Age-related impairment of human T lymphocytes' activation : specific differences between CD4(+) and CD8(+) subsets

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The relevance of physiological immune aging is of great interest with respect to determining disorders with pathologic immune function in aging individuals. In recent years, the relevance of changes in peripheral lymphocytes in age-associated neurologic diseases has become more evident. Due to the lack of immunological studies, covering more than one event after mitogenic activation, we envisaged a new concept in the present study, aiming to investigate several events, starting from T cell receptor (TCR) ligation up to T cell proliferation. In addition, we addressed the question whether changes are present in the subsets (CD4, CD8) with aging. Phosphorylation of tyrosine residues declines with increasing age in CD4(+) cells. Fewer levels of CD69 positive cells after 4 h mitogenic activation, altered expression of cytokines (IL2, IFN-gamma and TNF-alpha; 22 h) and lower proliferation (72 h) were determined in aging. Moreover, it could be shown that CD8(+) lymphocytes react more effectively to mitogenic stimulation with reference to CD69 expression and proliferation in both age groups (<35 and >60 years old). These data indicate that T cell activation, mediated by TCR engagement, is significantly impaired in aging and both subsets are affected. However, bypassing the TCR does not fully restore T cell function, indicating that there are more mechanisms involved than impaired signal transduction through TCR only. The results will be discussed in relation to their relevance in neurodegenerative and psychiatric disorders.

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