

CHEMICAL HERITAGE FOUNDATION

STEPHEN J. ELLEDGE

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Andrea R. Maestrejuan

at

Baylor College of Medicine
Houston, Texas

on

16, 17, and 18 August 1995

From the Original Collection of the University of California, Los Angeles



Stephen J. Elledge

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:

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. R950910

This Interview Agreement is made and entered into this 19~~th~~ day of March, 1995th by and between *CM* 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 STEPHEN J. ELLEDGE having an address at Department of Biochemistry, Howard Hughes Medical Institute, Baylor College of Medicine, Houston, Texas, 77030, called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about August 16, 1995, and tentatively entitled "Interview with Stephen J. Elledge". 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: Stephen J. Elledge
Department of Biochemistry
Howard Hughes Medical Institute
One Baylor Plaza
Houston, Texas 77030

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

INTERVIEWEE

Stephen J. Elledge
(Signature)

Stephen J. Elledge
(Typed Name)

Howard Hughes Medical Institute

One Baylor Plaza
(Address)

Houston, Texas 77030

X Date 8/16/95

THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA

Carli V. Rogers
(Signature)

Carli V. Rogers
(Typed Name)

Copyright Officer
(Title)

(Address)

Date March 19, 1996

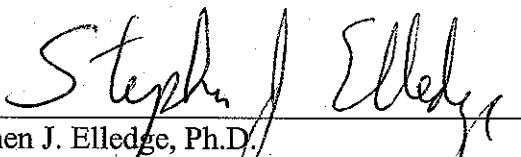
Pew Scholars in the Biomedical Sciences
Chemical Heritage Foundation Internet Posting Release Form

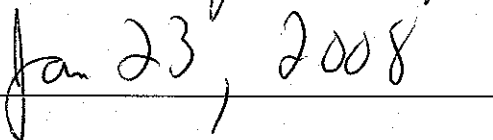
I, Stephen J. Elledge, Ph.D., hereby grant permission to post portions of the digital copy of the audio-taped interview of me, and the related written transcript, on the internet for non-commercial, educational use only as per the checked selection below.

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.


Stephen J. Elledge, Ph.D.


Date

This interview has been designated as **Free Access**.

One may view, quote from, cite, or reproduce the oral history with the permission of CHF.

Please note: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to credit CHF using the format below:

Stephen J. Elledge, interview by Andrea R. Maestrejuan at Baylor College of Medicine, Houston, Texas, 16-18 August 1995 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0431).



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.

STEPHEN J. ELLEDGE

1956 Born in Paris, Illinois, on 7 August.

Education

1978 B.S., University of Southampton, Southampton, England and
University of Illinois at Urbana- Champaign
1983 Ph.D., Massachusetts Institute of Technology

Professional Experience

1984-1989 Stanford University, Palo Alto, California
Postdoctoral Fellow

1989-1993 Baylor College of Medicine, Houston, Texas
Assistant Professor
1993-1995 Associate Professor
1995-present Professor

1993-present Howard Hughes Medical Institute, Chevy Chase, Maryland
Associate Investigator

Honors

1974-1978 Illinois State Scholar
1974-1978 James Scholar
1975 Monsanto Scholarship-Freshman Chemical Engineering Award
1976 Chemical Industries Council Scholarship-Sophomore
Chemistry Award
1977 Elliot Richie Alexander Award
1977 Eta Sigma Phi Honorary Fraternity
1978 Senior Chemistry Award, Phi Lambda Upsilon
1978 Bronze Tablet, University of Illinois
1984-1987 Helen Hay Whitney Postdoctoral Fellowship
1987-1989 American Cancer Society Senior Fellow
1991-1995 Pew Scholars Program in the Biomedical Sciences Grant
1994 Michael E. DeBakey, M.D., Award for Research Excellence

