

KARL AUGUST FOLKERS

An Interview Conducted by

Leon Gortler

at

Folkers's Summer Home

Sunapee, New Hampshire

July 6, 1990

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ABSTRACT: In this interview, Karl Folkers first talks about his family and his early exposure to science. He then describes some of his experiences as an undergraduate at the University of Illinois, as a graduate student at the University of Wisconsin, and as a postdoctoral fellow at Yale University. This is followed by a long discussion of his years at Merck, and includes his research on vitamins, particularly vitamin B₁₂, his work on penicillin, the structure of research at Merck, and comments on various co-workers and administrators. Special attention is paid to coenzyme Q₁₀, a project begun at Merck and continued for the last thirty-seven years. After Merck, Folkers talks about his five-year tenure as president of the Stanford Research Institute, and then about his current research at the University of Texas, including his work on vitamin B₆ and the carpal tunnel syndrome, and his work on peptide hormones.

INTERVIEWER: Leon Gortler is Professor of Chemistry at Brooklyn College of the City University of New York. He holds A.B. and M.S. degrees from the University of Chicago and a Ph.D. from Harvard University. He has long been interested in the history of chemistry and has conducted over forty oral and videotaped interviews with major American chemists.

KARL AUGUST FOLKERS

- 1906 Born in Decatur, Illinois on September 1.
(Parents: August William and Laura Susan [Black])
- 1928 B.S., University of Illinois
1931 Ph.D., University of Wisconsin
(Mentor: Homer Adkins)
- 1931-1934 Postdoctoral Fellow, Yale University
(Squibb & Lilly Research Fellow)
(Mentor: Treat B. Johnson)
- 1932 Married: Selma Johnson
Children: Cynthia Carol, Richard Karl

Merck

- 1934-1938 Research Chemist, Laboratory of Pure Research
1938-1945 Assistant Director of Research
1945-1951 Director, Organic and Biochemical Research
Department
1951-1953 Associate Director, Research and Development
Division
1953-1956 Director, Organic and Biological Chemical Research
1956-1962 Executive Director, Fundamental Research
1962-1963 Vice President for Exploratory Research
1963 Resigned March 1
- 1962 President, American Chemical Society
1963-1968 President and CEO, Stanford Research Institute
1968- Ashbel Smith Professor of Chemistry and Director
of The Institute for Biomedical Research,
University of Texas at Austin
- 1990- President, Karl Folkers Foundation for Biomedical
and Clinical Research

Honors and Awards

- 1940 Mead Johnson & Company Award (Co-recipient)
1941 Award in Pure Chemistry, American Chemical Society
1948 National Academy of Sciences
1948 Presidential Certificate of Merit (Harry S.
Truman)
- 1949 Mead Johnson & Company Award (Co-recipient)
1951 Board of Directors' Scientific Award, Merck & Co.,
Inc.
- 1959 Spencer Award, Kansas City Section, American
Chemical Society
- 1960 Perkin Medal, Society of Chemical Industry

1962 D.Sc., Philadelphia College of Pharmacy and
Science
1967 Nichols Medal, New York Section, American Chemical
Society
1969 D.Sc., University of Uppsala
D.Sc., University of Wisconsin
Van Meter Prize, American Thyroid Association (Co-
recipient)
1972 Robert A. Welch International Award and Medal
1973 D.Sc., University of Illinois
1974 APhA Research Achievement Award, Academy of
Pharmaceutical Science
1977 Alexander von Humboldt-Stiftung Award
1980 Award by Austin Capital of the Age of
Enlightenment
1986 Priestley Medal, American Chemical Society
Illinois Alumni Achievement Award, University of
Illinois
1989 Doctorate in Medicine, University of Bologna
1990 President's National Medal of Science (George
Bush)
1994 Achievement Award in Preventive Medicine, American
College for Advancement in Medicine

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NOTES

A complete list of publications by Karl Folkers can be found in the file which accompanies this interview.

