CHEMICAL HERITAGE FOUNDATION

MARGARET C. KIELIAN

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Neil D. Hathaway and Andrea R. Maestrejuan

at

Albert Einstein College of Medicine of Yeshiva University
Bronx, New York

on

20, 23, and 30 June 1994 and 14 November 1996

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

Margaret C. Kielian

ACKNOWLEDGEMENT

This oral history is part of a series supported by a grant from the Pew Charitable Trusts based on the PewScholars 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.

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REFORMATTING:

Kim Phan, Program Intern, Oral History, Chemical Heritage Foundation. B.A. expected 2011, Anthropology, Cornell 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, CornellUniversity.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

Oral History Interview Agreement No. T0602OOE

This Interview Agreement is made and entered into this 2nd day of June, 2000 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 MARGARET C. KIELIAN, having an address at Department of Cell Biology, Albert Einstein College of Medicine, 1300 Morris Park Avenue, Bronx, New York 10461, hereinafter called "Interviewee." This interview agreement supersedes any previous agreements regarding "the Work" described below.

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about June 17, 1994, and tentatively entitled "Interview with Margaret C. Kielian". 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.

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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.

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7. All notices and other official correspondence concerning this Agreement will be sent to the following:

If to University: Oral History Program
University of California, Los Angeles
Box 951575
Los Angeles, California 90095-1575

Attention: Director

If to Interviewee: Margaret C. Kielian
Department of Cell Biology
Albert Einstein College of Medicine
1300 Morris Park Avenue
Bronx, New York 10461

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

INTERVIEWEE

Margaret Kielian
(Signature)

Margaret C. Kielian
(Typed Name)

Albert Einstein College of Medicine
(Address)

ronx, New York 10461

X Date 4/21/2000

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

(Signature)

Dale E. Treleven
(Typed Name)

Director, Oral History Program
(Title)

Date June 2, 2000

Pew Scholars in the Biomedical Sciences

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Margaret Kielian
Margaret C. Kielian, Ph.D.

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Date

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Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106

MARGARET C. KIELIAN

1952 Born in Omaha, Nebraska, on 16 December

Education

1975 B.A., Microbiology, University of Nebraska at Lincoln
1981 Ph.D., Cell Biology, Rockefeller University

Professional Experience

University of Helsinki, Helsinki, Finland
1981 Visiting Scientist, Department of Virology

Yale University School of Medicine, New Haven, Connecticut
1982-1984 Postdoctoral Fellow
1984-1986 Associate Research Scientist

Albert Einstein College of Medicine of Yeshiva University, Bronx, New York
1986-1992 Assistant Professor, Department of Cell Biology
1992-present Associate Professor, Department of Cell Biology

Honors

1975-1978 National Science Foundation Predoctoral Fellow
1979-1981 Haggerty Predoctoral Fellow
1981 Sigrid Juselius Foundation Fellowship
1982-1984 Anna Fuller Postdoctoral Fellowship
1984-1986 Swebelius Cancer Research Award
1988-1991 American Cancer Society Junior Faculty Research Award
1988-1992 Pew Scholars Program in the Biomedical Sciences
1992-1997 Hirschl/Weill-Caulier Career Scientist Award

Selected Publications

Kielian, M.C. et al., 1977. Cell-cell interactions in blast transformation of rat lymphocytes by neuraminidase and galactose oxidase. *Experimental Cell Research* 109:211-21.

Kielian, M.C. and Z.A. Cohn, 1979. Determinants of phagosome-lysosome fusion in mouse

macrophages. In *Proceedings of the Third Conference on Mononuclear Phagocytes.* The Hague: Martinus Nijhoff 1077-95.

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Kielian, M.C. et al., 1986. Kinetics of endosome acidification detected by mutant and wild type Semliki Forest virus. *EMBO Journal* 5:3103-9.

Kielian, M.C., 1987. The membrane fusion protein of Semliki Forest virus. In *Molecular Mechanisms in the Regulation of Cell Behavior,* Modern Cell Biology series, Vol. 5, ed. C. Waymouth. New York: Alan Liss 197-202.

Kielian, M. and S. Jungerwirth, 1990. Mechanisms of enveloped virus entry into cells. *Molecular Biology and Medicine* 7:17-31.

Kielian, M. et al., 1990. Biosynthesis, maturation, and acid-activation of the Semliki Forest virus fusion protein. *Journal of Virology* 64:4614-24.

Phalen, T. and M. Kielian, 1991. Cholesterol is required for infection by Semliki Forest virus *Journal of Cell Biology* 112:615-23.

Levy-Mintz, P. and M. Kielian, 1991. Mutagenesis of the putative fusion domain of the Semliki Forest virus spike protein. *Journal of Virology* 65:4292-300.

