

Erwin Neher

The Nobel Prize in Physiology or Medicine 1991

Autobiography



Buchloe is a small town in Bavaria, situated in a rolling countryside in view of the Alps, 70 km west from Munich. This is where I grew up and spent most of my life until 1963, when I entered university. I was born in Landsberg, another town close by on the 20th of March 1944. My father, Franz Xaver Neher, was involved in the administration of a dairy company. Fortunately, this was considered to be of importance for food supply during the wartime, such that he was spared from military service. My mother Elisabeth (née Pfeiffer), who had received an education as a teacher in the early 1930s, was caring for the family of five, which included my two older sisters. Thus, in spite of the difficulties of the postwar period, I had the privilege to grow up in an intact family. Our family home was situated in a big, park-like garden, in which I spent hours by myself, watching plants and animals, and where I knew almost every pebble.

At the age of 10, I entered the 'Maristenkolleg' at Mindelheim. Mindelheim is another nearby town, and the local 'Gymnasium' is operated by a catholic congregation, the 'Maristenschulbrüder'. The big advantage of this school was that our teachers - both those belonging to the congregation and others - were very dedicated and were open not only to the subject matter but also to personal issues. During my years at the Gymnasium (1954 to 1963) I found out that, next to my interest in living things, I also could immerse myself in technical and analytical problems. In fact, pretty soon, physics and mathematics became my favourite subjects. At the same time, however, new concepts unifying these two areas had seeped into the literature, which was accessible to me. I eagerly read about cybernetics, which was a fashionable word at that time, and studied everything in my reach on the 'Hodgkin-Huxley theory' of nerve excitation. By the time of my Abitur - the examination providing access to university - it was clear to me that I should become a 'biophysicist'. My plan was to study physics, and later on add biology.

In the fall of 1963, I took up the study of physics at the 'Technische Hochschule' in Munich. The Technische Hochschule, in some contrast to typical German universities had a pretty tight schedule with quite an amount of problem-oriented course work supplementing ordinary lectures. Such training was of great help for many aspects of my subsequent research work.

In 1966, I won a Fulbright Scholarship to study in the US. I had applied for this with the idea, that it might provide access to biophysics. This was, indeed, the case. During my year at the University of Wisconsin at Madison, I was fully integrated into a biophysics laboratory involved in low angle X-ray scattering. My own project, directed by Prof. W.W. Beeman, was an early attempt at producing molecular beams of macromolecules for mass spectrometry. In a little more than a year I earned a 'Master of Science' degree. With this formal conclusion of a physics education I felt ready for switching to biology. I returned to Munich in 1967 and looked around for some PhD project in biophysics, preferably related to nerve excitation. Fortunately, my search led me to the Max-Planck-Institut für Psychiatrie, where H.D. Lux was investigating synaptic mechanisms in motoneurons and ion currents in snail neurons. We readily agreed on a project on voltage-clamping snail neurons. To circumvent space-clamp problems Dieter Lux suggested to use suction pipettes for local measurement of current density.

During my years in Dr. Lux's laboratory I met [Bert Sakmann](#), who did his PhD project in the same institute. Bert was very interested in the basic neuronal mechanisms that we were studying, we had many lively discussions, and became friends. Following his interests Bert decided to go to London to work in the biophysics laboratory of [Sir Bernhard Katz](#). We met again in Göttingen in 1973, where I had joined a physical chemistry laboratory to get experience with single channel recording in artificial membranes. Bert brought with him the experience on the neuromuscular junction and it required only little discussion to agree on a collaboration, aiming at the measurement of single channel currents. In 1976, we published the first single channel records while I spent a year in the laboratory of Charles F. Stevens at Yale University. Afterwards, our heads of department, Hans Kuhn and Otto D. Creutzfeldt, established independent 'Young Investigator Laboratories' for us. This was very helpful for close collaboration, and allowed us to attract a number of excellent postdoctoral fellows: Joseph P. Patlak, Fred Sigworth, Alain Marty and Owen P. Hamill. Together we perfected the technique, and developed the different recording configurations. I feel very much indebted to these collaborators as well as to colleagues who later joined the laboratory. After 1983, my interests shifted away from the channels themselves to processes they initiate inside cells, eventually leading to a cellular response-like secretion of hormones and neurotransmitters.

Just before starting to assemble my own laboratory I met my wife, Eva-Maria - in the laboratory, of course. We married in 1978, such that my family at home, and my 'research family' grew in parallel. We now have five children: Richard (12), Benjamin (11), Carola (10), Sigmund (7), and Margret (4). My wife has given up her own scientific career and given me constant support for the benefit of my research.

Honorary degrees

- Honorary Professor, University of Göttingen 1986

- Dr. h.c., Limburgs Universitair Centrum 1988

Awards (*mostly together with Bert Sakmann*)

Nernst-Haber-Bodenstein, Award of the German Society for Physical Chemistry 1977

Feldberg Award, Feldberg Foundation, London 1979

K.C. Cole Award, Biophysical Society 1982

Harold Lamport Award, New York Academy of Sciences 1982

Spencer Award, Columbia University 1983

Adolf Fick-Preis, Universität Würzburg 1984

Louisa Gross-Horwitz Award, Columbia University 1986

Fidia Research Award Lecture, Fidia Research Foundation 1986

Schunck-Preis, Universität Giessen 1986

Leibniz Award, Deutsche Forschungsgemeinschaft 1986

Gairdner Award, Toronto 1989

Hans Hellmut Vits-Preis, Universität Münster 1990

Bristol-Myers Squibb Research Award, New York 1990

Gerard Prize, American Neuroscience Association 1991

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This autobiography/biography was written at the time of the award and later published in the book series *Les Prix Nobel/Nobel Lectures*. The information is sometimes updated with an addendum submitted by the Laureate.

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Addendum, August 1999

Honorary Degrees

Dr. h.c. University of Alicante, Spain, 1993

University of Wisconsin, Madison, Wisconsin, USA, 1993

Technical University of Munich, FRG, 1994

University of Madrid, Spain, 1994

Huazhong University of Sciences & Technology, Wuhan, PR China, 1994

University of Bahía Blanca, Argentine, 1995

University of Rome, Italy, 1996

Hebrew University of Jerusalem, Israel, 1999