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Geometrical isomers of unsaturated fatty acids as markers of free radical stress

An increasing number of studies explore the presence of trans fatty acid moieties in living systems. Trans fatty acids are well known to have an exogenous origin, since those present in the diet can be incorporated in tissues. Their biological role and adverse health effects have been largely studied. However, some trans fatty acid residues found in humans can only be formed through an endogenous transformation of the naturally occurring cis structures, and their presence has been correlated with free radical stress produced during physiological and pathological processes.

The biological consequences of the free radical production are the central subject of a very lively scientific debate, focusing on the estimation of the type and extent of damage, as well as the efficiency of the protective and repair systems. Research is ongoing to establish the biological effects of free

radical-catalyzed transformation of lipids from cis to trans configuration, together with the overall effect of radical stress within the body, focusing on the consequences for membrane structures, lipid metabolism and enzymatic processes.

Functional lipidomics can monitor the changes of the lipid status in living organisms, and individuates the relationship also with free radical stress and metabolic situations. This is an important approach for developing diagnostic tools and health care products, which has been applied to an entrepreneurial initiative at CNR in Bologna (www.lipinutragen.it). An overview of the lipidomic approach applied in the company and referred to the metabolic and functional status of cell membranes is presented, including the development of medical diagnostic tools and an innovative consulting for nutraceutical companies.

Biography

Chryssostomos Chatgialloglu (born 1952) received the doctorate degree in chemistry from the University of Bologna in 1976 and has completed his postdoctoral studies from York University (UK) and National Research Council of Canada, Ottawa. He is research director at Consiglio Nazionale delle Ricerche and president of the spin-off company Lipinutragen. He has published more than 250 papers and has been invited speaker over 190 times at congresses and institutions.