Selected Publications

- Elledge, S.J. and G.C. Walker, 1983. Proteins required for UV and chemical mutagenesis: Identification of the products of the *umuC* locus of *Escherichia coli*. *Journal of Molecular Biology*, 164:175-92.
- Elledge, S.J. and R.W. Davis, 1990. Two genes differ-entially regulated in the cell cycle and by DNA-damaging agents encode alternative regulatory subunits of ribonucleotide reductase. *Genes and Development*, 4:740-51.
- Elledge, S.J. et al., 1991. Lambda YES: A multi-functional cDNA expression vector for the isolation of genes by complementation of yeast and *E. coli* mutations. *Proceedings of the National Academy of Sciences USA*, 88:1731-34.
- Zhou, Z. and S.J. Elledge, 1992. Analysis of the DNA damage sensory pathway through the isolation and characterization of the *CRT* mutants, constitutive for *RNR3* transcription. *Genetics*, 131:851-66.
- Durfee, T. et al., 1993. The retinoblastoma protein associates with the protein phosphatase type 1 catalytic subunit. *Genes and Development*, 7:555-69.
- Zhou, Z. and S.J. Elledge, 1993. *DUN1* encodes a protein kinase that controls the DNA damage response in yeast. *Cell*, 75:1119-27.
- Harper, J.W. et al., 1993. The p21 Cdk-interacting protein Cip1 is a potent inhibitor of G1 cyclin-dependent kinases. *Cell*, 75:805-16.
- Dulic, V. et al., 1994. p53-dependent inhibition of cyclin-dependent kinase activities in human fibroblasts during radiation-induced G1 arrest. *Cell*, 76:1013-23.
- Allen, J.B. et al., 1994. The SAD1/RAD53 protein kinase controls mutiple cell cycle checkpoints and DNA damage induced transcription in yeast. *Genes and Development*, 8:2401-15.
- Navas, T. et al., 1995. DNA polymerase epsilon links the DNA replication machinery to the S phase checkpoint. *Cell*, 80:29-39.
- Matsuoka, S. et al., 1995. p57^{KIP2}, a structurally distinct member of the p21^{CIP1} Cdk-inhibitor family, is a candidate tumor suppressor gene. *Genes and Development*, 9:650-62.
- Sicinski, P. et al., 1995. Cyclin D1 provides a link between development and oncogenesis in the retina and the breast. *Cell*, 82:621-30.
- Deng, C. et al., 1995. Mice lacking p21^{CIP1/WAF1} undergo normal development, but are defective in G1 checkpoint control. *Cell*, 82:675-84.
- Matsuoka, S. et al., 1996. Variable imprinting of the human cyclin-dependent kinase inhibitor p57^{KIP2}. *Proceedings of the National Academy of Sciences USA*, 93:3026-30.
- Sanchez, Y. et al., 1996. Regulation of *RAD53* by the ATM-like kinases *MEC1* and *TEL1* in yeast cell cycle checkpoint pathways. *Science*, 271:357-60.

ABSTRACT

Stephen J. Elledge was born in Paris, Illinois. He had two older sisters and an older half sister. He attended Roman Catholic elementary school but rebelled against the religious teaching and switched to public schools. From a young age, he was interested in science; Elledge's grandmother bought him chemistry kits, and he made rockets. Elledge's high school had very good science and mathematics classes, and he loved chemistry ("fun" he calls it). He was on the chemistry team, on which he won the individual and team competitions.

He was the first in his family to go to college, and he did not have enough guidance to know what he could or should do, so he entered the University of Illinois intending to major in chemical engineering. He won the chemical engineering prize as a freshman, but then switched his major to chemistry. By his junior year he'd taken all the chemistry courses, and recombinant DNA was just becoming the hot topic in biology, so when he went to University of Southampton for his junior year he took a genetics course. During his senior year he took a biochemistry class, which he found combined chemistry and his new interest in biology, and he officially switched to biology for graduate school. He decided to apply to Harvard University for graduate school, but he ended up going to the Massachusetts Institute of Technology, which people said was the best place in the world. There he worked in Graham Walker's lab, combining molecular biology and genetics. He did his first cloning there and became interested in methodologies for cloning.

Stanford University offered him a postdoc in Ronald Davis' lab, where he first began work in plants, but soon switched to yeast. He became convinced that it was important to find out how cyclin-dependent kinases that run the cell cycle were regulated, with a view toward an intersection between cell cycle and cancer. While at Stanford Elledge met his future wife, Mitzi Kuroda, herself a scientist.

