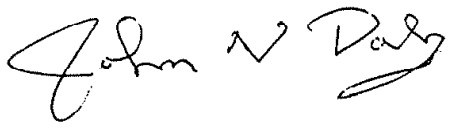
YUICHI KANAOKA
A Pioneer in Chemical Biology

Yuichi Kanaoka received his bachelor's degree from the University of Tokyo in 1950, where he began his impressive scientific career, initiated in studies on heterocycles with the late eminent chemist Shigehiko Sugasawa. His interest in nitrogen-containing heterocycles then continued in 1956 at Hokkaido University, where he spent thirty-five years as first an Instructor, then an Assistant Professor, and finally as Professor and Dean. Professor Kanaoka came to the Laboratory of Chemistry at the National Institutes of Health (NIH) in Bethesda, Maryland in 1959 for one and a half sabbatical years as a Visiting Associate in the group of Dr. Bernhard Witkop. At NIH his interest in small molecules as invaluable probes for biological processes was strengthened. It was my great fortune to share a laboratory with Yuichi Kanaoka during those years and I came to know him as a friend, a scientific colleague, and as a dedicated tutor to Dr. Witkop, concerning the Japanese Language. His contacts with scientists made at NIH continued over the years. Indeed, Dr. Witkop continued to collaborate with Professor Kanaoka over the following three decades resulting in nearly a dozen joint publications, including discoveries of unique photo-chemical reactions, pioneered by Professor Kanaoka. X-ray crystallography by Dr. Isabella Karle of the Naval Research Laboratories played an important role in such collaborations. Another member of Witkop's group, Dr. William Lawson was later to collaborate with Professor Kanaoka in inhibition of trypsin-like proteases. And I in studies initiated at NIH with Professor Kanaoka published a study on synthesis and physiological disposition of neurotoxic 6-hydroxy-catecholamines. But my

contacts with Professor Kanaoka as a friend and scientific colleague have continued to the present time. Over the years, so many have benefited and appreciated the talent, creativity and commitment to science of Professor Kanaoka. He has provided a rich legacy of scientific breakthroughs in applying chemistry to the solution of the biological processes that form the basis for the function of all living organisms. He has also influenced and mentored so many scientists over his career.

An underlying theme of Professor Kanaoka's impressive career has been the introduction of creative new ways that a chemist can develop new probes and strategies for investigating life processes. His early development of maleimido-derivatives that undergo facile reaction with thiol groups of proteins provided highly fluorescent probes for specific enzymes and other cellular proteins. That was but one of many such pioneering developments. Another was his development of amidinophenyl esters as selective agents for acylation and study of active sites in trypsin-like proteases. Over the years, his pioneering studies on photochemical reactions led to facile synthesis of many unique heterocycles. But it was his interest in ion channels that led to incredible breakthroughs. Dr. Kanaoka and colleagues played a key role in the definition of the primary structure of the voltage-sensitive sodium channel in collaboration with the group of the late Professor Shosaku Numa. This monumental achievement for such a massive ion channel (260 Kdaltons) was revealed to the world in a publication in Nature in 1984. Professor Kanaoka continued to make major contributions to ion channel structure, designing and utilizing photo-affinity probes based on the presence of trifluoromethyl-phenyl diazirine moieties.

Professor Kanaoka over a career spanning five decades has left a rich heritage of chemical approaches and probes for investigating biological functions and a richer understanding of photochemical processes, and has had a profound effect on the careers of many scientists in Japan and the world. His pioneering work has truly epitomized what is currently termed "Chemical Biology", namely how the knowledge and creativity of a chemist can be applied to solve fundamental biological problems with a resulting major impact on biomedical research. It has been an honor to have been associated with Professor Kanaoka from those early years in which we shared a laboratory at the National Institutes of Health until now when I share in honoring him on his seventy-five birthday.



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