

Editorial



The present special issue of Molecular Nutrition & Food Research is focused on scientific progress regarding dietary carotenoids and their role in sustaining human health or preventing the development of degenerative disorders. It was initiated to cover selective aspects of recent research activities in this area, however, the list of topics is not intended to be exhaustive and not all strains of new developments could be addressed.

According to the scientific alignment and tradition of the journal the major focus of the contributions relate to basic research in chemistry, nutritional biochemistry and molecular biology also evaluating nutritional and clinical effects of food constituents, particularly carotenoids but also with increasing importance their non-vitamin A metabolites and breakdown products.

Dietary intake of carotenoids has been associated with a decreased risk for cancer, cardiovascular events, ophthalmological disorders, and age related cognitive diseases. Intervention with carotenes and xanthophylls was used to ameliorate the symptoms of severe skin diseases and successfully applied to prevent UV-induced skin damage. β -Carotene and to some extent other provitamin A carotenoids are important sources for retinol and contribute to our vitamin A supply, although the contributing fraction and conversion factors are still a matter of debate.

Carotenoids are efficient antioxidants quenching excited state molecules and scavenge other reactive oxygen species including peroxy radicals. Their antioxidant properties have been related to beneficial health effects although the concept was challenged in

the last decade and possible prooxidant activity of carotenoids in-vivo has been discussed. Several trials with β -carotene and other antioxidants were performed to prove their cancer preventing efficacy but none of the completed trials provided sufficient evidence yet. The lack of success may be attributed, among other factors, to an incomplete understanding of the antioxidant network and interplay of various antioxidants, factors that modulate the bioavailability of provitamin A and non-provitamin A compounds, their metabolism, and their impact on cellular signaling.

Vitamin A, especially retinoic acid related pathways, represent important if not major mechanisms underlying the biological efficacy of carotenoids, however, also other regulatory effects have been demonstrated. At the molecular level other target proteins (except the retinoic acid receptors) have been identified and recent interest has also focused on biologically active metabolites of non-provitamin A carotenoids. They may affect electrophile, or rather prooxidant sensitive signaling thereby triggering the expression of secondary defense systems.

Another center of interest in recent years related to carotenoids and diet was stimulated by the

identification of the genes coding for carotenoid cleaving enzymes. Together with an improved understanding on the implication of transport proteins for the uptake of lipophilic compounds and their incorporation into lipoproteins biokinetic properties

of carotenoids, individual responses and non-responses are now understood and represent an important area of personalized nutrition.

The present compilation of papers and reviews shows that currently significant new views are developing regarding the contribution of carotenoids to human health and the mechanisms underlying their preventive role in degenerative diseases. Such new concepts will hopefully stimulate further research on dietary carotenoids.

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*“... scientific progress
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