Dr. Marie Maynard Daly (1921-2003)

The first African American woman to received a Ph.D. (1947) in chemistry in the US.

Marie M. Daly. Queens College Silhouette Yearbook, 1942.

A Budding Interest in Science

Born in the Corona neighborhood of Queens, New York, Daly was an avid reader and was fascinated by Paul De Kruif's popular book *The Microbe Hunters*. She was further inspired by her father's love of science. Unfortunately, he had been forced by economic circumstances to drop out of Cornell University, where he had been pursuing a bachelor's degree in chemistry.

Daly was educated at Hunter College High School, an all-female institution, where her ambition to become a chemist was supported and encouraged. She enrolled in Queens College in Flushing, New York, as a commuting student, and graduated magna cum laude in 1942 with a bachelor's degree in chemistry. The college offered her a fellowship to pursue graduate studies in chemistry at New York University while working part-time as a laboratory assistant at Queens College. In just one year she completed her master's degree.

A PhD from Columbia

Daly enrolled in the doctoral program at Columbia University after working for a year tutoring chemistry students at Queens College. She also obtained funding from the university to help in her full-time study of chemistry. Under the direction of Mary L. Caldwell, who was known for her work on the important digestive enzyme amylase, Daly researched how compounds produced in the body affect and participate in digestion. The title of her dissertation was “A Study of the Products Formed by the Action of Pancreatic Amylase on Corn Starch.” She was awarded her doctoral degree in 1947, only three years after enrolling in the program, and was the first African American woman to obtain a PhD in chemistry in the United States.

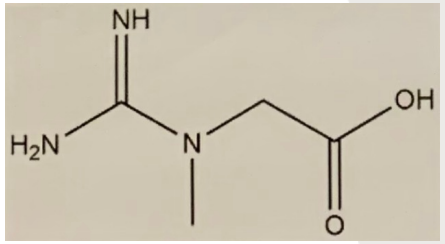
Career in Research and Education

After completing her doctoral degree Daly taught for two years at Howard University in Washington, DC. On receiving a grant from the American Cancer Society to support her postdoctoral research, she joined Alfred E. Mirsky, a pioneer in molecular biology, at the Rockefeller Institute in New York, where for seven years she worked on the composition and metabolism of components of the cell nucleus, among other studies. Then Daly took a new position teaching biochemistry at the College of Physicians and Surgeons of Columbia University. In 1960 she became a professor at the Albert Einstein College of Medicine, where she remained until her retirement in 1986.

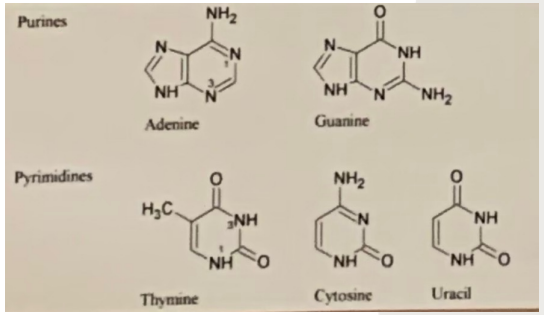
Marie M. Daly working in her lab, ca. 1960.

Contributions in science

- Discovered the role of RNA in protein synthesis, and a new type of histone. Lysine rich histone was discovered by Daly in 1955 and were found to disassociate from nucleic acids more readily and the other type of histone, Arginine rich histones.
- She proved that cholesterol contributes to heart disease, smoking cigarettes causes lesions within the lungs, and cardio muscles use creatine to produce energy.
- Daly researched and proved the direct relationship of RNA on protein synthesis by comparing glycine uptake within different bodily tissues.
- Daly developed methods for separating out the nuclei of tissues and measuring the base composition of purines and pyrimidines in desoxypentose nucleic acids.



creatine



Real-world applications of Daly's research

-Daly's research helped to connect the relationship between high cholesterol and artery complications (i.e. clogged arteries) and also helped to inform the general public about how different foods and diets affect the heart and circulatory system

-Analyzed how lifestyle choices (i.e. drinking and smoking) influenced metabolic diseases and metabolism by creatine in muscle cells

-Her research illustrates on a molecular level why certain dietary decisions can be more beneficial than others and why you should stay away from certain habits

-Discovery of purines and pyrimidines gave an insight to the structure of DNA, and therefore scientists are able to create medicines and solutions to genetic disorders because of her findings

Influence and Activism of Marie M. Daly

-In addition to her contributions to science, Mary Daly also worked as an activist to help students of color get enrolled in medical schools and graduate science programs. More specifically, she developed and ran the Martin Luther King-Robert F. Kennedy Program at Albert Einstein College, which prepared African American students to be admitted, and she recruited African American and Puerto Rican students to the school.
-In 1988, she started a scholarship in honor of her father for ethnic minority students at her alma mater, Queen's College.

Achievements

-Became a fellow of the American Association for the Advancement of Science in 1986 upon her retirement from Albert Einstein College.
-Recognized as one of the top 50 women in science, engineering, and technology by the National Technical Association in 1999.
-In 2016, The Dr. Marie M. Daly Academy of Excellence in St. Albans, New York, was named in her honor.

Legacy

Overcoming the dual hurdles of racial and gender bias, Marie Maynard Daly (1921–2003) conducted important studies on cholesterol, sugars, and proteins. In addition to her research, she was committed to developing programs to increase the enrollment of minority students in medical school and graduate science programs.

Reference: https://www.sciencehistory.org/
https://en.wikipedia.org/wiki/Marie_Maynard_Daly