

C06 A novel theory as a gift for the centenary vitamin E and to explain where have all the dietary tocotrienols gone

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It is known well since about half a century ago that, in many studies comparing with tocopherols particularly the α -tocopherol, oral supplementation of tocotrienols by animals and humans consistently showed very low bioavailability and undetectable in some organs 12 hours after dosing or fasting, existing antioxidant and non-antioxidant theories are inconclusive to explain why the tocotrienols were mostly disappeared. Despite low levels of plasma tocotrienols were always correlatively presumed to in vitro effects and extrapolated to various benefits, dosage efficacy of tocotrienols attempted for treatment of diseases remained puzzling. Fundamental homeostasis theory encompassing several principal chemical species is introduced to elicit the physiological roles of vitamin E, including homeostasis of radicalization and beyond the commonly known oxidation-reduction processes of lipids, it attempts to explain some regulatory functions of tocotrienols more broadly as compared to tocopherols, and to account for the disappearance of dietary tocotrienols. Applications of new concepts in the mechanisms of vitamin E's actions will open up some new directions of research for tackling various metabolic and chronic diseases. As long as the bizarre problems of low bioavailability using highly pure tocotrienols are still unresolved, clinical evaluation of their therapeutic efficacy will remain a great challenge in the vitamin E research, certainly, the biochemistry and chemistry fundamentals will be important core issues in the future exploration. Vitamin E, functioning as an excellent anti-inflammatory factor, may serve as a target therapeutic or nutrient in fighting against the COVID-19 infection or long covid syndrome and post-vaccination symptoms. Strategies with strong scientific basis emphasizing on chemistry and biochemistry fundamentals are definitely also needed to fight against non-communicable diseases. This paper will also discuss some electron spin resonance (ESR) results which showed that γ -tocotrienol and δ -tocotrienol have some better beneficial antioxidant activities than α -tocotrienol and α -tocopherol which form more stable radicals.