

**T CELL RECEPTOR PROXIMAL EFFECT OF VITAMIN E SUPPLEMENTATION IN OLD MICE: REVERSAL OF THE AGE-ASSOCIATED DECREASE IN EFFECTIVE IMMUNE SYNAPSE FORMATION IN CD4+ T CELLS**

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Aging is associated with impairment of T cell function. We demonstrated that in vitro and in vivo vitamin E (E) supplementation improves the immune response of old mice by enabling their T cells to produce more IL-2 and progress through the cell cycle. Recently we showed that age-associated declines in T cell signaling were due to the inability to form effective immune synapses (IS) at the site of T cell receptor and antigen interaction. Thus, we hypothesized that with a direct effect on proximal receptor signaling at the cell surface, E supplementation of old CD4+ T cells enhances effective IS formation through increased translocation of signaling proteins Vav, LAT and Zap-70. Using confocal microscopy we found that when exposed to antigen presenting cells, CD4+ T cells from old mice have lower percentage of effective IS compared to those of young mice (Vav  $18 \pm 1.8\%$  versus  $36 \pm 4.4\%$ ; LAT  $12 \pm 0.8\%$  versus  $27 \pm 4.5\%$ ; Zap-70  $11 \pm 0\%$  versus  $30 \pm 0\%$ , respectively). Furthermore, we show that in vitro and in vivo E supplementation increases the percent of old CD4+ T cells capable of forming functional IS [in vitro: Vav  $18 \pm 1.8\%$  versus  $38 \pm 5.5\%$ ; LAT  $12.3 \pm 0.9\%$  versus  $40 \pm 5.8\%$ ; Zap70  $14 \pm 2.0\%$  versus  $26 \pm 2.8\%$  ( $p \leq 0.05$ ) and in vivo: Vav  $19 \pm 1.6\%$  versus  $38 \pm 2.5\%$ ; LAT  $18 \pm 1.6\%$  versus  $32 \pm 3.4\%$  ( $p \leq 0.05$ ); Zap70  $16 \pm 1.3\%$  versus  $27 \pm 4.7\%$  ( $p \leq 0.10$ ) in control and E groups, respectively]. Further studies are underway to determine the mechanisms of age and E-induced enhancement of effective IS formation.

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