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Rosalyn Sussman Yalow (1921-) Endocrinologist, Medical Physicist

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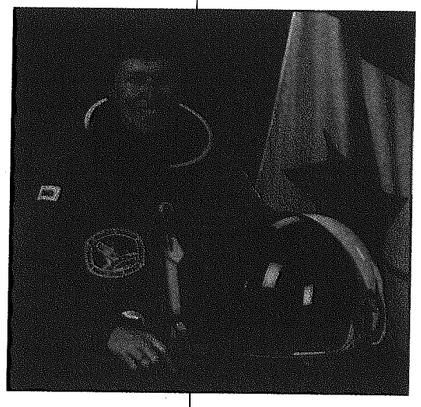
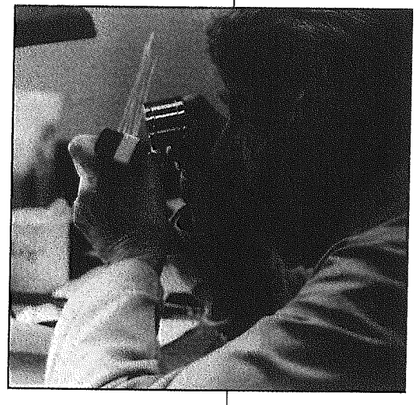
NOTABLE WOMEN *in the* LIFE SCIENCES

A Biographical Dictionary





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Notes

1. "Young Woman of the Year," *Crisis* 60, no. 1 (Jan. 1953): 4–5.
2. "Jane Cooke Wright," *Current Biography Yearbook* 29 (1968): 443–45.
3. "Young Woman of the Year," pp. 4–5.

Bibliography

"Jane Cooke Wright." *Current Biography Yearbook* 29 (1968): 443–45.

Notable Black American Women, ed. Jessie Carney Smith. Detroit: Gale Research, 1992.

O'Neill, Lois D. *The Women's Book of World Records and Achievements.* Garden City, N.Y.: Anchor Press/Doubleday, 1979.

"Young Woman of the Year." *Crisis* 60, no. 1 (Jan. 1953): 4–5.

HELEN-ANN BROWN

ROSALYN SUSSMAN YALOW

(1921–)

Endocrinologist, Medical Physicist

Birth	July 19, 1921
1943	Married Aaron Yalow
1945	Ph.D., University of Illinois
1946	First woman engineer at Federal Telecommunications Laboratory; joined faculty at Hunter College
1947	Joined staff at Bronx VA Hospital
1950	Began collaboration with Solomon Berson
1959	First use of radioimmunoassay (RIA)
1975	Elected to National Academy of Sciences; A. Cressy Morrison Prize in Natural Sciences, New York Academy of Sciences
1976	Albert J. Lasker Basic Medical Research Award
1977	Nobel Prize in Medicine or Physiology
1978	President, Endocrine Society
1988	National Medal of Science
1991	Retired from Bronx VA Hospital

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On October 13, 1977, at 7:00 A.M., Rosalyn Yalow was at work in the Veterans Administration Hospital in the Bronx when she learned she had been awarded the Nobel Prize in Physiology or Medicine. Yalow was the second woman to win the Nobel Prize in Medicine and the first American-educated woman to win a Nobel in science. The prize was awarded for the development of radioimmunoassay (RIA) of peptide hormones. Yalow received half the prize; the other half was shared by Roger C. Guillemin of the Salk Institute and Andrew V. Schally of the Veterans Administration Hospital in New Orleans for their related work on hormones in the brain.

RIA is a biological assay technique used to screen for very tiny amounts of chemicals in biological tissues and fluids. In comparison, it is sensitive enough to detect the presence of a sugar cube in a lake. The use of RIA revolutionized the study of endocrinology and the treatment of hormonal disorders such as diabetes. Blood in blood banks is screened for hepatitis virus, newborns are tested for underactive thyroid secretion to prevent mental retardation, athletes can be checked for drug abuse, and a new science—neuroendocrinology—has come into being through the use of RIA.

Yalow's mother, Clara Sussman, contended that Yalow showed her tenacity and combative spirit early in life. When Rosalyn was 3 years old, her mother visited an egg store with her and her older brother, Alexander, on the way home from a theater visit. Following the egg purchase, Rosalyn insisted that they return home by a different route than her mother intended. Rosalyn sat down on the sidewalk; unable to carry Rosalyn and the eggs, Mrs. Sussman gave in after a crowd began to gather.

When Alexander was in first grade, he was humiliated by having his hand smacked by his teacher. He wept and threw up over the incident. When Rosalyn entered the first grade and had her hand smacked by the same teacher, she struck back. She told the principal she had avenged her older brother after years of waiting. She kept an old photograph of herself as a 5-year-old in huge boxing gloves standing over her supine brother, and she claims that it was that attitude that enabled her to go into physics.

Rosalyn was born in 1921 and grew up in the South Bronx, where she has lived almost all her life. Few people in the Jewish neighborhood—including her parents—had schooling past the elementary level, although education was highly valued. When she graduated from high school in 1937 at age 15, she was admitted to Hunter College. She had already set her sights on medical research as a career. She chose physics as a major because of the excitement surrounding the field at the time, particularly nuclear physics. In 1938, Eve Curie published a biography

of her mother, Marie Curie, whom Yalow took as her professional role model.

