Autobiography

I was born in Caracas, Venezuela, on October 29, 1920 of Spanish-Jewish ancestry. My father, a self-made businessman, was a textile merchant and importer. He was born in Spanish Morocco, whereas my mother was born and raised in French Algeria and brought up in the French culture. When I was five years old, my family moved to Paris where we resided until 1939. My primary and secondary education was in French which had a lasting influence on my life. The Second World War caused our return to Venezuela, where my father continued to have a thriving business. It was decided that I should pursue my education in the United States, and we moved to New York in 1940. I registered at Columbia University in the School of General Studies, and graduated with a Bachelor of Science Degree in 1942, having also completed the pre-medical requisites for admission to Medical School. By that time, I had elected to study biology and medicine, instead of going into the family business, as my father would have wanted. I did not realize, however, that admission to Medical School was a formidable undertaking for someone with my ethnic and foreign background in the United States of 1942. In spite of an excellent academic record at Columbia, I was refused admission by the numerous medical schools I applied to and would have found it impossible to study medicine except for the kindness and support of George W. Bakeman, father of a close friend, who was then Assistant to the President of the Medical College of Virginia in Richmond. Learning of my difficulties, Mr Bakeman arranged for me to be interviewed and considered for one of the two remaining places in the Freshman class. I was accepted and began my medical studies in July 1942. While in medical school, I was drafted into the U.S. Army with the other medical students, as part of the wartime training programme, and naturalized American citizen in 1943. I greatly enjoyed my medical studies, which at the Medical College of Virginia were very clinically oriented. I received what I considered to be an excellent medical education in the relatively short time of three war years. This busy time was rendered very happy by my marriage in 1943 to Annette Dreyfus, a French student, also a refugee from Paris, whom I had met at Columbia University. I trained as an intern at Queens General Hospital in New York City in 1945 and was commissioned First Lieutenant in the U.S. Army Medical Corps in 1946. After the usual six weeks of basic training at Fort Sam Houston, Texas, I was shipped to Germany with several thousand other physicians. I was happy to be assigned to France, first in Paris, then in Nancy, where my wife joined me. I stayed there nearly two years, as the head of a medical unit where I enjoyed practising what today would be called community medicine. I was discharged in 1947 and, motivated by intellectual curiosity, decided upon a career in medical research at a time when such a choice was not fashionable. My interest was directed, from my medical student days, to immunology, and particularly to the mechanism of hypersensitivity. I had suffered from bronchial asthma as a child and had developed a deep curiosity of allergic phenomena. I sought the advice of many scientists, among whom were Rene Dubos at Rockefeller University, John Enders at Harvard Medical School, and Jules Feund at the Public Health Research Institute in New York, to whom I had been recommended by members of the faculty in Richmond. I was strongly urged to work with a dynamic young immunologist, Elvin Kabat, whose laboratories were at the Neurological Institute, Columbia University School of Physicians and Surgeons. Following an interview with Elvin Kabat, who offered me a Fellowship in his laboratory, I started my research career in February, 1948. Training with Elvin Kabat was one of the significant experiences in my development as a scientist. Elvin Kabat is a hard task-master with rigorous standards and an absolute respect for the quantitative approach to science. He felt that if a phenomenon could not be quantitated, it did not deserve to be studied. He taught me immunochemistry and basic immunology, but more importantly, I learned the significance of experimental proof, the need for intellectual honesty and scientific integrity. I was fortunate also that my first two years as a scientist were very productive and my initial goal of understanding experimental hypersensitivities mechanisms was in part fulfilled. My life for the next six years was very much influenced by family considerations. A daughter, Beryl, was born in 1949, and my parents had returned from Venezuela to their home in Paris. My father had suffered a severe stroke and was now a cripple. My wife's family also lived in Paris. The attraction of moving to France and settling close to our respective families was very strong. Accordingly, we moved to Paris in mid-1949 and I accepted a position in Bernard Halpern's laboratory at the Broussais Hospital. This position permitted me also to make frequent trips to Venezuela where my father's business interests now required my personal involvement. During this period I was privileged to form a close relationship with a young Italian scientist who had also joined Halpern's laboratory, Guido Biozzi. For six years we operated as a team and engaged in the study of reticuloendothelial function in relation to immunity. We developed the techniques to study the clearance of particulate matter from the blood by the RES, and formulated the equations that govern this process in mammalian organisms. After six years in Paris, I began to realize that as a foreigner to France, in spite of my French education, I would experience continuous difficulties in pursuing a scientific career and establishing an independent laboratory. This was made painfully clear to me by the chief of the laboratory, Dr Halpern. The significance of this message was heightened by my unhappy discovery that I could not find another laboratory in Paris in 1956 that would give me a chance to work and establish myself. I decided therefore to return to the United States. I am deeply grateful to Lewis Thomas who offered me an appointment as Assistant Professor of Pathology at New York University School of Medicine and helped me develop my own laboratory and research support. I returned to my earlier studies on hypersensitivity mechanisms, but this time also developed an interest in cellular as well as humoral hypersensitivity. From 1956 to 1961, I worked on cellular hypersensitivity with Philip Gell, immune complex diseases with Robert McCluskey and Pierre Vassalli, anaphylactic hypersensitivity with Zoltan Ovary, tumour specific immunity with Lloyd Old, and the structure of antibodies, in relation with their specificity, with Gerald Edelman. The years at New York University were very happy ones, and it was soon apparent that I had made the correct choice in returning to the
United States. The scientific atmosphere at New York University during that period was particularly favourable to the development of immunology. Numerous immunologists worked enthusiastically and interacted profitably; among these were Jonathan Uhr, Jeanette Thorbecke, Edward Franklin and Victor Nussenzweig, in addition to Robert McCluskey and Zoltan Ovary, mentioned earlier. This is the time when I started to teach research fellows and students and realized that the training of young scientists was one of my most valuable and rewarding experiences. Later I chose 'The Training of Scientists' as the topic of my presidential address to The American Association of Immunologists. Among the young immunologists with whom I had the pleasure and privilege to work at New York University are: Lloyd Old, William Paul, Ira Green, Victor Nussenzweig, Michael Lamm, Pierre Vassali, Stanley Cohen, Jeanette Thorbecke, Fred Kantor, Gregory Siskind, Stuart Schlossman, Kurt Bloch, Bernard Levine, Francois Kourilsky, Ted Brunner, and Takeshi Yoshida. During this period I also managed a New York bank, the Colonial Trust Company, which had been bought by my family and associates from Venezuela. However, the success of my laboratory made me realize that I had to choose between a scientific career and my business interests. I made the decision to devote myself solely to my laboratory and my students and to curtail my business career, as I felt the challenges were far greater in my chosen profession. This is precisely the time when I initiated the studies in immunogenetics that resulted in my being awarded the Nobel Prize in Medicine. I made the observation that random bred animals immunized with antigens with restricted heterogeneity, such as hapten conjugates of poly-L-lysine, distribute themselves into two groups, responders and non-responders. I sensed that this was an important phenomenon. I determined that responsiveness to these or other similar antigens is controlled by dominant autosomal genes termed immune response (Ir) genes. This was the beginning of a long and complex story that led to our understanding of the manner in which these genes, located in the major histocompatibility complex of mammals, exercise their function and determine immune responsiveness. By then I had become Professor of Pathology at New York University. The opportunity, however, arose at the request of John Seal to assume the Directorship of the Laboratory of Immunology of the National Institute of Allergy and Infectious Disease in Bethesda, where I moved in 1968 together with William Paul and Ira Green. Such a laboratory offered very attractive facilities and precious inbred guinea pig strains essential to my work in immunogenetics. Much of the insight on the mechanism of Ir gene function has indeed been obtained in that laboratory, from experiments of William Paul, Ira Green, Alan Rosenthal, Ethan Shevach, and Ronald Schwartz, with the systems I developed.

