Rita Levi-Montalcini Biography

Rita Levi-Montalcini

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Contents

Rita Levi-Montalcini Biography.....1

Contents.....2

Biography.....3

Biography

Rita Levi-Montalcini revealed a fundamental process for cell growth and differentiation by discovering the hormone-like protein nerve growth factor (NGF). For this work, she received part of the 1986 Nobel prize in physiology or medicine.

Levi-Montalcini was born in Turin, Italy, where her father was an electrical engineer and mathematician and her mother an artist. Despite the objections of her father, who did not approve of education for women, she earned two medical degrees in 1936 and 1940 from the University of Turin, specializing in neurology and psychiatry. She was particularly interested in embryo nervous systems, inspired by an article on limb growth in chick embryos published in 1934 by the nerve development specialist Viktor Hamburger. During World War II Levi-Montalcini, who is Jewish, lived and worked underground to avoid the Italian government's anti-Semitic practices, developing a theory that many immature nerve cells are normally programmed to die. After Italy was liberated in 1944, she worked as a physician in a refugee camp. In 1947, Hamburger invited Levi-Montalcini to Washington University in St. Louis, Missouri, to pursue her nerve theory, which their research confirmed in 1949. Intending to stay there just one year, she remained for thirty years, becoming a United States citizen in 1956.

After 1962, she divided her research time between St. Louis and Rome. Levi-Montalcini's discovery of NGF began when she observed that mouse tumors grafted to chick embryos stimulated the development of embryo nerves. Furthermore, rapid growth occurred whether the tumors were in direct contact with the embryo or not. In searching for a chemical that accounted for the growth, she went to Brazil (with one of her research mice in her purse) to use the latest procedures for the then-new technique of tissue culture-the mixing of tumor slices with chick blood and embryo extract. During twenty-four hours of incubation, a dense halo of nerve axons grew near the tumor. Further research conducted in St. Louis with her assistant Stanley Cohen identified a substance she named nerve growth factor.

Her work showed how target cells produce NGF and determine the direction axons grow. It also showed that nerve cells die when antibodies block NGF. After 1977, when she retired from Washington University, she lived in Rome with her twin sister Paola Levi-Montalcini, a well-known painter, where she published her autobiography, *In Praise of Imperfection* in 1988, one year before she died.