Rosalyn would have preferred to go to medical school after graduation, but at the time American medical schools were not admitting Jewish men, much less Jewish women. She took a part-time job as a secretary at the Columbia medical school in January 1941, with the understanding that she could take some science courses as long as she also learned stenography. A few months later she received an assistantship in physics from the University of Illinois and tore up her steno books. World War II was imminent, and male graduate students were being lost to the draft. She was the first woman in the University of Illinois engineering school since 1917, when World War I was under way.

Rosalyn met her future husband, Aaron Yalow, on her first day of graduate school at Illinois. Both did Ph.D. research in nuclear physics under Maurice Goldhaber. They were married on June 6, 1943, and remained partners until Aaron's death on August 8, 1992. In January 1945, Yalow received her Ph.D. (the second woman to receive a Ph.D. in physics from Illinois) and returned to New York City as the first woman engineer in the Federal Telecommunications Laboratory of International Telephone and Telegraph. She returned to teaching at Hunter College after a year, but there were no research facilities there. In 1947 she joined the Bronx VA Hospital in order to set up a radioisotope service while still teaching full-time at Hunter.

In January 1950 she resigned from Hunter to devote all her attention to medical physics. Yalow began looking for a collaborator to handle the medical aspects of her research while she focused on the engineering and physics aspects. She met Solomon A. Berson, a young resident at the VA, in the spring of 1950 and formed a partnership that lasted 22 years until his death in April 1972. Yalow and Berson worked 80-hour weeks, speaking to each other in a sort of scientific shorthand. There was unvarnished logic between them and each of them understood the other's meaning thoroughly; although when they subjected other scientists to this type of questioning in meetings, it was sometimes viewed as hostility instead of honesty.

RIA was developed as a side issue of insulin research. Adult diabetics were injected with radioactively tagged insulin to measure how rapidly it would disappear from their system. The adult diabetics retained the insulin longer than the normal controls; after further investigation, Yalow and Berson concluded that people who had taken insulin developed antibodies to it. This flew in the face of the conventional wisdom that the insulin molecule was too small to stimulate the production of antibodies. The *Journal of Clinical Investigation* refused to publish their article until the words "insulin antibody" were removed from the title.

In developing RIA, Yalow and Berson wanted a technique that did not

require injecting radioactive material into a living human being. They fixed on a method of labeling the antigenic substance to be measured and mixing it with a specific antibody to the substance. After mixing, the degree of binding of the antibody to the labeled substance could be calculated and used to estimate the amount of the substance present in a biological fluid by comparing it to a known standard. Despite the enormous commercial potential of RIA, Yalow and Berson decided not to patent it.

During the next few years, Yalow and Berson began using RIA to rethink all of endocrinology and made it one of the hottest areas of medical research. During these years, Yalow also bore and reared her two children. Benjamin was born in 1952 and Elanna in 1954. Both have earned doctorates. Benjamin directs the computer center at the City University of New York, and Elanna manages a company that establishes daycare centers.

In 1968, Berson decided to take a position as professor in charge of internal medicine at the Mount Sinai School of Medicine of the City University of New York. Yalow was extremely disappointed at the news, but Berson assumed he could put in a full day's work at Mount Sinai and then work through the night twice a week at the VA lab. But the pace began to catch up with him, and after a while Berson began to work only one night a week at the lab. In March 1972, Berson had a minor stroke. He died a month later of a heart attack at age 54.

Yalow was told she could not win a Nobel without Berson, although RIA was unquestionably an accomplishment worthy of the prize. Nobels are not given posthumously and had not been given to surviving partners in research projects. Yalow increased her work week to 100 hours, and the lab published 60 articles between 1972 and 1976. She was elected a member of the National Academy of Sciences in 1975. In 1976 she was the first woman to win the Albert Lasker Basic Medical Research Award, which is often a forerunner of the Nobel. Following her receipt of the Nobel Prize in Medicine in 1977, she received the nation's highest science award, the National Medal of Science, in 1988.

Yalow retired from the VA Hospital in 1991 and became a science activist. She lectures on causes such as instituting better-quality child care for families, requiring more science in American education, and promoting the role of women in science.

Bibliography

Gilbert, Lynn, and Gaylen Moore. *Particular Passions: Talks with Women Who Have Shaped Our Times.* New York: Crown, 1981.

Gleasner, Diana C. *Breakthrough: Women in Science.* New York: Walker, 1983.

McGrayne, Sharon Bertsch. *Nobel Prize Women in Science: Their Lives, Struggles, and Momentous Discoveries.* Secaucus, N.J.: Carol Pub. Group, 1993.

Moritz, Charles, ed. *Current Biography Yearbook.* New York: H.W. Wilson, 1978.
Opfell, Olga S. *The Lady Laureates: Women Who Have Won the Nobel Prize.* Metuchen, N.J.: Scarecrow Press, 1986.
Rayner, William P. *Wise Women.* New York: St. Martin's Press, 1983.
Stone, Elizabeth. "A Mme. Curie from the Bronx." *New York Times Magazine* (Apr. 9, 1978): 29.
Wasson, Tyler, ed. *Nobel Prize Winners: An H.W. Wilson Biographical Dictionary.* New York: H.W. Wilson, 1987.
Yalow, Rosalyn S. "A Physicist in Biomedical Investigation." *Physics Today* 32 (Oct. 1979): 25–29.
———. "Remembrance Project: Origins of RIA." *Endocrinology* 129, no. 4 (Oct. 1991): 1694–95.

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