

[<< back](#) 

2000

George Palade

Born in Jassy, Romania, the old capital of Moldavia, in the Eastern province of Romania, George Emil Palade was the son of a philosophy professor and a teacher. Palade remembers early in life acquiring a great respect for books, education, thinking and learning, nurtured by his father, Emil Palade.

Palade was educated at the Liceul "Al Hasdeu" of Buzau in Romania, where in 1930 he earned his bachelor's degree from the continental-style combination high school and college. "At the end of my high school I had to decide where to go," recalls Palade. "There were all kinds of suggestions. I had a distant cousin who was in medicine and I spent a summer in his company. After speaking with him I decided this is what I should do. In the end, my choices were engineering and medicine." So in 1930, despite his father's hope that he would become a philosopher, Palade entered the School of Medicine of the University of Bucharest, Romania.

"There were all kinds of suggestions. I had a distant cousin who was in medicine and I spent a summer in his company. After speaking with him I decided this is what I should do. In the end, my choices were engineering and medicine." So in 1930, despite his father's hope that he would become a philosopher, Palade entered the School of Medicine of the University of Bucharest, Romania.

Beginning with the third year of his medical training, Palade started serving as an intern, and later as a resident for the Association of Civil Hospitals of Bucharest. As a resident he worked in a variety of clinics, dealing with all aspects of internal medicine.

Following eight years of medical school training, Palade spent two years working on his required doctoral thesis, which examined microscopic anatomy. At the request of his professor of Anatomy, Palade selected a rather unusual topic for his thesis: the reconstitution of the nephron of the marine mammal *Delphinus delphi*. This included working with fishermen in the Black Sea to collect material, processing it, and then reconstituting the nephron out of serial sections. "It was an attempt to understand its structure in terms of the functional adaptation of a mammal to marine life," Palade recalls.

At the conclusion of ten years of medical training, Palade received his M.D. in 1940. Following graduation he served on the faculty as an Assistant, and then Associate Professor in the Institute of Anatomy at the University until 1946.

It was common for Europeans interested in research or academic medicine to spend a year or two abroad pursuing advanced studies; many of his professors and mentors had been fellows at the Rockefeller Institute in New York. So when his mentor and advisor, Grigore Popa, suggested that Palade visit either England or the U.S. for a couple of years for advanced studies, Palade explored his options, selecting the lab of Robert Chambers at the Department of Biology at New York University. He took with him his young wife, Irina Malax, and their children, Georgia and Philip.

After a few months in Chamber's lab at NYU, Albert Claude of the Rockefeller Institute presented a seminar at NYU on the electron microscopy of cultured cells. Palade was fascinated by Claude's work, and recalls still how exciting he found the possibilities of this new technology. After the seminar, Palade and Claude spoke and Claude invited the junior scientist to come to Rockefeller to work with him in James Murphy's department of Pathology. In the fall of 1946, Palade joined Claude at Rockefeller. Expecting to stay just a year or two, Palade remained at Rockefeller for twenty-seven years.

During the decades in New York, Palade studied the internal organization of cells, making many important discoveries. He explains that "after a period of exploration of the organization of the cell by electron microscopy, I decided to move to a correlated approach which was based on one side on electron microscopy and on the other side by bio-chemical analysis of isolated sub-cellular components. It turned out that it became possible to isolate mitochondria, endoplasmic reticulum, golgi fragments, nuclei and other components. And therefore there was the possibility of having on the one hand morphological information and on the other hand biochemical information about the same sub-cellular component. The first component on which we succeeded in having this integrated structural, functional information was in mitochondria. In fact, I started working on mitochondria at Rockefeller before working in electron microscopy."

Reflecting on that early work in integrated structural and biochemical studies, Palade notes that, "I relied in depth in this new direction on team-work, using at the beginning a collaboration, sustained continuously, with Philip Siekevitz. In fact, cell biology was founded on this principle of working in parallel the morphology of different sub-cellular structures and their biochemistry as an integrated function."

The electron microscopy work coming out of Rockefeller was becoming known world-wide. In the 1950's researchers from numerous disciplines, including anatomy, physiology and pathology came to Rockefeller to work on this new instrument, and to give birth to the new field of cell biology [see The Founding of the American Society for Cell Biology, page 2]. Continuing in the Rockefeller tradition, Palade's laboratory became a well-known training center for biological electron microscopy.

