

**MEMORIAL RESOLUTION**  
**DANIEL MAZIA**  
**(1912 - 1996)**

Daniel Mazia, eminent cell biologist and inspired mentor of generations of cell biologists, died on June 9, 1996 in Monterey, California, of heart failure and complications of cancer. He was 83.

Stanford University, and especially its Hopkins Marine Station, was fortunate to have on its staff the inspiration, teaching acumen and scientific insights of Professor Mazia. His career at Stanford was unique in that he arrived here after a distinguished career at Berkeley, where he was a professor of Zoology from the early 50's until his retirement there in 1979. Mazia wished to continue his pioneering work in cell biology, and through the intercession of Colin Pittendrigh, then Director of Hopkins, he was offered a professorship at the Marine Station.

Mazia remained at Hopkins from this date, working and teaching at the Marine Station and continuing his seminal discoveries in cell biology and intense involvement in Hopkins summer teaching program. He and his companion, the photographer Ruth Gilbert, quickly became important members of the intellectual and artistic communities of the Peninsula. Their home was a salon for animated discussions in biology and a center of artistic creativity on the Monterey Peninsula.

The bulk of Mazia's research centered on the broad question of cell reproduction. His isolation in the early '50s of the mitotic apparatus --the structure responsible for cell division-- heralded our understanding of the mechanisms of cell division and intracellular motility. A study in the early '60s on centrosomal reproduction--an until recently unappreciated structure--led to Mazia's interest in this cell organelle and the publication of a seminal paper that is still quoted widely today.

Mazia returned to studies on the centrosome when he moved to Hopkins and he focused his attention on this body until his death. His work anticipated the recent attention that this then neglected structure has now been receiving from the cell biology community and his 1987 review in the *International Review of Cytology* remains provocative and seminal. He was most impressed with the current flurry of discoveries on the molecular components of the centrosome, but felt that the emphasis on identification of molecules avoided deeper questions of centrosome structure and its precise mode of reproduction.

Besides his work on the centrosome at Hopkins, Mazia also involved himself in the teaching program and co-taught a summer course in the Cell Biology of Early Development with David Epel (his former student, also on the faculty at Hopkins). This course, really a workshop, received handsome funding from outside federal agencies for over ten years and this funding provided scholarships for the students and also allowed a steady stream of visiting faculty to participate in the course. Co-instructors included James Spudich from Stanford and other visiting scientists from around the US and world.

Mazia's active participation in Hopkins summer program followed from his earlier involvement with similar courses at other marine labs. From 1951-1954, he served as the Director in the Physiology Course at the Marine Biological Laboratory in Woods Hole. As President of the International Cell Research Organization (ICRO) of UNESCO he also taught in many laboratory-based training workshops around the world, including France, Italy, Chile, Puerto Rico, Japan, and Hungary.

Mazia earned his doctorate at the University of Pennsylvania in 1937, posing questions about cellular activation by studying the nature of calcium ions during fertilization of sea urchin eggs. This work, conducted at the Marine Biological Laboratory at Woods Hole, marked the beginning of Mazia's life-long love affair with sea urchin eggs.

Mazia's thesis demonstrated that calcium, bound in unfertilized eggs, is released upon insemination. Many years later Mazia revisited activation of the egg at fertilization and he and his collaborators more fully elaborated the ionic and bioelectric events during the fertilization process. His work and those of his students and collaborators led to the current understanding that ionic changes in calcium and pH are critical aspects of the triggering of development. Work on the calcium rise remains an active area today, with discovery of unimagined second and third messengers for calcium release and unexpected and intriguing complexities never imagined just a few years ago.

Mazia is perhaps best remembered for his insights into the mechanisms of cell division and cell reproduction. The isolation of the mitotic apparatus led to a mini-industry of scientists, initially in his lab and then in laboratories around the world. Attention focused on the structure and chemistry of the apparatus, and many modifications were made in the original technique both in his lab and elsewhere. Eventually several research groups succeeded in making mitotic models that actually carried out parts of the process in the test tube.

Mazia's interest in mitosis led him to accept an invitation from Jean Brachet to write a chapter in Brachet's multi-volume treatise entitled *The Cell*. This was a highly important monograph for the just beginning field of cell biology and Mazia's "chapter" soon turned into a 360 page treatise. The concepts in this monograph set the stage for thought on the cell cycle for many years, and the ideas are still relevant today.

One question raised in this chapter--the preparations for cell division--led in the 70's to a simple but elegant experiment showing that a newly synthesized protein was essential for transit through each cell cycle. The results of this paper, unappreciated at the time, presaged the identification of cell cycle proteins that we now refer to as the cyclins.

Mazia's most recent studies led to a new concept which he was unfortunately unable to publish before his death. In these new studies, he was tantalized by the concept of the 'cell body' --a structure he visualized as a supramolecular organization of

the entire intracellular structure, save perhaps the cortex -- which is shaped by the centrosome and includes the nucleus, microtubule array, and associated membranes and organelles.

Daniel Mazia was more than just a researcher and indeed he might have described his most important work as his influence on the training of young cell biologists. The list of his prominent students, trainees, and collaborations is lengthy and it is difficult to compile the entirety of those who trace their scientific ancestry to him.

Mazia was the recipient of numerous honorary degrees, and was a member of both the National Academy of Sciences and the American Academy of Arts and Sciences. He was the Executive Editor for *Experimental Cell Research* from 1963 through 1987, and served as President of both the American Society for Cell Biology (in 1976), the International Federation for Cell Biology, from 1976-1982 and the aforementioned International Cell Research Organization.

Mazia's lectures were always profound, entertaining and challenging. For him, the right word was never enough; only the perfect word would do. His abilities to raise deep concepts without resorting to jargon made his courses accessible to audiences that ranged from beginning cell biology students to visiting sabbatical professors.

He had hoped to participate in a workshop in South Africa in January 1996, but his failing health precluded this travel. In his stead, he sent an overture to the workshop's opening. He wrote of the advances to our understanding brought by classical microscopy and the newly invented imaging technology. He then concluded with the following words:

*There are many paths in the advancement of science, but the giant leaps in our Science of the Cell have been made by seeing. First we see and then we interpret and only then do we pursue mechanisms and theories. The earliest microscopes discovered the cell and with that came sensible thought about the nature of living things. How profound a generalization! -- that all the immense variety of life can be comprehended in cells which have so much in common with each*

*other. A century ago, the microscope answered a number of great questions about how life goes on: fertilization, mitosis and the basis of growth, chromosomes as the carriers of heredity, development and social behavior of cells. Now you will be seeing recent technical advances in imaging, learning how the fine points of the physics and chemistry of cells are revealed by microscopes. Some new equipment is fancy and expensive, but you can deal with major questions about chromosomal genetics and cell organization with simpler traditional microscopes.*

*The gifts of the microscopes to our understanding of cells and organisms are so profound that one has to ask: What are the gifts of the microscopist? Here is my opinion. The gift of the great microscopist is the ability to THINK WITH THE EYES AND SEE WITH THE BRAIN. Deep revelations into the nature of living things continue to travel on beams of light.*

*-- Daniel Mazia, written in January, 1996.*

Mazia was married to Gertrude Greenblatt in 1938 who passed away in 1990. He leaves behind his beloved companion Ruth Gilbert, his brother, Joseph, and his two daughters, Judith and Rebecca.

In addition, he leaves an idealistic and unadulterated devotion to fundamental science, as well as untold influence in shaping the careers of hundreds of cell biologists. His revelations will continue to beam among us all, and his inspiration, humor, criticism and affection will be greatly missed.

David Epel, Chair  
Dennis Powers  
James Spudich