Elledge accepted an assistant professorship at Baylor College of Medicine, where he has since advanced to associate and then full professor. He has brought some technological advances to genetics, and he and his lab discovered inhibitor molecules, especially the tumor suppressor p21, the first mammalian inhibitor. It was a new field then, but in the few years since publication, Elledge estimates that others have published perhaps a hundred papers on the subject. Elledge himself has continued his interest in what these molecules actually do, now that they have mostly been found. He has been selected a Howard Hughes Medical Institute Associate Investigator; he continues to publish; he has won numerous awards, including the Pew Scholars in the Biomedical Sciences Award. Most importantly, he attempts to balance his life at work with his life at home with his wife and two children.

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: Elledge's office, Baylor College of Medicine.

Dates, length of sessions: August 16, 1995 (86 minutes); August 17, 1995 (135); August 18, 1995 (124).

Total number of recorded hours: 5.75

Persons present during interview: Elledge 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 Elledge 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 Elledge'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 Elledge's childhood in Paris, Illinois, and continuing through his graduate work at Massachusetts Institute of Technology, his postdoc at Stanford University, and the establishment of his own lab at Baylor College of Medicine.

Major topics discussed include the discovery of cyclin-dependent kinase 2, work on DNA damage response, the intersection of cell cycle and cancer studies, technological advances Elledge has brought to genetics, and funding in the scientific community.

ORIGINAL EDITING:

Mimi Luc, 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.

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

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

Kathleen McAlister, editorial assistant, compiled the index..

TABLE OF CONTENTS

Early Years	1
Family background. Growing up in small-town Midwest. Early interest in science. Early interest in science. Chemistry kits. Chemistry team in high school. Detasseling corn.	
College Years	22
Matriculates at University of Illinois. Majors in chemical engineering and wins chemical engineering prize, but switches to chemistry after first year. Summer jobs. Loves learning, especially mathematics and chemistry. Straight A's. Junior year at University of Southampton in Southampton, England. Becomes interested in genetics. Comparison of English and American systems. Finishes in three and one-half years but stays at school. Takes biochemistry.	
Graduate School Years	68
Switches to biology. Enters Massachusetts Institute of Technology, "the best place anywhere." Studies genetics. Graham Walker's lab. Cloning. New technologies for cloning. Finishes PhD in four years. Spends an extra year at MIT.	
Postgraduate Years	82
Accepts postdoc at Stanford University in Ronald Davis' lab. Decides he is not interested in plants and switches to yeast. Meets future wife, Mitzi Kuroda. Cell-cycle regulation. DNA damage response. Marries.	
Faculty Years	92
Accepts assistant professorship at Baylor College of Medicine. Moves through associate professorship to full professorship. Tumor suppressor p21. Continuing importance of cyclin-dependent kinase 2. Competition and collaboration. Sexism in science. Pew Scholars in the Biomedical Sciences award. Other awards. Cell cycle and cancer. Writing grants. Publishing ("rat race"). Managing his lab. Balancing life with wife and two children with life in the lab.	
Index	119

INDEX

3

3, 76, 80, 87, 92, 97
3 GT-11 system, 82

A

AA. *See* Alcoholics Anonymous
Agrobacterium, 96
AIDS. *See* autoimmune deficiency syndrome
Alcoholics Anonymous, 4, 8
Amsterdam, the Netherlands, 60
Arabidopsis, 97
Austria, 60, 61
autoimmune deficiency syndrome, 108, 109

B

Baber, Bruce, 23, 25, 57, 95
Baber, Mary Helen, 23
Baker, Bruce S., 101
Baltimore, David, 79
Barry, Mr., 22
Bass, Brenda L., 118
Baylor College of Medicine, 85
Baylor University, 99
Beach, David, 37, 38, 43, 44, 45
Becherer, Kathleen, 87
Behrman, Amy, 114
Berkeley, California, 100
Berlin Wall, 62
Berlin, Germany, 62
biochemistry, 19, 51, 63, 64, 70, 71, 72, 73, 74, 80, 81, 83, 86, 89, 98
Bjorkman, Pamela J., 118
Boston, Massachusetts, 38, 40, 93
Botstein, David, 79, 82
Brent, Roger, 40
Brown, Barbara Ann Elledge (sister), 3
Brown, Dave (brother-in-law), 7, 27

