

CHEMICAL HERITAGE FOUNDATION

ADRIAN R. KRAINER

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Andrea R. Maestrejuan

at

Cold Spring Harbor Laboratory
Cold Spring Harbor, New York

on

9, 10, and 11 April 1997

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

ACKNOWLEDGEMENT

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Cold Spring Harbor, New York 11724

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

INTERVIEWEE

Adrian R. Krainer
 (Signature)

Adrian R. Krainer
 (Typed Name)

Cold Spring Harbor Laboratories
 (Address)

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Cold Spring Harbor, NY 11724

Date 6-29-98

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Adrian R. Krainer
Adrian R. Krainer, Ph.D.

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ADRIAN R. KRAINER

1958 Born in Montevideo, Uruguay, on 14 September

Education

1981 B.A., Biochemistry, Columbia University
1986 Ph.D., Biochemistry, Harvard University

Professional Experience

	Cold Spring Harbor Laboratory, Cold Spring Harbor, New York
1986-1989	Postdoctoral Researcher
1989-1990	Staff Investigator
1990-1994	Senior Staff Investigator
1994-present	Senior Staff Scientist
	State University of New York-Stony Brook, Stony Brook, New York
1990-present	Faculty Member, Graduate Program in Genetics
1995-present	Faculty Member, Molecular and Cellular Biology

Honors

1981	Phi Beta Kappa
1981	Phi Lambda Upsilon Honorary Chemical Society
1981	Josiah Macy Foundation Scholar
1986-1989	Cold Spring Harbor Outstanding Junior Fellow
1992-1996	Pew Scholar in the Biomedical Sciences

Selected Publications

Krainer, A.R. et al., 1984. Normal and mutant human E-globin pre-mRNAs are accurately and efficiently spliced in vitro. *Cell* 36:993-1005.

Krainer, A.R. and T. Maniatis, 1985. Multiple components including the small nuclear ribonucleoproteins U1 and U2 are required for pre-mRNA splicing in vitro. *Cell* 42:725-36.

Krainer, A.R. et al., 1990. Purification and characterization of pre-mRNA splicing factor SF2 from HeLa cells. *Genes and Development* 4:1158-71.

Krainer, A.R. et al., 1990. The essential pre-mRNA splicing factor SF2 influences 5' splice site selection by activating proximal sites. *Cell* 62:35-42

Krainer, A.R. et al., 1991. Functional expression of cloned human splicing factor SF2: Homology to RNA binding proteins, U1 70K, and *Drosophila* splicing regulators. *Cell*

66:383-94.

- Mayeda, A. and A.R. Krainer, 1992. Regulation of alternative pre-mRNA splicing by hnRNP A1 and splicing factor SF2. *Cell* 68:365-75.
- Birney, E. et al., 1993. Analysis of the RNA-recognition motif and RS and RGG domains: Conservation in metazoan pre-mRNA splicing factors. *Nucleic Acids Research* 21:5803-16.
- Caceres, J.F. et al., 1994. Regulation of alternative splicing in vivo by overexpression of antagonistic splicing factors. *Science* 265:1706-9.
- Wu, Q. and A.R. Krainer, 1996. U1-mediated exon definition interactions between AT-AC and GT-AG introns of a Na⁺ channel gene. *Science* 274:1005-8.
- Horowitz, D. and A.R. Krainer, 1997. Identification of a human homolog of yeast PRP18 and its role in catalytic step II of pre-mRNA splicing. *Genes and Development* 11:139-49.
- Xu, R.M. et al. , 1997. Crystal structure of human UP1, the domain of HNRNP A1 that contains two RNA-recognition motifs . *Structure* 5:559-70.

