

Professor Rolf Luft, 1914–2007

P.-O. Berggren · K. Brismar

Published online: 8 March 2008
© The Author(s) 2008



Rolf Luft came to appreciate at an early stage of his career that biomedicine, cell biology, cell physiology and genetics are all developing at a tremendous rate, and that it is therefore of vital importance to retain a sharp focus and to address one's chosen research questions in great depth. For this, a lot of hard work, talent and enthusiasm are definitely needed. This principle guided Rolf throughout his research career and became the golden rule for all of his pupils.

By applying his own standards Rolf was able to make a remarkable discovery, namely that disturbed function of a cell organelle, the mitochondrion, could lead to disease. He later remarked that he 'was in the position to undertake the first studies of a cell organelle in humans in 1959–1962. They were performed following observations made at the bedside of a patient with striking symptoms never encoun-

tered before. The clinical observations led first to an idea about the origin of the symptoms and second to studies of this particular organelle, the mitochondria' [1]. This finding emerged from painstaking study of a 30-year-old woman with profuse perspiration, extremely high energy intake and myopathy [2]. He hypothesised that these abnormalities were due to a derangement of respiratory control in the mitochondria. The concept of oxidative phosphorylation was at that time based on studies of rat liver mitochondria, and he extended these techniques to mitochondria obtained from biopsies of the patient's gracilis muscles. The studies showed the features of 'loosely-coupled' respiration, i.e. deficient respiratory control with a partially maintained ability to synthesise ATP. This accounted for all the clinical features: abnormal heat production leading to increased perspiration and the enormous energy intake needed to compensate for the increased combustion. Electron microscopy of the mitochondria revealed striking structural abnormalities, with many mitochondria of highly variable size located in the perinuclear zone of the muscle cells and vast paracrystalline inclusions. Despite the mystery that still surrounds the aetiology of Luft's disease, the demonstration of human pathology resulting from the biochemical and morphological abnormalities in mitochondria had a major impact on the field of mitochondrial medicine and the continuing growth of the field from that time.

Rolf Luft can no longer actively guide us in our daily work. This giant in the fields of diabetes, endocrinology and mitochondrial diseases died on 22 May 2007. Not only will we miss his stunning intellect, but also his generosity and humour. He was born in Stockholm on 29 June 1914. He came from a working-class Jewish family and money was scarce, but Rolf was a brilliant student and his studies were funded by scholarships. He took his MD at the age of 26, and 4 years later he submitted a doctoral thesis on Cushing's syndrome and the effects of cortisone. He went on to play a leading role in establishing endocrinology as a discipline in Sweden, and also in founding the Swedish Endocrine Society. His appointment to the Karolinska Institutet in 1961 represented the first chair of endocrinology in Europe.

P.-O. Berggren (✉) · K. Brismar
The Rolf Luft Research Center for Diabetes and Endocrinology,
Department of Molecular Medicine and Surgery,
Karolinska Institutet L1:03, Karolinska University Hospital,
SE-17176 Stockholm, Sweden
e-mail: Per-Olof.Berggren@ki.se

Rolf established a small clinic on hormone diseases connected to a small research laboratory in the early 1940s. In 1941 he showed that androgens are produced in women by the adrenal glands. In 1946 he obtained a grant from the Family Wallenberg Foundation and had the opportunity to study endocrinology in the USA, with the aim of developing this discipline further in Sweden. There he demonstrated that treatment with adrenocorticotrophic hormone (ACTH) improved the symptoms of patients with rheumatism. The years 1949 to 1951 were successful ones, and Rolf studied ‘body spaces’, ‘lean body mass’ and the metabolic effects of hormones, especially ACTH, deoxycorticosterone acetate (DOCA), cortisone and growth hormone. During the period 1951 to 1965 he introduced hypophysectomy as a treatment for sight-threatening diabetic retinopathy and advanced metastatic breast cancer, on the working hypothesis that the reduction in growth hormone secretion could improve the outcome of these conditions. He demonstrated that human growth hormone has a diabetogenic effect in healthy individuals, and in diabetic and hypophysectomised diabetic patients.