C

California Institute of Technology, 70, 73, 75
Caltech. *See* California Institute of Technology
Cambridge, England, 61
Cambridge, Massachusetts, 93
cancer suppressor
p16, 45
Case Western Reserve University, 92
cdc2, 84, 85
cdc28, 85
Cdk2. *See* cyclin-dependent kinase 2
Cdk-interacting protein 1, 43, 87
cell cycle, 37, 38, 41, 43, 44, 46, 47, 82, 83, 84, 85, 86, 88, 110
Champaign, Illinois, 62, *See*
Champaign-Urbana, Illinois, 1
Charleston, Illinois, 11
Checkpoint Charlie, 62
Chicago, Illinois, 1, 21, 24, 28, 54, 55, 56, 57, 95
Christopher Curl, 14
Cip1. *See* Cdk-interacting protein 1
Colson's Printing Company, 3
Cooper, Jonathan A., 42
Corsica, 60, 61
cyclin-dependent kinase 2, 43, 85, 86, 87
cyclin-dependent kinases, 37, 38, 43

D

Davis, Mona Elledge (cousin), 13
Davis, Ronald W., 13, 33, 81, 82, 92, 96, 99
Deng, Chuxia, 44
DePauw University, 57
DNA, 19, 38, 40, 44, 46, 47, 72, 73, 74, 75, 80, 82, 83, 86, 87, 96, 110, 111
cDNA, 84, 85, 87
DNA polymerase ϵ , 87
Dollar, Brenda Lee Elledge (sister), 3, 8,

9, 96

Drosophila, 87

Dudley, England, 11

Dudley, Illinois, 11, 23

DUNI, 38, 87

Durfee, Timothy, 87

E

E. coli, 40, 81, 83, 110

East Germany, 62

Edgar County Alcohol and Drug Abuse
Council, 4

Edward, Michael C., 85, 87

Eichele, Gregor, 88

Elledge, Daniel (son), 102, 103

Elledge, Joseph (father), 2, 95

Elledge, Julia (paternal great-aunt), 2, 13,
14

Elledge, Lucky (paternal great-uncle), 2

Elledge, Sarah Greco (mother), 2, 3

Elledge, Susanna (daughter), 102, 103

England, 57

enzymatic mechanisms, 19, 63, 71, 72

F

Fermat's last theorem, 32

Fields, Stanley, 43, 86

Fink, Gerald R., 82

Florida, 8, 59

Ford Motor Company, 7, 27

France, 60

G

Gal4, 86

genetics, 19, 41, 43, 47, 51, 63, 71, 72, 73,
74, 75, 76, 80, 81, 88, 89, 91, 101, 102,
110, 113

Germany, 60, 62

Gibson, Mr., 22

Gonzalez, Robert, 64

Goodman, Steve, 54

Gore, Albert, Jr., 55

Gottschling, Daniel E., 118

Grateful Dead, 100

Greenville, Mississippi, 2

H

Harlow, Edward, 85, 87

Harper, J. Wade, 39, 43, 86, 87, 99

Hartwell, Leland H., 82

Harvard University, 19, 38, 70, 71, 75, 106

HIV. *See* human immunodeficiency virus
HO gene, 83

Hobart, Billi Joyce Greco (half-sister), 3,
5, 7, 8

Hobart, Robert (brother-in-law), 7

Holifield, Carl (paternal step-grandfather),
3

Howard Hughes Medical Institute, 87, 99,
105, 106

Human Genome Project, 73, 109

human immunodeficiency virus, 86

Hunter, Anthony R., 38

I

Illinois, 8, 10

Illinois Cereal Mill, 65

Indiana, 1, 22, 49, 57

Indiana State University, 54

Ireland, 2, 61

Italy, 2, 5, 60

J

Jacks, Tyler, 44

Joliet, Illinois, 3, 13

K

Kentucky, 8

Kenyon, Cynthia, 40, 41, 94, 115

Kirschner, Marc W., 38

Kiwanis Club, 57

Kleckner, Nancy, 90

Knowles, Jeremy R., 19

Kuhn, Thomas S., 79, 111

Kuroda, Mitzi, 86, 92, 101, 103

L

Lamb, Casey, 95

Landis, Clark, 54, 57

Leder, Philip, 44

Lee, Melanie G., 91, 96
Leland, Mississippi, 2, 3, 5
Lewin, Benjamin, 38
Little Rock, Arkansas, 6
Lodish, Harvey F., 79
London, England, 38, 57, 61

