Professor Alain Krief

A Tribute

Alain Krief was born in Tunis on December 13th, 1942. He studied chemistry at the University "*Pierre et Marie Curie*" in Paris where he completed his Ph.D. entitled "*Cycloaddition of ynamine with α,β-unsaturated carbonyl compounds*" in 1970 under the supervision of the late Professor Jacqueline Ficini. A CNRS Research Associate Fellowship allowed him to move to Harvard University in 1970 for a postdoctoral stay in the laboratory of Professor Elias J. Corey where he worked, together with Professor Hisashi Yamamoto, on sterol biosynthesis and in particular on the conversion of des-6-methyl-2,3-oxido-squalene to 19-lanosterol by 2,3-oxidosqualene sterol cyclase. After a 10 months stay in the United States, he returned to Paris where he pursued the study of the cycloaddition of ynamines and, in parallel, started to work on the reactivity of sulfur ylides on imine, cyanoimine and sulfonylimine derivatives. In 1972, he applied for a position at the "*Facultés Universitaires Notre-Dame de la Paix*" in Namur, Belgium, where he became Associate Professor in the new Laboratory of Organic Chemistry. He was then promoted to Full Professor in 1975.

From the beginning, Professor Krief has focused his research on several different topics. One of his favourite themes was, and still is, the elucidation of the mechanism of sterol biosynthesis, as a follow-up of the work undertaken during his postdoctoral stay. This remarkable work, which resulted in the development of several new synthetic methodologies, was awarded the Prize of the French "*Académie des Sciences*" in 1985.

Frequent contacts in the seventies with Roussel-Uclaf led him to start work on the synthesis of pyrethroid derivatives and chrysanthemic acid in particular. From 1976 until recently, he reported an impressive series of viable synthetic routes towards this fascinating small molecule characterized by several synthetic challenges. The construction of this three-membered ring as well as the control of the relative and absolute stereochemistries were studied in detail using various methodologies starting from either natural compounds such as tartaric acid or simple olefinic derivatives and involving a diversity of isopropylidene transfer reagents such as phosphorus and sulfur ylides or the more economically viable α-metallonitroalkanes and α-

metallosulfonylalkanes. Several patents filed together with the leading industries in the field demonstrate the great interest of these methodologies from an industrial perspective. Within that framework, elegant and useful strategies directed towards the synthesis of cyclopropanes have also been developed. More recently, Professor Krief began work in the field of monoclonal antibodies and became interested in the synthesis of pyrethroid-derived haptens and the subsequent production of antibodies, used as biocatalysts, directed towards the right chrysanthemic acid stereoisomer.

One remarkable event in the career of Professor Krief was the fortuitous discovery of an old box of powdered black metallic selenium on a laboratory shelf soon after his arrival in Namur. Working on the reactivity of sulfur ylides at that time, he naively thought to simply replace sulfur by selenium in order to increase their reactivity and therefore prepared the first selenium ylides starting from selenonium salts. These first experiments were the starting point of 35 years of noteworthy achievements and successes in the field of selenium chemistry for which he is now considered as one of the pioneers. Since the beginning of his tenure, he has contributed to demonstrate the high value of selenium in organic synthesis either by exploring new or re-exploring old reactions involving selenium as well as their intimate mechanism, by taking advantage of the peculiar reactivity of selenium-containing molecules such as β-hydroxyselenides or selenoxides, by using selenides as smooth precursors of organolithium derivatives - by selenium-lithium exchange - or by studying the reactivity of selenium-containing species such as selenolates or selenocyanates.

Professor Krief has always promoted the use of inorganic reagents in organic synthesis. For example, bromoazide, diphosphorus tetraiodide, phosphorus triodide, osmium tetroxide, beryllium dichloride, disodium or dilithium diselenide, samarium diiodide have proved attractive in several key reactions where classical procedures proved less successful.

Recently, initiated an ambitious project aimed to the development of an electronic encyclopaedia of organic syntheses involving the creation of communication tools, of an electronic chemistry dictionary, of an original search engine, of chemistry ontologies and of a suitable database. This initiative has been awarded by the "*International Prize Wernaers for Research and Broadcasting of Knowledge*" in 1999.

Professor Alain Krief has been a member of the organic and inorganic division of the "*Fonds National de la Recherche Scientifique*" in Belgium for more than 20 years due to his high expertise in synthetic organic chemistry. He also acts as an expert for several prestigious associations: the CNRS in France, the European Community, the Third World Academy of Sciences and the Petroleum Fund of the American Chemical Society. He was elected as President of the Royal Society of Chemistry in 1993. He is an esteemed member of the editorial boards of many international journals such as "*Synlett*", "*Russian Journal of Organic Chemistry*", "*Sulfur Reports*" and "*Mini Reviews in Organic Chemistry*".

He has been invited as visiting professor in more than 14 universities worldwide and has given more than 230 lectures at congresses and symposia or in universities and industries.

He has organized and been chairman of several congresses of international renown such as the "Belgian Organic Synthesis Symposium or BOSS" or the "European Symposium on Organic Chemistry" and has been chairman of the 40th Bürgenstock Conference in 2005.

Professor Krief is a respected scientist with a long and impressive publications list. He is the author of over 335 original scientific publications including patents and review articles.

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Selected Papers

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