

Laudatio, honoring Professor Dr. Robert C. Gallo, 1999 recipient of the Paul Ehrlich and Ludwig Darmstaedter Prize given at Paulskirche in Frankfurt, on March 14, 1999.

Professor Robert C. Gallo, whom we honor today on his receipt of the Paul-Ehrlich and Ludwig Darmstaedter Prize, is one of the most productive and prominent medical research scientists of the present century. Dr. Gallo's focus is on viruses, viral diseases, and molecular biology, and his greatest contribution, perhaps, was his discovery of an immunologic regulatory molecule, now known as interleukin-2. Interleukin-2 was one of the first cytokines to be discovered. As is often the case in science, the ultimate significance of his discovery of signal molecules in immunology and inflammation was not immediately recognized. The finding, however, was seminal and allowed him to grow T lymphocytes of the immune system in the laboratory which led to his discovery of the first human exogenous retroviruses. These viruses, named HTLV-I and HTLV-II (for Human T-Cell Leukemia Viruses), were shown by him and others to cause both leukemia and neurologic diseases in people. These timely discoveries opened the way to the detection by Dr. Montagnier and by Dr. Gallo and their co-workers, in the early 1980's, of the human immunodeficiency virus, HIV, that causes AIDS.

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It is commonly said that a man is a product of both his own environment and his own initiatives. The curious may ask what background and what experiences lead to greatness in science? The boundaries may be indistinct and blurred, but it is clear that Robert Gallo, the person, and Professor Gallo, the scientist, both speak loudly of humanism and compassion coupled with science and achievement.

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Robert Gallo, the individual, was a product of the northeastern industrial region of the United States, that is of New England. He was born in Waterbury, Connecticut in 1937 and spent his early formative years in that New England environment. His early interest in the biological sciences is revealed by his receipt of a Bachelor's degree in Biology, summa cum laude, in 1959. This was followed by a doctor's degree in medicine from the Thomas Jefferson Medical College of Philadelphia. Summer internships, while at Jefferson, sharpened his zeal for experimental investigations that were carried into his internships and Residency in Medicine which were completed at the University of Chicago.

Dr. Gallo joined the National Cancer Institute of the U. S. National Institutes of Health (NIH) in 1965 and rose rapidly to become chief of the Laboratory of Tumor Cell Biology. He left the NIH in 1995 to found a new Institute of Human Virology at the University of Maryland in Baltimore. This change was not without some fear and trepidation, for Gallo repeatedly stated that his total professional employment for his first 30 years in science was solely at the National Institutes of Health. The new virology institute would provide new challenges and new experiences for him.

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Dr. Gallo, the scientist, is best known and honored for his pioneering work with retroviruses. Recognizing the importance of HIV in human disease and its spread by products derived from human blood, Dr. Gallo and his associates quickly developed the first test to detect HIV in human blood. This provided the means to create a safe blood supply as well as safe human blood products, and thus saving unaccountable human suffering and innumerable lives.

While conducting research into Kaposi's sarcoma of man, which develops relatively frequently in HIV-infected people, Gallo and colleagues discovered a new human herpes virus, the first in 25 years, that was shown to be the cause of pseudorubella (exanthem subitum), a common febrile disease of early infancy. His studies of Kaposi's sarcoma revealed a role of exocrine and paracrine factors in the pathogenesis of the disease that were induced by HIV itself.

Continuing studies of HIV brought the seminal discovery only three years ago by Professor Gallo and his colleagues of the role of immunologic regulatory substances, called chemokines, in the pathogenesis of AIDS. These pro-inflammatory substances were found to limit infection with the virus of AIDS in man and may explain the long latency period between HIV infection and AIDS development. Follow-up investigation by others showed that receptors for chemokines on cells of the immune system were the co-receptors needed by HIV to gain entry to cells. This discovery has added a new dimension to our understanding of the pathogenesis of HIV infection and the role of chemokine analogues for preventing HIV infection, with associated prophylactic and therapeutic potentials.

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Professor Gallo's discoveries, collectively, have been critical and far reaching in our quest to improve the health and welfare of mankind and are of seminal importance to the so far largely unsuccessful development of vaccines against HIV. There is consensus among scientists that only an efficacious and inexpensive vaccine will be able to limit the HIV epidemic that rages out of control in some regions of the world. Such eminence in scientific discoveries has led to awards, recognitions, and distinctions too numerous to recite today. Professor Gallo is an elected member of the U.S. National Academy of Sciences and the Institute of Medicine of the National Academy. Uniquely, he has twice been the recipient of the United States' coveted Albert Lasker Award, the first for Basic Medical Research and the second a few years later for Clinical Medical Research. His other numerous awards include the General Motors Prize for Cancer Research, Canada's Gairdner Prize, the Japan Prize for Science and Technology, the French Cancer Research Prize (Grifuel Award), Harvard University's Warren Alpert Prize, and the German Red Cross Award. Dr. Gallo has received 14 honorary doctorates from distinguished universities, the most recent being the Karolinska Institute in Stockholm. In recognition of the importance of his research, Dr. Gallo was the most referenced scientist in the world in scientific publications between 1980 and 1990.

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In viewing the individual and his research, there are evident parallels between Paul Ehrlich and Robert Gallo. Both can be characterized as indefatigable scientists of high renown in their quest for new knowledge and truth, and in their desire to improve the health of human kind. They are known as warriors in spirit and reality, both somewhat impatient, and neither

willing to suffer fools lightly. This attitude does not always make friends. On the other hand, both are comparable in their stance for veracity and both are well known for their extensive help and support of friends and colleagues, when in need. Paul Ehrlich's scientific career was marked by prophetic insight and tireless advance, with creation of the sciences of chemotherapy, with seminal discoveries in immunology, and with the creation of the concept of specific ligand/receptor binding in biologic recognition and signal transduction, a phenomenon that is the basis for modern understanding of immunologic function and for extensive developments in pharmacology and chemotherapy. The long-term implications of Dr. Gallo's work remains to be determined. However, the seminal truths revealed in Professor Gallo's work have already opened successive cascades of new discoveries and practical progress in medicine.

Reinhard Kurth