M

M. D. Anderson Cancer Center, 7
Marshall, Illinois, 3
Massachusetts Institute of Technology, 19,
51, 52, 70, 72, 73, 75, 77, 79, 80, 81, 93,
96, 106, 110
Mattoon, Illinois, 11
McKenry, A.J., 22
Menlo Park, California, 101
Meyers, Barbara J., 96
Mississippi, 5, 57
MIT. *See* Massachusetts Institute of
Technology
Monsanto Company, 54
Montgomery Ward, 21
Mulligan, John, 84

N

Nasmyth, Kim A., 83
National Institutes of Health, 104, 105,
106, 107
Nester, Eugene W., 96
New Orleans, Louisiana, 57
New York Times, 39, 107
Nguyen, Thanh, 97
NIH. *See* National Institutes of Health
NIH Office of Aids Research, 109
Nobel Prize, 41, 78, 81
Nurse, Paul, 43, 82, 84, 85, 91

O

Oblong, Illinois, 11, 12
Olney, Illinois, 10, 11, 12

P

p57, 88
Palo Alto, California, 100, 101
Paris Automobile Company, 21

Paris, France, 60
Paris, Illinois, 1, 3, 4, 8, 10, 11, 12, 13, 28,
29, 54, 55, 60, 65, 95, 96
Pauling, Linus C., 19
PCR. *See* polymerase chain reaction
Pew Charitable Trusts, 117
Pew Scholars in the Biomedical Sciences,
47, 99, 105, 110
phasmid, 81
polymerase chain reaction, 37
Ptashne, Mark, 40

R

Ramer, Sandra W., 84
REA. *See* Rural Electrification
Administration
RecA, 82
Reed, Steven I., 43, 85, 86
retinoblastoma, 42, 87
ribonucleotide reductase, 82, 83, 87
Rice University, 52
RNA, 83, 86
Roman Catholic/Catholicism, 2, 4, 9, 14,
22, 49
Rural Electrification Administration, 3
Russia, 62

S

Saccharomyces cerevisiae, 43
Saint Mary's [elementary school], 20, 22
San Francisco, California, 100
Scotland, 61
Seattle, Washington, 96
Sheffield, England, 61
Sicily, 2
Signer, Ethan, 110
simian virus 40, 88
Smith, James R., 43, 108
Soriano, Philippe M., 46
Southern blot, 36
src, 46
Stanford University, 48, 70, 81, 83, 94, 96,
97, 98, 100, 101
Stidle, Steve, 20
Stillman, David, 83

Structure of Scientific Revolutions, The,
111

Strugala, Lisa, 57

Sugino, Akio, 88

SV40. *See* simian virus 40

Swindle, Ann, 60

T

Tatara, Richard, 54, 57, 59, 95

Terre Haute, Indiana, 1, 28, 29, 54, 57

Theresa Gagen (paternal grandmother), 2
transposon, 40, 80

tumor suppressor, 38, 42, 44, 45

p21, 37, 43, 44, 87, 88

p53, 38, 42, 43, 44, 87

U

UCSF. *See* University of California, San
Francisco

umuC, 40, 76

United States Alcohol, Drug Abuse, and
Mental Health Administration, 5

University of California, Berkeley, 70,
100, 106

University of California, San Diego, 101

University of California, San Francisco,
84, 106

University of Chicago, 23

University of Illinois, 1, 7, 19, 28, 51, 54,
56, 58, 63, 69

University of Iowa, 92

University of Southampton, 57, 59, 63

University of Texas, 7, 107

University of Washington, 96

University of Wisconsin, 70

V

Vallee, Bert L., 86

Varmus, Harold E., 42

Veterans Administration, 10

Vienna, Austria, 57, 61, 62

Vietnam War, 15

Vogelstein, Bert, 38, 43, 47, 87

W

Wales, 61

Walker, Graham C., 40, 64, 72, 73, 80, 93,
99

Walsh, Christopher, 72

Weinberg, Amy, 55

Weinberg, Robert A., 42

Wharton, Robin P., 40

Willow Hill, Illinois, 11

Wishart, David, 54, 55, 63

World War II, 2

X

X YES, 84

Xiong, Yue, 43

Y

Yanofsky, Charles, 101

Young, Richard, 96

Z

Zhou, Z., 38

Zinn, Kai, 118