

CHEMICAL HERITAGE FOUNDATION

LESTER F. LAU

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Neil D. Hathaway

at

University of Illinois College of Medicine and Neil D. Hathaway's hotel
Chicago, Illinois

on

6, 7, and 8 November 1992

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

ACKNOWLEDGEMENT

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UNIVERSITY OF CALIFORNIA, LOS ANGELES

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If to Interviewee: Lester F. Lau
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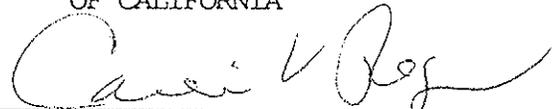
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INTERVIEWEE

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(Signature)



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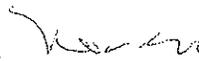
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LESTER F. LAU

1955 Born in Hong Kong on 19 September

Education

1976 B.S., Chemistry, City College of New York

1983 Ph.D., Biochemistry/Molecular Biology, Cornell University

Professional Experience

1983 Cornell University, Ithaca, New York
Postdoctoral Associate, Department of Biochemistry, Cell and
Molecular Biology

1983-1986 Johns Hopkins University School of Medicine, Baltimore, Maryland
Helen Hay Whitney Postdoctoral Fellow, Department of
Molecular Biology

1986 Associate, Department of Molecular Biology, Howard Hughes
Medical Institute Laboratory

1986-1989 Northwestern University Medical School, Evanston, Illinois
Assistant Professor, Department of Molecular Biology

1989-1992 University of Illinois College of Medicine, Chicago, Illinois
Assistant Professor, Department of Genetics

1992-present Associate Professor

Honors

1976 Phi Beta Kappa

1976 Arthur Levy Award for Chemistry, City College of New York

1978-1981 National Institutes of Health Predoctoral Training Grant

1983-1986 Helen Hay Whitney Postdoctoral Fellowship

1988-1991 American Cancer Society Junior Faculty Award

1988-1992 Pew Scholars Program in the Biomedical Sciences

1992-1995 University Scholar Award, University of Illinois

1992-1997 Established Investigator, American Heart Association

Selected Publications

- Lau, L.F. et al., 1982. Transcription terminates at tR1 in three clusters. *Proceedings of the National Academy of Sciences USA*, 79:6171-75.
- Lau, L.F. et al., 1983. RNA polymerase pausing and transcript release at the λ tR1 terminator in vitro. *Journal of Biological Chemistry*, 258:9391-97.
- Lau, L.F. et al., 1984. A potential stem-loop structure and the sequence CAAUCAA in the transcript are insufficient to signal rho-dependent transcription termination at λ tR1. *Nucleic Acids Research*, 12:1287-99.
- Lau, L.F. and W. Roberts, 1985. Rho-dependent transcription termination at λ tR1 requires upstream sequences. *Journal of Biological Chemistry*, 260:574-84.
- Lau, L.F. and D. Nathans, 1985. Identification of a set of genes expressed during the G₀/G₁ transition of cultured mouse cells. *EMBO Journal*, 4:3145-51.
- Lau, L.F. and D. Nathans, 1987. Expression of a set of growth-related immediate early genes in BALB/c 3T3 cells: Coordinate regulation with *c-fos* or *c-myc*. *Proceedings of the National Academy of Sciences USA*, 84:1182-86.
- Lau, L.F., 1990. Growth factors and growth control. *Current Opinion in Cell Biology*, 2:280-84.
- Lau, L.F. and D. Nathans, 1991. Genes induced by serum growth factors. In *Molecular Aspects of Cellular Regulation*, Vol. 6: *The Hormonal Control of Gene Transcription*, eds. P. Cohen and J.G. Foulkes. Amsterdam: Elsevier, 257-93.
- Yang, G.P. and L.F. Lau, 1991. Cyr61, product of a growth factor-inducible immediate-early gene, is associated with the extracellular matrix and the cell surface. *Cell Growth and Differentiation*, 2:351-57.
- O'Brien, T.P. and L.F. Lau, 1992. Expression of the growth factor-inducible immediate-early gene cry61 correlates with chondrogenesis during embryonic development. *Cell Growth and Differentiation*, 3:645-54.

