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1999

Günter Blobel

Günter Blobel, 1989 President of the ASCB, will receive the 1999 Nobel Prize in Medicine or Physiology for his discovery that proteins have intrinsic signals that govern their transport and localization in the cell. "Blobel's Nobel Prize," remarks current ASCB President Randy Schekman, "culminates twenty-five years of experimental work in his lab on the signals and mechanism that guide secretory proteins through a translocation channel in the ER membrane. His achievement is one of the great triumphs of modern cell biology, combining biochemistry with cell fractionation to solve a problem that was framed by morphological analysis. Blobel's signal hypothesis has stood the test of time and is now accepted as the key first stage in the process of secretion in all organisms."

Blobel was born prior to World War II, in 1936, in Silesia, then Germany, now part of Poland. To this day, he marvels that at the same time that his family was living amidst the greatest war known to man, the first electron micrograph of the cell was being taken by Albert Claude, Keith Porter and Ernest Fullham. He recalls vividly the fire-bombing of Dresden, resulting in out-of-control burning lasting four days, fueled by the ancient structures of the town's old architecture.

Following the destruction of the city, Blobel, with his parents and six siblings, made their way through the rubble to try to return to Silesia. But a new eastern border was established for Germany at the Potsdam Conference, ceding Silesia to Poland, and they were turned back. So the family sought refuge with relatives in Reichenbach, Saxony. The Blobel family lived there on a farm and young Blobel attended school in a one-room schoolhouse where the students ranged in age from six to fourteen. Blobel remarks that "it was reminiscent of rural American schools."

After the war, in 1947, Blobel's father, a veterinarian, moved the family to Freiberg where he opened a practice. Blobel remembers Freiberg as "a beautiful medieval city that was one of the few cities that escaped the destruction of the war" and he holds "wonderful memories" of his youth there, though they are not entirely free of the residue of war. Blobel recalls that when the Americans first moved into their village, "several shots were fired," one of which narrowly missed his head. Blobel comments, "I still don't know who fired the shots, but I was surprised I survived."

By the time young Blobel reached college age, his family was considered "capitalist" by the East German authorities because of the father's profession, so Blobel was denied entrance to the university in 1954. As a result, Blobel left for the West, something he could do without interference before the Cold War and the construction of the Berlin Wall. He was able to attend the Universities of Frankfurt, Muenchen, Kiel and Tübingen to study medicine, but was on his own financially, away from his family.

Once enrolled, he became increasingly intrigued by the professors' frequent response to student queries: "we don't know." Following graduation in 1960, Blobel served a medical internship for two years, and was surprised to learn that most diseases were treated "symptomatically, not causally." This focused his aspirations on research, but he wasn't sure how one could go about developing such a profession.

Blobel's older brother, Hans, had gone ten years before to the United States as a Fulbright Scholar to earn his Ph.D. at the University of Wisconsin, where he then joined the faculty. Hans advised his younger brother that medical training would not suffice to develop a career in research, and encouraged Günter to visit him at the University to explore the possibility of pursuing a Ph.D. At Wisconsin, Blobel met Van R. Potter in June, 1962. Having never met him nor knowing anything about Potter's work, Blobel decided on the spot to join his lab because of the force of Potter's "wonderful personality." Today, Blobel attributes his love of both biochemistry and of architecture to Potter. The professor was a devotee of the renowned architect Frank Lloyd Wright and for many years campaigned to have a Wright building, Monona Terrace, constructed in Madison. Blobel's appreciation for architecture led him decades later to designate the proceeds from his Nobel Prize to the restoration of the Frauenkirche Church and the synagogue in Dresden.

Despite his "very poor" command of English, Blobel thoroughly enjoyed his education at Wisconsin and also credits Potter for giving him and his fellow students a great deal of freedom to work on projects that interested them. "We were taught to think on our own and not to be bottle fed," Blobel recalls appreciatively. Much of his time was focused on isolating messenger RNA following its discovery by others. But he failed in that pursuit and so decided to switch his thesis work to cell fractionation and to think about free ribosomes and membrane-bound ribosomes. Also while Blobel was a student in Potter's lab, the professor became President of the young society of scientists he had helped to establish three years earlier, the American Society for Cell Biology, a fledgling organization of a couple of hundred scientists, run by volunteers.

