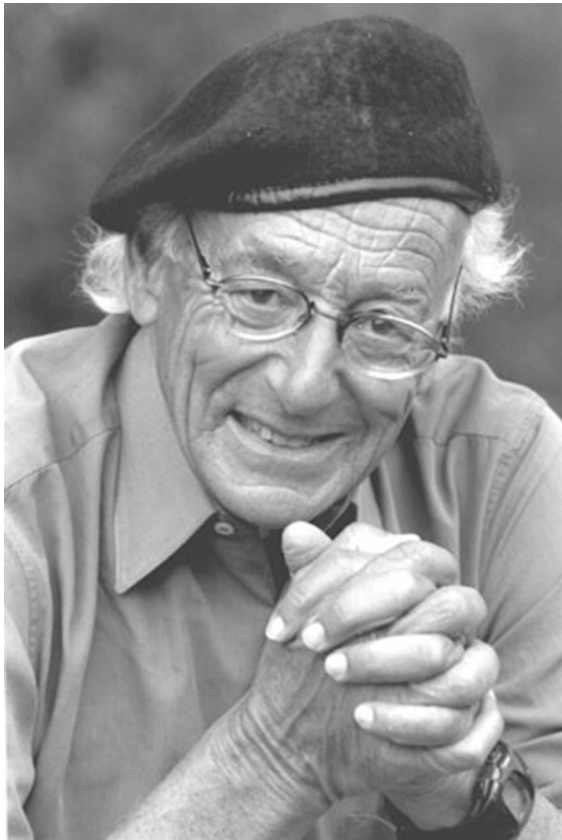


Werner R. Loewenstein

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Dr. Werner Loewenstein in 2002

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When Werner Loewenstein founded the *Journal of Membrane Biology* and the first issue appeared in 1969, those of us working with membranes were struck by its being an event which marked a ‘coming of age’ of the field. Membranes had been around for quite some time, of

course, and the post-war developments of the 1940s and 1950s had been spectacular, particularly in the field of animal cell excitability and the revelations of electron microscopy, to name but two. But membrane studies had originated in physical chemistry and still bore the marks of their origin, and there were areas of cell biology which obviously called for a focus on membranes but hadn’t quite got there yet—and it was still common for people to fall between two stools. The physics of bilayers and the associated mathematics of ion transport were sometimes alien to biologists, while the range of biological processes mediated by cell membranes was not always appreciated or understood by physical chemists.

Papers focussing on membranes were published in a number of prestigious journals but were obviously scattered, and the subject lacked a degree of cohesiveness. It was in this context that the very title of the *Journal* proclaimed its philosophy: here was a venue where the central role of membranes in biology was emphasized and where those sharing a common interest could find parallels to their work in animal, plant and microbial areas—all in the interest of the cell. Werner Loewenstein was obviously interested in an interplay and fusion of approaches. It was the rising phase of the ‘membrane revolution’ to which the *Journal* made a timely and important contribution. The title page of the first volume bears ample witness to its scope: its editors were truly international and their disciplines covered a full range of topics from membrane structure and thermodynamics to single cells, organelles, plant cells and epithelia.

Born 1926 in Germany, his family escaped from Nazi Germany in 1939 and emigrated to Chile. His interest in science developed and he received a B.Sc. (physics and biology) and subsequently a Ph.D. in physiology in 1950

from the University of Chile, where he became an associate professor of physiology. After working at Johns Hopkins and then the University of California in Los Angeles as a zoologist, in 1957 he became a professor of physiology at the College of Physicians and Surgeons, Columbia University, serving as the director of the Laboratory of Cell Physics. In 1971, he moved to become a professor of physiology and biophysics and departmental chairman at the University of Miami School of Medicine. He developed a long association as a visiting researcher at the Marine Biological Laboratory, Woods Hole, MA, and in 1994 he became a Senior Investigator there and with his wife, Birgit Rose, a co-worker of many years, set up the Laboratory of Cell Communication at the MBL. His wife of 43 years survives him, as do his children Stewart and Claudia, and four grandchildren. Two daughters, Patricia and Harriet, predeceased him.

He worked originally in electrophysiology, publishing studies on receptors and mechano-electric coupling in sense organs. It was in the early 1960s that he pursued the electrical properties of the nuclear membrane with microelectrodes between nucleus and cytoplasm. This led to cell-to-cell coupling in dividing oocytes and then in epithelia (insect salivary glands and later vertebrate renal systems, etc.) leading to the discovery of cell-to-cell coupling via specific intercellular junctions, now generally known as gap junctions, and work for which he became justly famous. Subsequently, in the mid-1970s, he was joined by his wife in

showing that cell-to-cell coupling was controlled by calcium levels in the cell, with raised calcium (originally caused by puncturing the membrane) causing uncoupling. This led to general principles of control of intercellular coupling by the cell and its implications for growth in normal and cancer cells, finally involving the expression of genes controlling the junction pathway. In his later years, he wrote books on more general topics drawing on his extensive knowledge of biology and sensory physiology, the last of which in 2013 was *Physics in Mind*, chosen by *Physics World Magazine* as the 2013 Best Book in Physics. He was an editor, a guest speaker at numerous conferences and the recipient of many honours during his lifetime.

As an editor of the *Journal*, he had a sure touch and often used his sound judgement with humour. In 1992, he published an Editorial outlining his own views of the relationship between theory and experiment in biology as opposed to physics in which he wrote “the endeavours of biologists are more like strenuous minuets between theorists and empiricists, where these partners are not always in step and may change hats. So the view gets blurred and it is not always easy to see who leads whom”. He once wrote to me on acceptance of a paper (part analysis, part ideas) “Thank you for submitting such a provocative paper!” Modern editors take note.

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