Petar Alaupovic
The Father of Lipoprotein Classification Based on Apolipoprotein Composition

Frank M. Sacks, H. Bryan Brewer

Petar Alaupovic, an internationally renowned biochemist and lipidologist, died on January 30, 2014, in Oklahoma City at the age of 91 years. Dr Alaupovic was a founder of the modern field of lipoproteins whose ideas continue to have an impact on its development. He performed research and taught at Oklahoma Medical Research Foundation since 1960.

In 1964, Dr Alaupovic proposed a revolutionary new classification system for lipoproteins. Until that time, the classification of lipoproteins focused on the physical properties of lipoproteins, emphasizing the lipid component and the size of the lipoprotein particle. However, Dr Alaupovic considered the protein part to have great biological importance that directed every step in the metabolism of lipoproteins and determined their effects on atherosclerosis. When he began his research on lipoproteins, there were considered to be just 2 apolipoproteins, apolipoprotein B and apolipoprotein A. Using immunologic and protein chemistry techniques, he isolated and characterized several additional apolipoproteins associated with lipoproteins. He proposed the ABC nomenclature for apolipoproteins, which initially included apolipoproteins A-I, A-II, B, C-I, C-II, C-III, D, and E. Most important to the subsequent progress in the field of lipoprotein, he subdivided the major lipoprotein classes, apolipoprotein A-I and apolipoprotein B lipoproteins, according to their content of other apolipoproteins that, although not required for their formation and secretion, confer specific crucial functions to lipoproteins. Thus, a second major change in his classification system from the prevailing view of lipoproteins at that time was the concept that there were separate and distinct lipoprotein particles or families with defined apolipoprotein composition within the major density classes of very-low-density, intermediate-density, low-density, and high-density lipoproteins. Dr Alaupovic hypothesized that apolipoprotein E and the apolipoprotein Cs are not randomly scattered among all the apolipoprotein B and apolipoprotein A-I lipoproteins but are focused on specific subfractions that comprise a percentage of the total. He divided apolipoprotein B into lipoprotein B:E (containing apolipoproteins B and E), lipoprotein B:C-III (containing apolipoproteins B and C-III), lipoprotein B:E:C-III (containing apolipoproteins B, E, and C-III), and lipoprotein B (containing apolipoproteins B, but not apolipoprotein E or C-III). Dr Alaupovic showed that these lipoprotein subtypes have specific functions and relation to atherosclerosis. Thus, Dr Alaupovic conceived the concept and demonstrated the biological and clinical importance of lipoprotein speciation.

These radical changes in the concepts of the heterogeneity of plasma apolipoproteins and lipoproteins and the need for the development of a new classification system for lipoprotein particles were only slowly accepted. Despite initial resistance to Dr Alaupovic’s new concepts of apolipoproteins and lipoprotein particles or families, he persevered and the lipoprotein field has gradually understood the classification system for apolipoproteins and lipoprotein particles, and his review in Methods in Enzymology is a classic in the lipoprotein field. His classification system has become adopted by scientists and clinicians around the globe. Dr Alaupovic’s legacy extends to a growing number of research groups that are building on his work by studying intensively the action of apolipoproteins and the basis for speciation of apolipoprotein B and apolipoprotein A-I lipoproteins.

Petar Alaupovic was born August 3, 1923, in Prague, Czechoslovakia. He and his family of 2 brothers moved to Zagreb, Croatia, where he attended elementary and high school under the tutelage of his grandfather, Tugomir Alaupovic, an accomplished poet and politician. In addition to pursuing his studies, he was an accomplished athlete in soccer, water polo, and cross-country skiing. In 1947, Alaupovic married his beloved Alexandra, who later became an internationally known artist. He and Alexandra were together for 65 years until her death on January 2, 2013. Betsy, their only child, was born in 1949. In 1956, Alaupovic received his PhD in Chemistry at the University of Zagreb. In 1957, Dr Alaupovic accepted a research fellowship at the University of Illinois, and he immigrated with his wife and daughter to the United States. In 1960, Dr Alaupovic accepted a position in the Cardiovascular Section at Oklahoma Medical Research Foundation. In 1964, Dr Alaupovic and his family became US citizens. Dr Alaupovic’s contributions to the field of lipoproteins will remain as a model for young scientists to understand the challenges and persistence that are required to advance science. During his 53-year career at Oklahoma Medical Research Foundation, Dr Alaupovic remained passionate about the importance of apolipoproteins and lipoprotein particles in the development of cardiovascular disease and as a target to reduce heart disease. Although he retired at the age of 88, he continued to go to his office each day to work on articles and reviews. Throughout his career, and especially...
in his later years, Dr Alaupovic extended the application of lipoprotein particle types to gain insight on diseases other than cardiovascular disease. Remarkably, his bibliography includes 9 research publications in 2013. Dr Alaupovic was appreciated by all for his warmth, kindness, and complete sincerity.

Dr Alaupovic was a frequent lecturer throughout the world and received numerous awards and honorary degrees during his career. He published >330 scientific papers. During his career, he supervised >20 PhD candidates and 72 postdoctoral fellows. Numerous current experts in lipoproteins and atherosclerosis had the privilege of spending time during their career in Oklahoma City with a memory of excellent science and unforgettable wine-testing with Pierre and Alexandra as the consummate hosts. Dr Alaupovic received numerous awards including the prestigious Distinguished Career Scientist Award from the Oklahoma Medical Research Foundation; honorary doctoral degree from the University of Lille, France; honorary diploma from the National University of La Plata, Argentina; honorary doctoral degree from the University of Buenos Aires, Argentina; honorary doctoral degree from the University of Goteborg, Sweden; and Special Recognition Award from the Council on Arteriosclerosis, American Heart Association. Dr Alaupovic had a remarkable scientific career during which he not only established a new paradigm, lipoprotein classification based on apolipoprotein composition, but also directly touched the lives and careers of innumerable trainees and colleagues.

Dr Alaupovic is survived by his daughter Betsy Alaupovic Hyde in the Oklahoma City and 2 grandsons: Homer Clark Hyde and his wife Aga in Chicago, and Robert Alexander Hyde and his wife Mary in Cleveland, OH.

Disclosures

None.

Select Publications From a Total of 255 Listed in PubMed


29. Alaupovic P, Hodis HN, Knight-Gibson C, Mack WJ, LaBree L, Cashin-Hemphill L, Corder CN, Kramsch DM, Blankenhorn DH. Effects of...
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