A large donation from the Family Wallenberg Foundation enabled Rolf to establish the first Endocrine Clinic at the Karolinska Institutet/Karolinska University Hospital in Stockholm in 1958. With Errol Cerasi, he made the important observation that an impaired first-phase insulin response to glucose is associated with the development of type 2 diabetes. With Suad Efendic he showed that somatostatin is produced not only in the hypothalamus, but also in the endocrine part of the pancreas: the islets of Langerhans. Together they published the first studies on the effects of somatostatin analogues. Rolf Luft’s clear-sightedness made it possible to fully establish the translational concept in medicine at the Karolinska Institutet/Karolinska University Hospital in Stockholm, and it was there that he went on to establish the Rolf Luft Research Center for Diabetes and Endocrinology, a state-of-the-art laboratory for cell biology and molecular biology.

He started the first national programme for diabetes care in 1967 and later founded a WHO centre for education in diabetes. He was the president for the International Diabetes Federation from 1973 to 1979. He was a member of the Nobel Assembly at Karolinska Institutet (1961–1980) and he was the president of the Nobel Committee for Physiology or Medicine (1976–1979). Rolf was also a member of a large number of other National and International organisations and associations, such as the Swedish Royal Academy of Sciences, the Royal College of Physicians, the National Academy of Sciences, the American Academy of Arts and Sciences, and the Finnish Society of Arts and Letters. He was honourable member of most international diabetes organisations in the world and was

awarded honorary doctorates by many universities. Rolf Luft received 40 international awards and medals.

Rolf also played an important role in the development of the Swedish pharmaceutical industry. Growth hormone was produced for the first time from pituitaries in his laboratory in 1960, and production was later transferred to the pharmaceutical company Kabi. In time this led to the production of the recombinant growth hormone, Genotropine, which became a leading drug for Kabi, and later for Pharmacia.

Rolf took a great interest in and was actively involved in social issues; in the 1960s he was instrumental in changing the law in Sweden to recognise trans-sexuality as a medical disorder and to permit sex changes.

Rolf Luft has played a central role for Swedish medical research and especially the research conducted at the Karolinska Institutet. In his honour, the Karolinska Institutet has, for the last 6 years, given the Rolf Luft Award to world-leading scientists for their seminal discoveries within the fields of diabetes and endocrinology. Rolf created the Rolf Luft Foundation for Diabetes Research in 2004.

As an expert in diabetology and endocrinology, it was obvious to Rolf Luft that a good lifestyle is important for a long and active life. He was a runner and a cross-country skier and also liked to hike in the mountains. He walked from his apartment to the Karolinska University Hospital every day until the age of 90 years. Rolf loved to work in the garden in his summer house outside Stockholm and grew all sorts of vegetables there. These vegetables he then served to his colleagues at the numerous dinners that he hosted in his home—dinners that were full of discussion and debate on all kinds of topics—science and art.

Right up to his death, Rolf had an endless curiosity and great interest in the big questions related to science and life. He was always a most stimulating partner in discussion and had much to offer in terms of wisdom and good advice to his younger colleagues. It was characteristic of Rolf that he always wanted to find out what was going on, and even when he intellectually understood that life must come to an end he was emotionally unprepared. There were still papers to write, books to read and art that should be discussed. Clearly, Rolf did not have the time to die yet. He saw life as a wonderful gift awarded for a very short period of time, and that every single day should be enjoyed, something that Rolf did. He had a long and fantastic life together with his wonderful wife and life companion Ritva, who was always his dearest friend and support.

Rolf has gone and we miss him enormously. However, our joyful memories of him will make us go forward in his

spirit. ‘Rolf, we know that you are still keeping an eye on us all...’

Open Access This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

References

1. Luft R (1994) The development of mitochondrial medicine. *Proc Natl Acad Sci USA* 91:8731–8738
2. Luft R, Ikkos D, Palmieri G, Ernster L, Afzelius B (1962) A case of severe hypermetabolism of nonthyroid origin with a defect in the maintenance of mitochondrial respiratory control: a correlated clinical, biochemical, and morphological study. *J Clin Invest* 41:1776–1804