Synthetic antioxidants; an alternative pathway for therapy of age-related diseases

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As a result of aerobic life style, cells are constantly exposed to increasing levels of reactive oxygen species. When the production of these reactive molecules overwhelms cellular antioxidant systems, an oxidative stress is generated. Interestingly enough, ageing a normal and inevitable cellular process has also been associated with oxidative stress. Currently, a great number of severe diseases such as cancer and neurodegenerative disorders have been considered as age-related diseases. Synthetic and natural antioxidants have been used in an attempt to counteract the side effects of these diseases. Thus, development of synthetic antioxidant has come into focus as new alternative to alleviates organisms against oxidative stress and ageing. We have been investigating the synthetic metallo Fe(III), Cu(II), Mn(II), Ag(I) compounds, which mimics catalase and superoxide dismutase enzymes decomposing hydrogen peroxide and superoxide anion. These synthetic mimics prevent the harmful effects of H_2O_2 in *Saccharomyces cerevisiae* and *Galleria mellonella* models of study, by decreasing the level of lipid peroxidation and increasing tolerance. These compounds are also involved in life span extension of *Saccharomyces cerevisiae* during ageing. Given the antioxidant activity of some of these compounds, we are also interested to search the therapeutical potential against neurodegenerative diseases such as aggregation of alpha-synuclein, related to the toxic events of Parkinson disease. Altogether, our results indicate that these synthetic antioxidants are a promising alternative as anti-aging and anti-neurodegenerative diseases.

Keywords: Synthetic antioxidants, *Saccharomyces cerevisiae*, *Galleria mellonella*.