ELEVATED EXPRESSION OF CXCL AND CCL CHEMOKINES AND THEIR RECEPTORS IN HEALTHY ADULTS WITH SIGNS OF IMMUNOSENESCENCE

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Immunological aging is characterized by chronic low-grade inflammation and altered immune cell dynamics. Chemokines from the CXCL and CCL families, along with their respective receptors (CXCR and CCR), are crucial regulators of immune cell trafficking and inflammatory responses. This study aimed to evaluate the expression of chemokines in healthy adults with and without features of immunological aging.

Healthy, physically active adults aged 18–65 were stratified based on immunosenescence markers including $CD28^{-}CD57^{+}CD8^{+}$ T cell frequency and naïve/memory T cell ratios. PBMC RNA was analyzed using RT² Profiler PCR Arrays targeting chemokines and receptors.

Individuals exhibiting immunological aging showed significantly elevated expression of *CXCL1–6, CXCL9–10, CCL2, CCL3*, and *CCL5*, alongside increased levels of *CXCR1, CXCR2, CXCR4, CCR2*, and *CCR5*. CXCL chemokines' expression levels dominate over CCL ones.

Our findings highlight the dysregulation of both CXCL/CXCR and CCL/CCR chemokine systems as a hallmark of immunological aging. CXCL predominantly mediate neutrophil recruitment and activation, whereas CCL chemokines mainly regulate monocyte and T cell trafficking. The concurrent upregulation of both axes correlates with enhanced chronic inflammation and altered immune cell distribution characteristic of immunosenescence. Targeting these pathways could provide novel strategies to mitigate age-related immune decline.

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