Obituary


Shosaku Numa

(1929–1992)

Shosaku Numa died on February 15, 1992, of cancer of the colon at the age of 63. Numa was one of the outstanding biochemists of his time. His life was devoted entirely to science; his creative mind left us a wealth of innovative ideas and highly important discoveries. We owe him lucid examples of a most successful combination of classical biochemistry, molecular and cell biology. His achievements brought him the highest esteem from the international scientific community. Many researchers from all over the world flocked to his laboratory to participate in the most advanced studies and to grasp the spirit of this very productive institute. Despite his world-wide fame as a scientist and the many honors that were bestowed on him, he remained the modest, friendly and helpful colleague we knew from his early days in the laboratory.

Shosaku Numa was born in Kyoto, Japan, on February 7, 1929. He studied Medicine at Kyoto University under the guidance of Professor Katashi Inouye. Following a two-year Fulbright Fellowship at Harvard Medical School, Boston, with J. C. Oncley, Numa finished his education in Kyoto with a thesis on Electrophore-sis studies on serum proteins, especially in liver diseases.

In 1958, Numa joined the laboratory of Feodor Lynen, Munich, as an Alexander-von-Humboldt-Fellow to intensify his training in biochemistry. It was the time when Lynen was fully occupied with the discovery of fatty acid biosynthesis. Numa participated in this exciting endeavour concentrating his experiments on aspects of the regulation of this process. Numa’s name is associated with the crystallisation of the carboxylase and with important observation on its structure and regulation. Ten publications on acetyl-CoA carboxylase and related topics emanated from this period in Munich that lasted until 1968, interrupted only by an appointment at Kyoto University (1961-1963).

Ten years after his arrival in Munich, Numa received a call to the Chair of Medicinal Chemistry of the University of Kyoto. The honor to return to his Alma Mater and to a prestigious Medical School as Full Professor was irresistible. Despite his definite departure to Japan, he did not allow his scientific and personal ties to Munich and Germany to deteriorate. Almost every year since then, Numa came back to Germany to see his son, his Mentor Feodor Lynen and his many friends in the scientific community. This close connection was mutual: the Baye-rische Akademie der Wissen-schaften in München elected him Corresponding Member in 1979; the Max Planck Society with which he was affiliated while working with Lynen, made him a Foreign Scientific Member in 1986, the Deutsche Akademie der Naturforscher Leopoldina, Halle, a Foreign Associate 1990.

Numa’s research during the initial years in Kyoto was mainly devoted to continuing studies on the regulation of fatty acid biosynthesis by allosteric control of acetyl-CoA carboxylase.
CoA carboxylase and phospholipid biosynthesis in animal cells. However, as early as 1976 a new area of interest became apparent with his publication entitled ‘A large product of cell-free translation of messenger RNA coding for corticotropin’. One year later, he presented the evidence for this large polypeptide to be a multi-hormone precursor that yields corticotropin as well as β-endorphin (the ‘endogenous opiate’) upon limited proteolysis. 

Numa had at that time turned his interest to the molecular biology of genes encoding important signal molecules of the pituitary and the hypothalamus and, finally, to receptors of neurotransmitters and ion channels. These spectacular achievements came in rapid succession: the gene of the corticotropin-ß-lipotropin precursor, as it is now called, was incorporated in a bacterial plasmid, isolated, characterized and transcribed. Using essentially the same strategy Numa and his coworkers also succeeded in elucidating the genes encoding other opiate-like peptides and their precursors, the enkephalins A and B, β-neoendorphin and dynorphin. These brilliant successes won him the highest praise and established him among the leading biochemists of our time.

Another highlight of Numa’s team was the elucidation of all genes involved in the expression of the neurotransmitter-gated nicotinic acetylcholine receptor of skeletal muscle and the precursor molecules of its subunits. Within 15 months, his group published the primary structures of the α-, β-, γ- and δ-subunits as well as the entire ensemble of the receptor. To prove the authenticity of the analytical work, they were able to express the cloned genes and their mRNAs in Xenopus laevis oocytes and to demonstrate their correct function. In these highly involved experimental projects, Numa exhibited a singular talent as a leader and inspirator of a large group of highly motivated young scientists. The planning and coordination of the multiple tasks in molecular biology, cell biology, analytical and synthetic chemistry, immunology and electrophysiology was a marvellous performance in itself. Most researchers would be satisfied if they were able to accomplish such results once in their lifetime. Numa’s laboratory repeated that success several times throughout the 80s. To speak of ‘repetition’ indicates that people got accustomed to see him do research of the most advanced type; but it certainly does not do him and his coworkers justice. The following elucidation of the genetic structures of voltage-gated ion (sodium and calcium) channels, a cyclic nucleotide-gated rod photoreceptor channel and the G-protein-coupled muscarinic acetylcholine receptor were great accomplishments in themselves, although experience and strategic planning of the previous work was certainly helpful. Numa’s scientific activities since the late 80s were overshadowed by his sickness. Nevertheless, he did not allow himself to be subdued until the last few months. He kept his schedule in the laboratory and still accepted many invitations; his brilliance as a lecturer was evident until the end.

Professor Shosaku Numa impressed the scientific community by the continuous creativity of his mind, his willingness to approach problems on the forefront of science with full dedication and perseverance, the apparent ease with which he mastered a broad spectrum of modern experimental methods and his personal success as the leader of a large group. He was able to take full advantage of his dual training in medicine and science. He focussed his interest on problems in the overlapping area of medicine and biology and was aware of the possible clinical implications of his work. It is very likely that his discoveries will have beneficial consequences for medicine. Shosaku Numa served biochemistry actively for 35 years. The wealth of his contribution to science and, especially, his pioneering work on the molecular biology of neurohormones, receptors and ion channels will be a permanent reminder of a most successful scientist. The
impact of his discoveries was immediately realized by his colleagues. Thus, it was almost inevitable that recognition of his achievements followed in the form of prizes, honorary memberships and medals. In addition to those indicated already only a few shall be mentioned: Heinrich-Wieland-Preis 1973, Phillip-Franz-von-Siebold-Preis 1979, Erwin-von-Bälz-Preis 1982, The Asahi Prize 1983 and the Aschoff Medal 1984; Foreign Member of the Royal Society 1986, Foreign Associate of the National Academy of Sciences of the United States of America 1991. The nomination as Person of Cultural Merit bestowed on him by the Emperor of Japan shortly before his death was certainly the most precious reward to Shosaku Numa.

The scientific community of the world owes much to Shosaku Numa. With sincere sympathy for his son and close relatives and in deep sorrow at the deceased friend and colleague, we acknowledge that we have lost one of the most outstanding biochemists of this century.

Karl Decker Freiburg i. Breisgau

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Decker
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