

IN LAUDATIO

LOOKING AT THE FUTURE WITH RITA

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Abstract—This paper on Rita Levi-Montalcini (1909–2012), who received in 1986 the Nobel Prize in Physiology or Medicine for the discovery of nerve growth factor, focuses on aspects of her advocacy and her commitment to education in which she has been especially active in the last part of her long life. With passionate confidence on the capabilities of the aging brain (together with severe admonition against the pursuit of immortality), she encouraged contributions of senior citizens to the society. Always projected into the future, with enduring faith in the potential of young individuals, in education as a key to development, in the capabilities of women, in the importance of gender equality, Rita established in 2001 the Rita Levi-Montalcini Foundation for the education of African women. Her legacy on engagement for a better ‘global village’ should not be forgotten by the neuroscience community.

Key words: Rita Levi-Montalcini, aging brain, capacity-building, African women.

“Do you ever think of the future?” This was one of the questions posed to Rita Levi-Montalcini (Fig. 1), then aged 101, during a talk show in the Italian TV. “I think of the future all the time, I only think of the future” Rita answered. And she meant it. Rita rarely looked back. She rather looked forward, very interested in the contributions that individuals of all ages (including centenarians, of course) could give to the society and to progress. “Tell me what you are doing” she was always asking, and this was followed by “tell me what’s next”. This is what she told me when I first met her in the mid-1970s in her apartment in Rome, which resembled a greenhouse. When she invited me to her lab, at the Institute of Cell Biology of the National Research Council, I found Rita very elegantly dressed, as usual, a tiny figure standing against a gigantic poster of Martin Luther King covering the entire wall behind her desk, and surrounded by fish tanks with tadpoles for her studies on nerve growth factor (NGF).

Rita passed away on December 30, 2012, aged 103. Her long life was frequently difficult, interesting, inspiring; much has already been written about her and

her scientific achievements (see, for example, Bradshaw, 2013; Chao and Calissano, 2013; Zeliadt, 2013), and she wrote the autobiography of the first eight decades of her life (Levi-Montalcini, 1988). A detailed account of her scientific legacy can be found in the companion paper by Chao et al. (2013).

Rita was born in Turin in a Jewish family, and obstinately wanted to study medicine. She enrolled at the Faculty of Medicine of the University of Turin in 1930, where she met her mentor, Giuseppe Levi (1872–1965), Professor of Anatomy, a pioneer of *in vitro* studies on cultured cells, with broad research interests. Levi was obviously a very stimulating mentor, since three of Levi’s disciples (who moved to United States at the end of World War II) were awarded the Nobel Prize in Physiology or Medicine: Salvatore (Salvador Edward) Luria (1912–1991), Renato Dulbecco (1914–2012), and Rita (see Bentivoglio et al., 2006). She graduated in Medicine and Surgery in 1936 and enrolled as resident in Neurology and Psychiatry at the University of Turin. In 1938 the *Manifesto della Razza* (“Manifesto of Race”) was issued by the Ministry of Culture of Mussolini’s fascist regime. Jews were not allowed to pursue academic and professional careers. Rita (and Giuseppe Levi and many others) had to leave the university.

Rita then set up a small laboratory in her bedroom at home, performing neuroembryology experiments with chicken embryos with simple tools (i.e., working on eggs using needles), and had a difficult time during World War II. Invited by Viktor Hamburger (1900–2001) to Washington University in St. Louis, Missouri, Rita moved to United States. The experimental itinerary that brought her to the discovery of NGF is well known (see Levi-Montalcini, 1988; Aloe, 2004; Chao and Calissano, 2013; Federico, 2013; Iversen, 2013; Zeliadt, 2013; Chao et al., 2013). In 1968 she returned to Rome. From 1969 to 1978 she served as director of the Institute of Cell Biology of the Italian National Research Council. After her retirement she kept going everyday to the lab, as she did, almost until the end of her life, at the European Brain Research Institute (EBRI; see further). In 1986 she was awarded the Nobel Prize in Physiology or Medicine together with Stanley Cohen.

Having traversed almost the entire twentieth century, Rita entered the new century and the new millennium with unprecedented energy and determination for her age. This was made easier by her appointment, in 2001, as Senator for life by the President of the Italian

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Fig. 1. Rita Levi-Montalcini in 2002; on the left, Rita is with the Moroccan neuroscientist Nouria Lakhdar-Ghazal (currently Secretary General of the Society of Neuroscientists of Africa, SONA).

Republic. Rita made her voice heard at difficult times for the Italian government. In 2001 she created the Rita Levi-Montalcini Foundation dealt with below. In 2002 she founded EBRI (see [Chao et al., 2013](#)). She was the first woman to be admitted the Pontifical Academy of Sciences, and the first Nobel laureate to live 100 years or more (see [Abbott, 2009](#)).

I herewith wish to highlight aspects of her advocacy for science and commitment to education that may be less known than her scientific achievements.

ABOUT AGING: THE ADMONITION OF THE “STRULDBRUGGS”

In her long life, Rita dedicated many thoughts to aging. “Add life to your years” (implicitly meaning “since you cannot add years to your life”) Rita used to say. She indeed followed up this motto in her life, very active almost until the end, despite sight and hearing impairments in the last decade (deficits she fiercely fought but also accepted: “I have much more time to think now than when I was 20”).

One of the several books Rita published in Italian, aimed at the diffusion of scientific culture and of neuroscience in particular, is entitled “*L’asso nella manica a brandelli*” (“The ace up your tattered sleeve”) ([Levi-Montalcini, 1998](#)). The “sleeve in tatters” is the aging body. The “ace” is the aging brain. In the book Rita uses as testimonials of long, productive lives (“sunset or dawn?”) Michelangelo Buonarroti (1475–1564), Galileo Galilei (1564–1642), Bertrand Russell (1872–1970), David Ben Gurion (1886–1973), and Pablo Picasso (1881–1973).

In the prologue of this book, Rita writes “All living organisms of the vegetal or animal kingdoms are destined in the last leg of their life to a progressive decadence, as prelude to the suspension of all vital activity. In humans, the senile decline acquires more flashy and dramatic features than in other living beings for three reasons. The first is a longer life span. The second is the deterioration of organs deriving from attrition... The third is the casting out of the elderly on behalf of society.” Rita then recalls the story of the island of Luggnagg from *Gulliver’s Travels*, the renowned satirical opus published in 1726 by Jonathan Swift (1667–1745). This is the story of Gulliver’s encounter with a group of immortals, called the Struldbruggs ([Fig. 2](#)), described as follows (many of these quotes are in Rita’s book):

“When they came to fourscore years... they had not only all the follies and infirmities of other old men, but many more which arose from the dreadful prospect of never dying. They were not only opinionative, peevish, covetous, morose, vain, talkative, but incapable of friendship, and dead to all natural affection, which never descended below their grandchildren. Envy and impotent desires are their prevailing passions... they find themselves cut off from all possibility of pleasure; and whenever they see a funeral, they lament and repine that others have gone to a harbor of rest to which they themselves never can hope to arrive. They have no remembrance of anything but what they learned and observed in their youth and middle-age, and even that is very imperfect; and for the truth or particulars of any fact, it is safer to depend on common tradition, than upon their best recollections...”

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