1. Eric T. Stiller, John C. Keresztesy and Joseph R. Stevens, "The Structure of Vitamin B₆. I," Journal of the American Chemical Society, 1939, 61, 1237-1242.
2. (a) Stanton A. Harris and Karl Folkers, "Synthetic Vitamin B₆," Science, 1939, 89, 347-348; (b) Stanton A. Harris, Eric T. Stiller and Karl Folkers, "Structure of Vitamin B₆. II," Journal of the American Chemical Society, 1939, 61, 1242-1244; (c) Stanton A. Harris and Karl Folkers, "Synthesis of Vitamin B₆," ibid., 1939, 61, 1245-1247.
3. Eric T. Stiller, Stanton A. Harris, Jacob Finkelstein, John C. Keresztesy and Karl Folkers, "Pantothenic Acid. VIII. The Total Synthesis of Pure Pantothenic Acid," ibid., 1940, 62, 1785-1790. See also Roger J. Williams and Randolph T. Major, "The Structure of Panthotenic Acid," Science, 1940, 91, 246.
4. Stanton A. Harris, Donald E. Wolf, Ralph Mozingo, R. Christian Anderson, Glen E. Arth, Nelson Easton, Dorothea Heyl, Andrew N. Wilson and Karl Folkers, "Biotin. II. Synthesis of Biotin," Journal of the American Chemical Society, 1944, 66, 1756-1757.
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6. Vincent du Vigneaud, Donald B. Melville, Karl Folkers, Donald E. Wolf, Ralph Mozingo, John Keresztesy and Stanton A. Harris, "The Structure of Biotin: A Study of Desthiobiotin," Journal of Biological Chemistry, 1942, 146, 475-485.
7. The Chemistry of Penicillin, eds. Hans T. Clarke, John R. Johnson, and Robert Robinson. Princeton University Press, Princeton, NJ (1949). Chapters IV, VII, IX, XVIII.
8. Frederick A. Kuehl, Jr., Robert L. Peck, Alphonse Walti and Karl Folkers, "Streptomyces Antibiotics. I. Crystalline Salts of Streptomycin and Streptothricin," Science, 1945, 102, 34-35.
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10. (a) Edward L. Rickes, Norman G. Brink, Frank R. Koniuszy, Thomas R. Wood and Karl Folkers, "Crystalline Vitamin B₁₂," Science, 1948, 107, 396-397; (b) Edward L. Rickes, Norman G. Brink, Frank R. Koniuszy, Thomas R. Wood and Karl Folkers, "Vitamin B₁₂, A Cobalt Complex," ibid., 1948, 108, 134. (c) Edward L. Rickes, Norman G. Brink, Frank R. Koniuszy, Thomas R. Wood and Karl Folkers, "Comparative Data on Vitamin B₁₂ from Liver and from a New Source, Streptomyces griseus," ibid., 1948, 108, 634-635.
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12. E. Lester Smith, "Purification of Anti-pernicious Anaemia Factors from Liver," Nature, London, 1948, 161, 638-639.
13. (a) Edward A. Kaczka, Frank J. Wolf, Fern P. Rathe, Karl Folkers, "Cathomycin. I. Isolation and Characterization," Journal of the American Chemical Society, 1955, 77, 6404-6405; (b) Clifford H. Shunk, Charles H. Stammer, Edward A. Kaczka, Edward Walton, Claude F. Spencer, Andrew N. Wilson, John W. Richter, Frederick W. Holly, Karl Folkers, "Novobiocin. II. Structure of Novobiocin," ibid., 1956, 78, 1770-1771.
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15. (a) Donald E. Wolk, Carl H. Hoffman, Paul E. Aldrich, Helen R. Skeggs, Lemuel D. Wright and Karl Folkers, " β -Hydroxy- β -methyl- δ -valerolactone (Divalonic Acid), A New Biological Factor," Journal of the American Chemical Society, 1956, 78, 4499; (b) Helen R. Skeggs, Lemuel D. Wright, Emlen L. Cresson, Gloria D. E. MacRae, Carl H. Hoffman, Donald E. Wolf and Karl Folkers, "Discovery of a new Acetate Replacing Factor," Journal of Bacteriology, 1956, 72, 519-524; (c) Arthur F. Wagner and Karl Folkers, "The Organic and Biological Chemistry of Mevalonic Acid," Endeavour, 1961, 20, 177-187; (d) Arthur F. Wagner and Karl Folkers, "Discovery and Chemistry of Mevalonic Acid," Advances in Enzymology, Interscience Publishers, Inc., N.Y., 1961, 23, 471-483 and references cited therein.

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17. Arthur F. Wagner and Karl Folkers, Vitamins and Coenzymes. Wiley-Interscience Publishers, New York, 1964.
18. Karl Folkers, "Vitamins - Perspectives and Prospectives," Perkin Medal Award address before the American Section of The Society of Chemical Industry, Waldorf-Astoria Hotel, New York, NY, February 5, 1960.
19. Karl Folkers, Franz Enzmann, Jan Bøler, Cyrily Bowers and Andrew V. Schally, "Hypothalamic Hormones 1. Discovery of Modification of the Synthetic Tripeptide Sequence of the Thyrotropic Releasing Hormone Having Activity," Biochemical and Biophysical Research Communications, 1969, 37, 705, and succeeding papers. Folkers and his coworkers have published over 250 papers in the field of peptide hormones.

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