Kielian, M., 1993. Membrane fusion of alphaviruses. In *Virus Fusion Mechanisms,* ed. J. Bentz. Boca Raton: CRC Press 385-412.

Marquardt, M.T. et al., 1993. Cholesterol is required in the exit pathway of Semliki Forest virus. *Journal of Cell Biology* 123:57-65.

Justman, J. et al., 1993. The role of spike protein conformational changes in the fusion of Semliki Forest virus. *Journal of Virology* 67:7597-607.

Klimjack, M.R. et al., 1994. Membrane and protein interactions of a soluble form of the Semliki Forest virus fusion protein. *Journal of Virology* 68:6940-46.

Kielian, M., 1995. Membrane fusion and the alphavirus lifecycle. *Advances in Virus Research* 45:113-51.

Duffus, W.A. et al., 1995. Mutations in the putative fusion peptide of Semliki Forest virus affect spike protein oligomerization and virus assembly. *Journal of Virology*

ABSTRACT

Margaret C. Kielian grew up in Omaha, Nebraska, the third of four children. Her father was an accountant with the Army Corps of Engineers; her mother was a homemaker. She became interested in science at an early age. She had a chemistry set that at one time caused an explosion, leaving a blob mark on the ceiling, and she had a fish tank that was a great source of protozoa that she liked to study under a microscope. Her parents were interested in and exposed her to many cultural things as well. Kielian attended Roman Catholic schools, where she found that she had some good teachers. Her physics and chemistry teacher and her biology teacher were very good, encouraging her curiosity and interest. Her family had hiking trips and picnics in national parks and forests, and these trips also stimulated her love of nature. A summer National Science Foundation program at the University of Kansas inspired her decision to become a microbiologist. She won a Betty Crocker scholarship which helped pay for college.

Kielian attended the University of Nebraska, where she majored in microbiology. She considered Stanford and Rockefeller Universities for graduate school and was encouraged to attend Rockefeller. She worked in William Bowers' lab, then took a summer lab course at the Woods Hole Marine Biological Laboratory. Kielian discusses having and raising children while pursuing a science career and the challenges facing two-career couples. She talks about Zanvil A. Cohn, her thesis adviser. As she studied fusion of phagocytic vacuoles with lysosomes in the Cohn lab she became increasingly interested in molecular biology; she learned fluorescence polarization technique.

Next Kielian went to the European Molecular Biology Laboratory and then the University of Helsinki as a visiting scientist to learn techniques for working with Semliki Forest virus (SFV). From Finland she went to Yale University for postdoc with Ari Helenius; there she worked with viruses with an altered pH threshold for fusion. Then Kielian's research focus shifted to conformational changes in the spike protein. She isolated the mutant virus *fus*-1, which turned out to be a useful pH probe for work on endocytosis.

At that point Albert Einstein College of Medicine vigorously recruited Kielian. She set up her lab with funding from National Institutes of Health, American Cancer Society, and Pew Foundation. Kielian's interview continues with more discussion of her lab's work on fusion in the SFV spike protein; the role of cholesterol in SFV infection; her collaboration with Carolyn Machamer; keeping up with literature in the field; experiments that did not produce usable lab results; Marianne T. Marquardt's work on cholesterol-depleted cells in the exit pathway; and an unexpected finding in Kielian's work on virus assembly and fusion. Kielian points to her scientific role models and discusses the representation of women on the Einstein faculty. She concludes the interview by telling of her academic responsibilities.

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.

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: Kielian's office, Albert Einstein College of Medicine of Yeshiva University.

Dates, length of sessions: June 20, 1994 (149 minutes); June 23, 1994 (77) ; June 30, 1994 (111) , November 14, 1996 (60). Due to a technical malfunction, the first tape of the June 20 session required retaping in 1996.

Total number of recorded hours: 6.6

Persons present during interview: Tape I, Kielian and Maestrejuan; Tapes II-VI, Kielian and Hathaway.

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, Hathaway and Maestrejuan held telephone preinterview conversations with Kielian to obtain written background information (curriculum vitae, copies of published articles, etc.) and to agree on an interviewing schedule. They also reviewed prior Pew scholars' interviews and the documentation in Kielian'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 general background on the recent history of the biological sciences, Hathaway and 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 Kielian's childhood in Nebraska and continuing through her education at the University of Nebraska and Rockefeller

University and the establishment of her own lab at Albert Einstein College of Medicine of Yeshiva University. Major topics discussed include the structure and mechanism of Semliki Forest virus, the growing importance of molecular biology techniques, and women in the sciences.

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.

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

Jane Collings, editor, prepared the table of contents and index.

Beyrer compiled the biographical summary and interview history.

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