In 1970, Dean Robert Ebert offered me the Chair of Pathology at Harvard Medical School. I moved to Harvard because I missed the University environment and more particularly the stimulating interaction with the eager, enthusiastic, and unprejudiced young minds of the students and fellows. At Robert Ebert's request, we initiated an interdepartmental immunology graduate programme at Harvard Medical School which has developed very successfully under the stewardship of my colleague, Emile Unanue. At Harvard, I have continued my work on immune response genes and their role in the regulation of specific immunity with David Katz, Martin Dorf, Judith Kapp, Carl Pierce, Ronald Germain and Mark Greene. We also determined the role of immune response genes in the control of immune suppression phenomena with the help of Patrice Debré, Judith Kapp, and Carl Waltenbaugh; we analysed the specificity of cytolytic T lymphocyte in relation to Ir gene function with Steven Burakoff and Robert Finberg and demonstrated how alloreactivity arises as a consequence of the commitment of T lymphocytes to recognize antigen in the context of autologous MHC gene products.

While reaching these scientific goals, I was elected President of the American Association of Immunologists in 1973, President of the American Society for Experimental Biology and Medicine in 1974, and President of the International Union of Immunological Societies in 1980. I was elected to the American Academy of Arts and Sciences in 1972, the National Academy of Science, U.S.A. in 1973, and I was appointed President of the Sidney Farber Cancer Institute in 1980. I have received the following awards: R. E. Dyer Lecture of National Institutes of Health, 1969; Rabbi Shai Schacknai Lectureship and Prize in Immunology and Cancer Research, Hebrew University of Jerusalem, 1974; T. Duckett Jones Memorial Award of The Helen Hay Whitney Foundation, 1976; Honorary Degree of Doctor of Medicine, University of Geneva, Switzerland, 1980; Waterford Biomedical Science Award, 1980.

My work has been generously and continuously supported since 1956 by the National Institute of Allergy and Infectious Diseases, and for the last decade also by the National Cancer Institute. I am very grateful for their enlightened support to me and my associates, which made our work possible. I am also particularly indebted to my many students and associates who have contributed so much to our common goal and whom I hold responsible in the largest measure for my achievements.
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