16
Bass, Brian (brother), 3, 4, 6, 7
Bass, E. Guyton, Sr. (grandfather), 3, 17
Bass, Guy (Ernest) (father), 1, 2, 3, 4, 5, 6,
7, 8, 10, 16, 18
Bass, Jeanne (mother), 1, 3, 4, 5, 6, 7, 8, 10,
16, 18
bind double-stranded RNA, 59, 70
biochemistry, 7, 9, 20, 24, 36, 37, 40, 41,
42, 43, 49, 67, 70, 71, 72, 74
biology, 1, 2, 4, 9, 13, 15, 37, 39, 41, 42, 43,
48, 49, 53, 57, 62, 70, 71
biomedical sciences, 11
Boulder, Colorado, 29, 37, 40, 41, 54
Brigham Young University, 11
Brown, George E., Jr., 61

C

Caenorhabditis elegans, 70
California Institute of Technology, 74

cancer, 3, 7, 8
Cape Canaveral, 14, 15
Caruthers, Marvin H., 43
Casey, John L., 32, 72
catalysis, 43, 44, 45, 46, 55, 59
Cech, Carol L., 30, 43
Cech, Thomas R., 30, 40, 41, 42, 43, 44, 45,
46, 47, 52, 55, 56, 57, 58, 59, 68, 69, 75
cell, 8, 41, 43, 44, 49, 58, 59, 60, 62, 66, 70,
71
Cell, 57
chemistry, 7, 9, 12, 13, 15, 20, 22, 23, 24,
25, 26, 27, 35, 36, 37, 39, 40, 41, 42, 43,
49, 52, 53, 57, 58, 62, 71, 73
Chicago, Illinois, 29, 36, 37, 39
Children's Asthma Research Institute and
Hospital, 16, 23
choir, 10, 14
chromatin, 40, 43
chromatography, 50
collaboration, 31, 32, 72, 73
Colorado, 23, 39, 40
Colorado College, 19, 20, 21, 22, 23, 24, 25,
26, 27, 35, 36, 37, 39, 40
Colorado Springs, Colorado, 29, 37, 40
Cornell University, 24
covalently modified, 49, 50
Cristol, Stanley J., 40
cytosine, 59

D

David and Lucile Packard Foundation, 62,
63, 64
Denver, Colorado, 16, 17, 18, 21, 23, 29, 54
Deshields, Dovie (grandmother), 2, 4, 5, 6,
18
DNA, 40, 45, 55, 59, 70
double helix, 59
double-stranded RNA adenosine deaminase,
58, 59, 60, 63, 72

dsRAD. *See* double-stranded RNA
adenosine deaminase
Duke University, 19, 20, 21

E

electrophoresis, 49
embryos, 57, 60
Emory University, 19, 20, 21, 22, 23, 25, 27
English (language), 12, 13, 14, 19, 22, 25,
27, 37
enzyme, 44, 45, 48, 49, 57, 58, 59, 60, 70,
72
eucaryote, 49
European system, 64
Everglades, 18
expression, 49, 57

F

female, 2, 14, 18, 30, 31, 32, 33, 34, 74
fishing, 18
Florida, 1, 2, 3, 4, 12, 14, 15, 16, 17, 18, 19,
21, 29
Fort Lauderdale, Florida, 1, 3, 4, 9, 10, 17,
18
Fred Hutchinson Cancer Research Center,
7, 48, 49, 50, 52
frogs, 57
Fulenwider, Ann, 15, 21
funding, 9, 60, 61, 62, 63, 64, 65, 76

G

gel, 9, 49, 63
gender, 5, 22, 30, 31, 32, 33, 34
gene, 44, 49, 57
genetic, 8, 16, 49, 72
genetics, 70, 71
Gordon Conference, 44, 69
Grabowski, Paula J., 44, 55
Graves, Barbara, 74
guanosine, 58
Guthrie, Christine, 48

H

Howard Hughes Medical Institute, 65, 72

I

inosines, 58
inversion, 19

J

Jones, Harold, 27

K

Keystone, Colorado, 74

L

Lawrence, Robert, 39, 40
Lipkin, W. Ian, 38

M

male, 18, 30, 31, 32, 33
math, 13, 15
McCloskey, James A., 32, 72
medical technician, 39
Melton, Douglas A., 57
men, 32, 33
Mexico, 40
molecule, 44, 49, 50, 52, 57, 59, 70
monomer, 8
Mormon, 11, 12
music, 10, 14, 15, 19

N

National Academy of Science, 61
National Institutes of Health, 61, 62, 63, 64
National Jewish Center for Immunology
and Respiratory Medicine, 16
National Science Foundation, 61
Natural Obsessions: The Search for the
Oncogene (1988), 7
New York Times, 7, 8
NIH. *See* National Institutes of Health
Nobel Prize, 40, 43, 44, 55, 77
NSF. *See* National Science Foundation
nucleic acid, 49, 52, 58
nucleotide, 8
nutrition, 20, 24
nutritional biochemistry, 20, 27, 36

O

oncogenes, 7

P

peer review, 31
Pew Scholars in the Biomedical Sciences,
44, 60, 61, 62, 63, 64, 70
phenotype, 70
phosphorimager, 63
Polson, Andrew G., 72
Presbyterian, 10
proteins, 7, 40, 44, 45, 46, 48, 49, 51, 55,
56, 58, 59, 60, 63, 70, 75
protozoan, 57

R

racism, 14, 16, 17, 21, 29
radioactivity, 49, 63
Rebagliati, Michael R., 57
religion, 10, 11
ribozymes, 48
RNA, 7, 43, 44, 45, 46, 48, 50, 51, 55, 56,
57, 58, 59, 60, 63, 69, 70, 71, 72, 75
Roberts, James M., 50
rocket, 14, 15
Rush Medical College, 29, 36, 37, 38

S

Salt Lake City, Utah, 11, 30, 74
schools, 9, 10, 12, 17, 21, 35, 36, 37
science, 1, 2, 3, 6, 7, 11, 12, 13, 15, 20, 21,
24, 27, 30, 31, 32, 34, 35, 36, 37, 43, 44,
50, 54, 55, 56, 61, 62, 63, 65, 66, 68, 71,
73, 74, 75, 76, 77
Science, 61
Seattle, Washington, 29, 30, 48, 54, 70
sexism, 14, 30
sixties, 3, 12, 14, 15, 16, 17
skiing, 5, 54

soccer, 54
splicing, 44, 48, 75

T

tenure, 31, 34
tetrahymena, 57, 58, 70
the South, 1, 3, 14, 17, 19, 21, 29, 30
the West, 17, 23, 29, 30, 39, 74

U

United States, 21
University of California, Davis, 74
University of Chicago, 5, 30, 73, 74
University of Colorado, 21, 37, 39
University of Texas, 23
University of Utah, 11, 59, 62, 69, 73, 74
University of Wisconsin-Madison, 74
uracil, 59
Utah, 11, 19, 29, 31, 74

V

vaccine, 8
values, 4, 6, 11
Varmus, Harold E., 61
Vietnam, 15
virologist, 72

W

Weinberg, Robert A., 7
Weintraub, Harold, 30, 44, 48, 49, 50, 52,
53, 56, 57, 58, 59, 75, 76
Whiteman, Kathy, 15
women, 15, 20, 30, 31, 32, 33
worm, 70
writing, 13, 14, 19, 37, 68

Z

Zaug, Arthur J., 44, 55