ABSTRACT

Adrian R. Krainer was born and raised in Montevideo, Uruguay in a Jewish family of eastern European descent (Hungary and Romania), the younger of two brothers. (Krainer's father was forced to work in a Romanian labor camp during World War II and on his way through Italy to Uruguay after the war, a clerical error changed the family name from Kreiner to Krainer). His parents had a small business making leather items in Montevideo. Political unrest framed his teenage years in the 1970s, as did the Zionist movement and witnessing anti-Semitism. Krainer went to a bilingual French elementary school (such that half of his classes were conducted in French, and half in Spanish) before transitioning into a public school for two years and then into a Hebrew school to complete his pre-college education. He was inspired by some of his high-school teachers to pursue science as a career, which he did instead of medicine, and developed an early interest in classical genetics. Seeing all the science being produced in the United States in genetics, Krainer decided that he wanted to attend a U.S. academic institution and set about learning English.

He applied to and decided to matriculate at Columbia University and major in biochemistry, finding a laboratory course with James A. Lewis and lectures by Charles R. Cantor quite stimulating. He worked for a time in a photocopying and messenger office on campus; he later worked in Catherine L. Squires's lab, successfully cloning a bacterial ribosomal operon. While still not feeling totally comfortable with the English language, he did quite well academically at Columbia, and was accepted both to Harvard University and the Massachusetts Institute of Technology's graduate programs, choosing the former for his doctoral research. While at Harvard, Krainer rotated through James Wang's and Walter Gilbert's labs, and wrote a computer program in Mathew S. Meselson's lab to correlate recombination frequencies and distance of residues within proteins, before joining the lab of Thomas P. Maniatis, who had done groundbreaking work cloning full-length cDNAs. While a graduate student, Krainer developed an efficient *in vitro* splicing system, which made it possible to study detailed aspects of human pre-mRNA splicing mechanisms, regulation, and disease-associated splicing defects. From this work Krainer had three articles published in *Cell*. He moved on to an independent fellow position at the Cold Spring Harbor Laboratory in Long Island, New York, being mentored by Richard J. Roberts (a co-discoverer of splicing in 1977) and worked on purifying and characterizing snRNP and protein components of the spliceosome, before accepting a faculty position there in 1989.

Throughout the interview Krainer talks about his scientific life and balancing family life with his career, all the while reflecting on life and science in Uruguay. In addition, he discusses Richard J. Roberts and Phillip A. Sharp's Nobel Prize; the system of staff promotion at Cold Spring Harbor; the rationale behind Cold Spring Harbor's "rolling-five system"; the National Cancer Institute grant review process; the advantages of the Pew scholars network; the growing tendency for clinical research to be funded over basic research; and James D. Watson's program of bringing Eton students to Cold Spring Harbor. The interview ends with his thoughts on his participation in Programa de Desarrollo de Ciencias Básicas and the Pew Latin American Fellows program; and the valuable interactions at the Pew scholars annual meetings.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Andrea R. Maestrejuan, Interviewer, UCLA Oral History Program; B.S., Biological Sciences, University of California, Irvine, 1986; M.A., History, University of California, Riverside, 1991; C. Phil., History, University of California, Riverside.

TIME AND SETTING OF INTERVIEW:

Place: Krainer's office, Cold Spring Harbor.

Dates, length of sessions: April 9, 1997 (132 minutes); April 10, 1997 (192); April 11, 1997 (215).

Total number of recorded hours: 9

Persons present during interview: Krainer 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 Krainer 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 Krainer'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, Maestrejuan 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*. 3d ed. New York: Garland, 1994; and Horace F. Judson, *The Eighth Day of Creation*. New York: Simon and Schuster, 1979.

The interview is organized chronologically, beginning with Krainer's childhood in Uruguay and continuing through his education at Columbia University, his graduate work at Harvard University, his postdoctoral work at Cold Spring Harbor Laboratory, and the establishment of his own lab at Cold Spring Harbor. Major topics discussed include Krainer's childhood in Uruguay, his work on in vitro splicing, crediting of authorship for publication, and the atmosphere and staffing structure at Cold Spring Harbor

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.

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

Jane Collings, senior editor, prepared the table of contents and biographical summary. Beyrer assembled the interview history and index.

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