After completing his Ph.D. in 1967, Potter urged Blobel to take a position at the Rockefeller University to

work with another co-founder and later President of the ASCB, George Palade. Immediately Blobel understood the value of working with the founders of cell biology at the place of the field's founding. These included Philip Siekevitz, David Luck, David Sabatini, Jim Jamieson, Walter Stoeckenius, Marilyn Farquhar and, two floors above, Christian de Duve. Keith Porter had just left the Rockefeller for Harvard, but Blobel could not help but to feel his presence: a Porter photo in a conference room was captioned, "Our Father Who Art at Harvard." For Blobel "it was a very exciting atmosphere," in part because of the famously crowded New York conditions, forcing everyone in the department to work together closely — literally and figuratively.

Blobel initially worked in Phil Siekevitz's lab, where he learned a great deal about cell fractionation. But Blobel was increasingly drawn to the work of David Sabatini on ribosomes. In the early 1970's, Blobel and Sabatini collaborated to study the differences between free and membrane-bound ribosomes. Blobel recalls that "after analysis by one-dimensional gel electrophoresis, we were bold enough to declare that there wasn't any difference between the two populations of ribosomes. It was much more appealing that the information was in the nascent chain. The only problem," Blobel admits, "was there was absolutely zero evidence for it."

From then on, Blobel's work has focused on the mechanisms by which proteins are translocated across cellular membranes. He hypothesized that in order for proteins to be translocated across the membrane of an organelle, they needed a sort of "address label," which Blobel termed a signal sequence. A receiving molecule then directs the protein to a specific receptor, where it triggers the opening of a channel across which the protein is translocated. In 1975 Blobel developed a model test tube system that mimicked protein translocation in the cell. Reminiscent of Watson and Cricks' use of a physical model to work out the structure of DNA, Blobel's model enabled his lab to understand how proteins enter membrane-bound organelles, with useful implications for the way therapeutical proteins may be mass produced by bacteria.

Blobel is the Rockefeller University John D. Rockefeller, Jr. Professor and a Howard Hughes Medical Institute Investigator; he is also recipient of the Lasker Award as well as other prestigious honors. But he insists that his gratification comes from laboratory discovery: "when you can say, 'boy, that's the protein conducting channel,' or 'boy, we've reconstituted the first step in the secretory pathway sincatoid pathway,' or 'boy, here's the signal recognition particle.' Nothing is more exciting than when the results come in on an experiment."

Fellow Nobelist Joshua Lederberg, Blobel's Rockefeller colleague, says of Blobel, "his selection for the Nobel award was no surprise, and is well recognized as timely, if not overdue. His work has given us a vision of how the architecture of the cell, as complex as it is, is imprinted on its building blocks, and can self-assemble following the plans and templates guided by physico-chemical principles."

Blobel's wife, Laura Maioglio, is equally successful as a businesswoman. She owns and operates one of Manhat-tan's famous upscale restaurants, Barbetta, on West 46th. The elegant restaurant and gardens have been in her family since 1906, and draws from the cuisine of her native Northern Italy. Each year Maioglio returns to her family home in the Piemonte region of Italy to relax in the summer. Maioglio and Blobel, who have no children, have found that their devotion to their respective demanding careers is pleasingly compatible.

The one major activity Blobel indulges outside the lab is for the Friends of Dresden, an organization he founded four years ago. The charitable organization has raised over a million dollars, an amount to be nearly doubled when Blobel adds the proceeds from his Nobel Prize. Construction on the new church is already underway, with completion expected in 2006. Blobel recalls from his childhood that the old church was "the most determining feature of the famous Dresden skyline," unique for its bell-shaped cupola. In addition to the church and the synagogue in Dresden, some of his prize money will also go to the Italian village of Fubine, Maioglio's hometown.

Blobel declares that winning the Nobel Prize is like all of cell biology winning a prize: "it is really a recognition of the field of cell biology. I think the entire community has been honored by this award."