

TITLE: THE OXIDATIVE STRESS ON AGING MAY BE ASSOCIATED TO SUSCEPTIBILITY TO LEPROSY PATHOGENESIS.

AUTHORS: SILVA, P. H. L.; LEAL, J. M.; CASTRO, K. K. G.; FLORES, G. O.; LARA, F. A.; ESQUENAZI, D. A.

INSTITUTION: LEPROSY LABORATORY, OSWALDO CRUZ FOUNDATION – RIO DE JANEIRO (AVENIDA BRAZIL, 4365, MANGUINHOS, CEP 21045-900 – RIO DE JANEIRO – RJ, BRAZIL).

ABSTRACT:

Leprosy is a chronic infectious disease caused by *Mycobacterium leprae* which affects skin and peripheral nerves causing physical and sensitive/motor injuries to patients. The leprosy's prevalence is higher in adult young people (20 - 40 years), but the cases in older patients (≥ 60 years) are increasing. Factors like immunosenescence and oxidative stress may be associated to the susceptibility to leprosy infection during aging, because the increment of reactive oxygen species (ROS) and their accumulation impair the immunological response mediated by T cells. This study analyzed the frequency and activity of ROS in blood and skin samples from patients with leprosy (young and old) and healthy volunteers (young and old). This analysis was made by the quantification of carbonyl proteins, produced by oxidation of proteins, and 4-hydroxynonenal (HNE), a product of lipid peroxidation. The carbonyl content of the serum samples was detected by the 2, 4-dinitrophenyl-hydrazine (DNPH) colorimetric method, while the indirect immunofluorescence was used to quantify the HNE on skin lesions. The frequency of carbonyl content was higher in older groups than young patients (median of old patients was 35,81 nmol/mL and young was 30,15 nmol/mL, $P=0,0045$). Furthermore, we observed that reduction of bacillary load during and after multidrug therapy was linked with an increase of carbonyl content. This finding suggests that the *M. leprae* can control the oxidative stress to its survival. The presence of HNE on skin lesions was higher in older than younger patients, mainly in multibacillary patients, where 48% of skin cells was positive to HNE in seniors, while only 26% was positive in young patients ($P<0,0001$). Taken together, our results showed that there are higher ROS levels and oxidative lesions in old patients, considering carbonyl proteins and HNE quantifications. Therefore, the activity of ROS on T cells can provoke reduced immune response to *M. leprae*, and this fact can contribute to create conditions for the bacilli proliferation and old people illness.

Keywords: leprosy, ageing, oxidative stress, T cell, ROS.

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