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Commentary

Biological Psychological and Social Determinants of Aging

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ABOUT THE STUDY

Aging is associated with progressive molecular and structural changes that result in the loss of function of multiple organs. There is a general hypothesis that very old people will undergo major changes when different areas (immunity, metabolism, cognition) lose the close functional connections that exist in the young body. However, it is not clear how this interdependence is affected in the very early stages of aging and whether gender plays a role. Therefore, our goal was to evaluate some biological markers of institutionalized healthy individuals at the very early stages of aging (60-65 years, female and male).

Blood was drawn and serum creatinine, albumin, and glucose were measured. In addition, the lymphocyte phenotypes (TCD4+, TCD8+, CD19+) of these individuals were evaluated by flow cytometric of peripheral blood mononuclear cells. In the early stages of aging, it has been observed that men have higher serum creatinine and albumin levels than women. In addition, males had a high proportion of effector memory CD4+ and CD8+ T cells and a low proportion of naive CD8+ T cells. No difference was observed on B cells. These results suggest that men's metabolic function and immune system are impaired very early in aging, so gender differences need to be considered when developing new therapies for the elderly.

The continuous aging process of nature is associated with some changes in living organisms. It is difficult to pinpoint exactly when the aging process begins, in developing countries people after the age of 60 are called the elderly, and in developed countries the elderly are people over the age of 65. Healthy aging appears to be associated with less burden of chronic illness, and above all, maintenance of immune system function.

Several factors are involved in the process of aging, and recently, infections, chronic illnesses, and deaths are more common in older men, suggesting that gender influences the progression of aging. Many authors report aging changes in T lymphocytes with the accumulation of highly differentiated T cells and the depletion of naive cells. B lymphocytes in the elderly show reduced antibody specificity, affinity, and iso type switch. These changes are associated with reduced protection against new infectious agents and inefficient responses to vaccines.

The decrease of naive along with the accumulation of highly differentiated T cells have been explained by the decrease in thymic output and higher susceptibility of naive T cells to apoptosis after antigen activation. Infection and malignancies have also been associated with the increase of effector memory T cells.

Another important event related to changes in immune system during ageing is the declined function of hematopoietic stem cells which is characterized by impaired lymphopoiesis and enhanced myelopoiesis. This event could favor the expansion of Myeloid-Derived Suppressor Cells (MDSCs) which have been shown to be increased in ageing individuals.

MDSCs have been associated with inflammatory conditions such as infections and cancer and could contribute for the suppressive state observed in ageing individuals. It has been reported that the age-related decrease of naive T cells and increase of T effector memory in peripheral blood also occurs in bone marrow. These findings suggest that the increase of homeostatic cytokines (i.e. IL-15) during ageing favors the survival an expansion of memory instead of naive cells.

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