Pharamceutical Biology, 48(3) :306-317

Modeling of the in Vivo Kinetics of Antioxidants Delineates Suitable Parameters for Selecting Potential Antioxidant Adjuvants for Cancer Therapy

Yang, Ming-Hua; Chuang, Chao-Ming; Hsieh, Chiu-Lan; Wang, Hui-Er; Chen, Kuan-Chou; Chiu, Wen-Ta; Shih, Chun-Ming; Peng, Robert Y.

Abstract

To find in vivo behaviors of an antioxidant when used as an adjuvant cancer therapy, a more detailed integrated pharmacokinetic scheme is needed. Major reaction parameters associated with the sequential routes from ingestion to decay of an antioxidant were used in mathematical analysis, which included absorption rate coefficient k(a), quenching rate coefficient of the antioxidant k(q1) and tissue quenching rate coefficient k(r). The model was then treated with computer simulation using cited decay rate coefficients and some assumed parameters. When intestinal absorption rate coefficient k(a) becomes larger, retention time of antioxidant in plasma would be prolonged. moreover, k(a) had no effect on either quenching ability of antioxidants or tissue recovering capability. in quenching plasma ROS, the larger the quenching coefficient k(q1), the shorter peak- and the life-times would be for the secondary free radicals that are formed in primary quenching. Conclusively, it is suggestive to prescribe an antioxidant therapy with an appropriate values of k(a) and larger values of k(q1).

Key words：Therapeutic behaviours; Quenching; Complementary therapy; Cancer