

Albert Bendelac (1956–2023)

By Luc Teyton

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Albert Bendelac, one of the fathers of innate T cells and discoverer of natural killer (NK) T cells, died on 23 August 2023, having just celebrated his 67th birthday. Having had lymphoma for ten years including three relapses, Albert exhibited his character in the following defining words: courage, resilience and energy, and in his will to live and give to the end. Two weeks before his death, Albert was working with his wife Bana on what will be his last two manuscripts.

Albert had understood and digested the work of the German philosopher Arthur Schopenhauer and retained in his personality a zest of cynicism and a critical view of himself and the other. However, he lived a life that was imprinted by generosity and the philosophy of Nietzsche. To affirm life, you must strive for greatness, and accomplish self-defining tasks.

Albert was born in Casablanca in 1956 into a family of Sephardic Jews that had traveled Europe and then its colonial expansions that they called home. They ended up in Paris when Albert was 13 and already an excellent student interested in math and science. Being good academically in French schools at the time meant a choice between ‘Grandes écoles’, veterinary school or medical school. Albert decided that medicine was academically interesting but was unsure about practicing it full time. Nonetheless, he graduated in medicine from the Assistance Publique des Hôpitaux de Paris and became a dermatologist. Albert then decided to explore science and immunology by joining the laboratory of Jean-François Bach at the Necker Hospital in Paris. There, he found his calling and published a series of landmark papers in the field of type 1 diabetes, including on the transfer of disease by T cells,



CD4 and CD8 dependency of disease progression, and abrogation of disease by MHC class II antibodies. To become a ‘real’ scientist, Albert followed the remarkable curriculum of immunology at the Pasteur Institute, obtained his PhD in 1992, and pursued his training by joining the laboratory of Ron Schwartz at the National Institutes of Health for a postdoctoral fellowship.

Albert’s intellect was confronted and challenged by the minds of leading immunologists of the 1990s such as Schwartz, Germain, Paul, Matzinger and others. Albert focused his research on two fundamental and linked questions: thymic selection and innate lymphocytes. How does functional diversity develop in the thymus, and why are specific lymphocytes preserved throughout evolution? The field of evolutionary immunology had not been explored much in 1990 as the tools were still being developed. In 1995, after collaborating with Olivier Lantz on a T cell subset with an invariant T cell receptor – now known as NK T cells – Albert identified CD1 as their restriction element. In the following 15 years, he defined their thymic selection, functional properties, the identity of exogenous and endogenous ligands, produced knock-in and knockout mouse models and T cell hybridomas, and was made a Howard Hughes Medical

Institute investigator in recognition of his contribution to the field of NK T cells.

In addition to his passion for science, Albert was known for his generosity, always sharing the latest tools and protocols with scientists around the world. In 2008, he identified the transcription factor PLZF as the master regulator of NK T cells, mucosal-associated invariant T cells and the development of innate lymphoid cells. A body of work followed, but Albert had already set his eyes on another understudied innate population – mucosal IgA B cells. His characterization of these cells in germ-free mice has already delivered important findings.

Albert’s scientific acumen was matched by his passion for mentorship, and he held trainees to the same rigorous standards that he set for himself. During his daily run along Lake Michigan, science was on his mind in the search for elegant solutions to difficult problems. The introductory immunology course he taught to students each year was both demanding and rewarding; at the end, everyone knew that a mixed bone marrow chimera was how to distinguish cell-intrinsic and -extrinsic mechanisms.

Albert was a shy and private individual, an intellectual with a love of literature, world affairs, politics and sport, and leaves behind his wife Bana and their three children Julien, Aude and Raphaele.

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