

Oxidative stress and aging: studies on an ultraoctagenarian population living in Orria (SA)

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The role of the free radicals in aging has been in center of research for long years. It is assumed that with advancing age, damaging effects of oxygen free radicals might be accumulated in the organisms on all components, especially on the DNA and the mitochondria. In addition, because of the decreased efficiency of the antioxidant systems, the oxidative mechanisms prevail in numerous age-dependent diseases, such as the arteriosclerosis, Parkinson and Alzheimer diseases. The present study was aimed at revealing an eventual correlation between the oxidative balance and nutritional profile and/or psychopathological status in an ultraoctagenarian population living in a small country, Orria (SA) at home, by means of routine specific serum tests, such as d-ROMs test and BAP test.

16 on 24 (total population) ultraninety-years-old subjects (2.36%), 1 of them was institutionalized and 15 living outside the institutes were studied. 9 (56%) were females and mean age was 93.4 (SD 2.44) years. 16 ultraoctagenarian subjects, 1 of them were institutionalized and 15 living outside the institutes. Serum total oxidant capacity was determined by performing the d-ROMs test (2), which chemical principle is based on the ability of a biological sample to oxidize N,N-diethylparaphenylenediamine (normal range 250-300 CARR U, where 1 CARR U is equivalent to 0.8 mg/L H₂O₂), while serum total antioxidant capacity was assessed by means of BAP test, which measures the ability of a serum sample to reduce iron from the ferric to the ferrous ionic form (optimal value >2200 micromol/L reduced iron). The psycho-physical state of the subjects was estimated by means of the mini mental state examination (MMSE), activities of daily living (ADL) and instrumental activities of daily living (IADL). The nutritional state and the physical activity of the subjects were evaluated through the mini nutritional assessment (MNA). All studied parameters underwent a correlation analysis of Pearson.

Statistically significant negative correlation was found between the free radical levels and the cognitive performance ($p < 0.0001$), as well as the levels of autonomy and autosufficiency, the physical activity in the total population ($p < 0.01$). These correlations were even more expressed in the institutionalized subjects. Statistically significant positive correlation seems to exist between the free radical levels and the nutritional status ($p < 0.001$).

The levels of oxygen free radicals were higher in the former group, indicating a stronger oxidative stress, influencing the psychophysical state of the elderly subjects. This may have negative consequences on the quality and duration of the life. It is difficult to define the exact role of free radicals in the determination of aging pattern, but they may be considered without any doubt as true 'markers' of an enhanced oxidative stress, accompanying a non-successful aging process.