Palade's research relied heavily on the development of progressively refined cell fractionation procedures. This body of knowledge was extended by other laboratories to the endocytic pathway and to the processing of membrane proteins along these different pathways. One of Palade's most important discoveries was that microsomes, bodies formerly thought to be fragments of mitochondria, are actually parts of the endoplasmic reticulum and have a high RNA content. These cellular components were subsequently named ribosomes.

Following his wife's death in 1969, Palade married his colleague Marilyn Farquhar, who later also became an ASCB President. Palade recalls that the new administration at Rockefeller in the early 1970's did not favor large departments, and the laboratory of cell biology was one of the largest departments in the school, creating a number of administrative problems and frustrations for Palade as he worked to help younger colleagues establish their scientific careers. So after three decades in New York, in 1973 Palade and Farquhar crossed state lines to join the faculty of the Yale University Medical School. He adds, "work at the Rockefeller University was done; when I left, there were at least five other laboratories working in different sectors of cell biology there."

At Yale, Palade founded a section of cell biology. He believed that the time had come for fruitful interactions between the new discipline of cell biology and the traditional fields of interest of medical schools, pathology and clinical medicine.

Ironically, Palade's crowning achievement came shortly after he moved to Yale. In 1974, he shared the Nobel Prize for Physiology or Medicine with Albert Claude and Christian de Duve for their discoveries at Rockefeller concerning the structural and functional organization of the cell. Palade describes receiving a Nobel Prize as a "unique experience... on the one hand a level of recognition you are obtaining; on the other hand there are elaborate festivities in which you are involved. Finally it is also the fact that afterwards you do not acquire additional privileges; you in fact acquire additional obligations and responsibilities." Years later, Harold Varmus described the experience "like receiving both a magnet to attract invitations and a megaphone to amplify our voices."

For his first ten years at Yale, Palade served as Professor and Chairman of the Section of Cell Biology. His research was on the vascular endothelium, especially the continuous type of endothelium found in the microvasculature of muscles, myocardium and lungs. From 1983 until his departure in 1990, he served as Senior Research Scientist in the Department of Cell Biology and Special Advisor to the Dean of the School of Medicine.

As a chief player in the birth of the new field of cell biology, Palade served as a founding member of the American Society for Cell Biology. Active throughout the life of the Society, Palade served as President of the ASCB from 1974 to 1975. Palade's presidency was memorable to him for two reasons. First, it coincided with the ASCB hosting the first International Congress of Cell Biology in Boston. Second, it was during the Palade Administration that poster presentations were introduced to cell biology meetings. Palade recalls working hard to convince the Treasurer of the ASCB to invest money in "something very new and considered risky, namely organizing panels for posters." Ultimately, Palade prevailed, establishing one of the most valued and important aspects of the ASCB Annual Meeting.

Fellow ASCB President and Nobel Laureate Günter Blobel was a post-doctoral fellow with Palade. Blobel says of his mentor, "Clearly, George Palade is one of the preeminent scientists of the 20th century. Many of his discoveries have developed into thriving fields. But even more enviable is his record in teaching. His methods are subtle. A lengthy and boring research seminar suddenly becomes illuminated by his lively and concise remarks and summaries. He readily bundles a plethora of apparently disparate facts into an amazingly simple and coherent concept. Working hypotheses are formulated with great ease. [He] allows for active participation in his creative processes. It's like responding to a beautiful serve in tennis; it's a dialogue, not a monologue. I can't imagine a greater mentor. I probably would not have continued in science were it not for my intense six-year encounter with George Palade." After 17 years at Yale, in 1990 Palade and Farquhar moved to La Jolla, California where Palade became Dean of Scientific Affairs at the School of Medicine in the University of California in San Diego. He continues in this role today.

Palade served for more than a dozen years as an editor of the Journal of Biophysical and Biochemical Cytology, predecessor of the Journal of Cell Biology, and more than ten years with Bruce Alberts and James Spudich as an editor of the Annual Review of Cell Biology.

Today, Palade's daughter, Georgia Palade Van Duzen, works in the real estate business in New York City, and his son, Philip Palade, followed his father into scientific research, working on calcium channels in the Department of Physiology and Biophysics at the University of Texas Medical Branch in Galveston, Texas.

George Palade and Marilyn Farquhar spend their free time reading, walking, and enjoying music. The

couple has always enjoyed the mountains, often combining hiking vacations with trips to the Aspen Music Festival in Colorado. Palade's personal favorites, the Elk Mountains in Colorado and the Carpasian Mountains in Europe, have been featured in many family trips.