

Rita Levi-Montalcini

1909–2012

I am not afraid of death—I am privileged to have been able to work for so long. If I die tomorrow or in a year, it is the same. It is the message you leave behind you that counts, and the young scientists who carry on your work.
—Rita Levi-Montalcini

On December 30, 2012, Rita Levi-Montalcini passed away at her home in Rome at age 103. Rita was a model and inspiration for the younger generation: not simply because of her scientific and political achievements but equally for her warm personality, exemplary life, and boundless enthusiasm.

Rita, along with her twin sister Paola, was born into an intellectual and highly cultured Turinese Jewish family on April 22, 1909—the two youngest of four children.

A polymath, postenlightenment ethos flowed from their parents to each child, creating an ambience where intellectual pursuits were highly appreciated and avidly pursued. Adamo Levi, her father, was an engineer and talented mathematician, and her mother Adele Montalcini, renowned for her personal charm, was a gifted painter. Her oldest brother, Gino, was among Italy's best-known architects and a professor at Turin University. Anna was a keen "child of the Renaissance" immersed in literature and the humanities, whereas Paola, from early childhood, displayed extraordinary artistic talents, especially, like her mother, as a painter.

After completing grammar school, the young Rita felt unable to adjust to the conventional feminine role (expected by her father) and embarked instead on a career in medical research. As a result, she studied at Turin University under Giuseppe Levi, the then Professor of Histology, who also tutored Salvador Luria and Renato Dulbecco, two other future Nobel laureates. All three became close friends, as well as colleagues.

In 1936, Rita graduated in Medicine and Surgery and began her specialization in neuropsychiatry—fortuitously two years prior to publication of the antisemitic "A manifesto for defending our race" by a coterie of Fascist scientists and intel-

lectuals (first published on July 15, 1938, it led to the formulation of Act n. 1024 of July 13, 1939 XVII, promoted by the antisemitic area of the National Fascist Party). Rita spent a short sabbatical in Brussels in 1940 to improve her neuroscience skills and returned to Turin shortly before the German army invaded Belgium. This was a very difficult time, and Rita pursued her research activity from a small laboratory that she built at home, continuing her collaboration with Giuseppe Levi until her family was forced to flee a heavily bombed Turin for Florence in 1943. During 1943 and 1944, she established close contacts with partisans through friends and members of the antifascist coalition known as the Partito d'Azione (1942–1947, important during the war as well as in the early postwar years and leading to the "Assemblea



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Costituente" that prepared the new Italian Constitution). Subsequently, she worked as a medical doctor assigned to a refugee camp, where epidemics and infectious disease daily undermined the health of already weak and malnourished war victims.

In opting to specialize in neuropsychiatry, Rita was inspired by the Viktor Hamburger's early scientific work on the effects of limb extirpation in chick embryos. Later, in 1947, Rita was able to join Hamburger's laboratory at Washington University in St. Louis, MO, where in 1956 she became an Associate Professor and in 1958 became a Full Professor, a position that she held until her retirement in 1977. During this period, she also became a member of the Accademia dei Lincei (Italy's leading Academic Society founded in 1603), of the Pontifical Academy of Sciences (Vatican), of the Royal Society, and of the National Academy of Sciences of the USA.

During these years in St. Louis, she collaborated with Stanley Cohen and, in the early 1950s, found that mouse tumor cells release a factor that causes rapid growth of nerve cells both in vitro and in vivo. Today, it comes as little surprise that this was nerve growth factor (NGF). Together with Cohen, Rita shared the Nobel Prize in Physiology for Medicine in 1986 for this discovery. NGF as a neuronal survival factor was identified well before many other endogenous cell survival ligands, and consequently, this discovery became the template for understanding fundamental mechanisms in biology.

NGF has the potential to improve clinical therapy for the increasing burden of neurodegenerative disease; indeed, it is now at an advanced stage of optimization of formulation and delivery. Rita contributed significantly to this, partly by improving large-scale production of recombinant human NGF (rhNGF), as well as through a small-scale human study that demonstrated how NGF therapy can reduce retinal-ganglion cell loss in patients with glaucoma.

In 1962, Rita established a research unit in Rome, dividing her time between there and St. Louis. In Rome, she established the Institute of Cell Biology at the Italian National Research Council (CNR). Additionally, in 2002, to further develop

basic and applied research on NGF and neurodegenerative diseases, as well as to attract world-class scientists, she created the European Brain Research Institute (EBRI), also in Rome, where I had the honor to serve as Scientific Director. There, I had the great pleasure of closely interacting with Rita and admiring her curiosity, her desire to keep abreast of knowledge, and her ability to disseminate enthusiasm and perseverance among the young scientists—characteristics that persisted to her very last day. Indeed, her last papers were published only a few months ago. In simple words, Rita was a model for scientists and a model for life. Research at EBRI covers a wide range of neurodegenerative pathologies, as reflected in the content of the proceedings published

on the occasion of her 100th and 102nd birthdays, and I hope the Institute will continue to diffuse her ideas for forthcoming generations. The Israel Hospital in Rome will also shortly adopt her name.

Beyond medicine, Rita championed ethics and women's rights throughout her adult life. In recent years, the Rita Levi-Montalcini Foundation has supported education for thousands of African women, and Rita herself has published more than 20 books disseminating her beliefs as standards for the young. Rita was among her country's most popular women.

In 2001, she was nominated a Senator-for-Life by Italy's President Carlo Azeglio Ciampi and was a firm supporter of the center-left Romano Prodi government,

especially during its difficult times. Then, Rita was determined to be present up to 10 hours in the Chamber, participating in the discussions and on occasion providing the crucial single vote of majority.

In the words of Aaron Ciechanover, "Rita was 'one of a kind' in the deepest and broadest sense of these words, very close to me in person. Hard to imagine that this thin, frail, and small Jewish woman—who was a true lady, the ultimate in fine taste—carved her way during days when women were hardly seen in universities, in Fascist Italy, to peaks of science and humanity, where the air is thin and only a few, much stronger than her can survive. She probably had attributes we may never be able to unveil. I will miss her sorely."

She will always live in our hearts.

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