

Editorial

Plastid-derived Natural Products of Medicinal Use – (Part I)

Plastids have a tremendous evolutionary, structural, functional and metabolic diversity. However, the contribution of plastids to the synthesis of medicinally or nutritionally active compounds is only sporadically or marginally discussed. Even plant biologists tend to prioritize studies on the primary metabolism of chloroplasts, first of all photosynthesis and related autotrophic processes, and their relation to plant stress, while other metabolic activities and plastid types are in general much less studied. In spite of existing data about the synthesis of specific economically important molecules in distinct plant species or general reviews about their biosynthesis, comprehensive overview of these compounds and processes outlining the various roles of plastid biology in human health and nutrition are very scarce. In addition, most plant biologists are reluctant to analyze data related to *in vitro* or *in vivo* pharmacokinetic, pharmacological and medicinal studies. With these two Thematic Issues we provide an original, gap-filling and broad multidisciplinary compilation of data obtained by basic and applied science about the important plastid-derived primary and secondary metabolites for a large public (students, university teachers, scientists and decision makers working in plant biology, agriculture, medicine and the pharmaceutical industry).

Reviews written by leading scientists cover plastid fatty acid and lipid metabolism; tetrapyrrole and carotenoid biosynthesis; shikimate and phenylpropanoid pathways (including vitamins E, K and B9 and lignans); the biochemical routes leading to the formation of vitamins B1, B2 and B3; terpenoids (more specifically diterpenoids and cannabinoids) and lysine-derived alkaloids. The occurrence, structure and biosynthesis of these metabolites, their relation to plastid structure and human health are also carefully reviewed. It should be noted, however, that in many cases not only the plastid but multiple compartments are involved in the production of these metabolites and that several other plastid-derived medicinally important compounds are not discussed due to space limitations. Additionally covered topics include the potential use of genetically transformed plastids as biofactories to produce oral vaccines and other pharmaceuticals, as well as a review about plastid vesicle transport and how its better understanding may provide benefit for human medicine.

These two Special Issues were made possible only by the enthusiasm and hard work of the authors. I also owe great thanks to the anonymous reviewers for their valuable contribution (in general 3 experts have reviewed all papers). These two Special Issues are dedicated to Dr. Áron Keresztes (Eötvös Loránd University) on the occasion of his 75th birthday. This work was supported by the János Bolyai Research Scholarship of the Hungarian Academy of Sciences to K.S.

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