ABSTRACT

Lester F. Lau, the youngest of three children, lived in Hong Kong until he was fourteen. Lau's parents were strict, Lau was—he says—introverted, and Chinese schools stressed conformity over creativity, so when the family moved to Brooklyn Lau was able to do so well in science and mathematics that he skipped a grade. This led to difficulty in high school, as his understanding of English did not keep pace. He actually ended up seventh in his class of over 1,000, however, which was more than good enough to qualify him for City College of New York. He decided to go there in great part because it was free, but another consideration was that he had been accepted into their honors program and given a scholarship. He originally thought he might be a history major, but an organic chemistry class changed his mind. He found science to be like a puzzle or a detective story; and he was excited by the enormous addition to knowledge that science had provided.

Lau began graduate school at Purdue University, studying X-ray crystallography, but he switched to molecular biology at Cornell University, entering Ray Wu's lab. He describes working with Jeffrey Roberts, manipulating synthetic DNA to study transcription and termination. Here he discusses the shift from his interest in procaryotic systems to eucaryotic systems; continuity and discontinuity in his career; and his independent research style. From there he went to Gerald Fink's lab to study yeast genetics, and he created a double-mutation yeast strain. He decided to do a postdoc in molecular biology in Daniel Nathans's lab at Johns Hopkins University School of Medicine, and he received a Helen Hays Whitney Fellowship. Here Lau talks about the genesis and impact of Nathans's work on simian virus 40; the value of interacting with other fellows; and applying a molecular approach to studying cell cycle regulation. He continues with a discussion of the difficulties involved in differential hybridization; differential screening in other labs; encountering skepticism in the field; prior work on how genes activate cells; the usefulness of simple lab techniques; the reaction to Lau's findings; and the politics of scientific publishing. Lau gives his opinion about whether outsiders can still make contributions to science, grant review sections, and the status of women and minorities in science. He talks more about the reception given his papers and publication timing and the job market. He goes into his reasons for leaving Nathans's lab.

At this point in his career, Lau began to hunt for a job. One criterion was his preference for big cities, so he accepted a position at Northwestern University Medical School in Chicago and set up his new lab. His next peroration encompasses the role of basic research in a medical school, to wit the teaching duties of research biologists versus doing research.

Lau's next move was to the University of Illinois College of Medicine in Chicago, where he is now an associate professor. He discusses sequencing cDNAs; trying to determine gene functions; and his competitors. He explains how different stimuli can activate immediate-early genes; the complex process of cell cycle regulation; the need to look beyond the tissue culture model to the organism; and how he learned to make transgenic mice. He concludes by talking about his National Institutes of Health grant reviews and his plans to explore a genetics approach to isolating immediate-early genes.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Neil D. Hathaway, Interviewer, UCLA Oral History Program. B.A., English and History, Georgetown University; M.A. and C. Phil., History, UCLA

TIME AND SETTING OF INTERVIEW:

Place: Tapes I and II, University of Illinois College of Medicine, Chicago, Illinois; Tapes III to V, Hathaway's hotel in Chicago.

Dates, length of sessions: November 6, 1992 (80 minutes); November 7, 1992 (83); November 8, 1992 (208).

Total number of recorded hours: 6.25

Persons present during interview: Lau and Hathaway.

CONDUCT OF INTERVIEW:

This interview is one in a series with Pew Scholars Program in the biomedical sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts's Pew Scholars Program 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 five-year Pew scholarships, from 1988 through 1992.

In preparing for this interview, Hathaway, in consultation with the director of the UCLA Oral History Program and three UCLA faculty project consultants, developed a topic outline to provide an overall interview framework. Hathaway then held a telephone preinterview conversation with Lau to obtain extensive written background information (curriculum vitae; copies of published articles, etc.) and agree on a research and interviewing timetable. Hathaway further reviewed the documentation in Lau'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, Hathaway consulted such works as: J.D. Watson et al., *The Molecular Biology of the Gene*. 4th ed. 2 vols. Menlo Park, CA: Benjamin/ Cummings, 1987; Lubert Stryer, *Biochemistry*. 3d ed. New York: W.H. Freeman, 1988; *The Journal of the History of Biology*; and H.F. Judson, *The Eighth Day of Creation: Makers of the Revolution in Biology*. New York: Simon and Schuster, 1979.

The interview is organized chronologically, beginning with Lau's childhood in Hong Kong and Brooklyn and continuing with his education at City College of New York, Purdue University, and Cornell University, his postdoc at Johns Hopkins University School of Medicine, and the creation of his labs at the Northwestern University Medical School and the University of Illinois College of Medicine. Major topics discussed include gene transcription,

yeast genetics, cell cycle regulation, peer review, science funding, and the status of women and minorities in science.

ORIGINAL EDITING:

Steven J. Novak, 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.

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

Novak also prepared the table of contents, biographical summary, interview history, and index.

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