TACSM Abstract

Age Related Alterations in Chemokine and Chemokine Receptor Gene Expression in Mouse Hearts

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ABSTRACT

Data from our lab and others demonstrate that there is greater cardiac T cell infiltration with age and that these T cells play a role in pathogenic cardiac hypertrophy and fibrosis. However, how T cells are recruited to the heart with advanced age is unknown. **PURPOSE:** The purpose of this study was to assess age-related alterations in T cell recruiting chemokine and chemokine receptor gene expression in the heart. **METHODS:** This study was conducted using five young (4-6 months old) and five old (22-24 months old) mice. Following euthanasia, the heart tissue was snap frozen and homogenized. RNA was extracted using the phenol/chloroform method. Following cDNA synthesis, qPCR was performed for the chemokines *Ccl2, Ccl5, Cxcl10*; as well as the *18s* gene which was used as an endogenous control. Additionally, we performed qPCR for chemokine receptors, specifically *Ccr1, Ccr3, Ccr5,* and *Cxcr3*. After qPCR, relative gene expression was determined using the delta delta CT method. Differences were assessed using an independent sample T test. All data are expressed as mean relative gene expression ± standard error. **RESULTS:** For the *Cxcl10* cytokine, the relative gene expression was 1.43 ± 0.39 in young mice and 3.07 ± 0.52 in old mice (p=0.018). For the chemokine *Ccl5,* the relative gene expression was 1.03 ± 0.25 in young mice and 7.35 ± 4.37 in old mice (p=0.093). Additionally, the *Ccl2* chemokine had a relative gene expression of 1.19 ± 0.47 in young mice and 1.44 ± 0.27 in old mice (p=0.328). Because we observed age related elevations in the *Cxcl10* and *Ccl5* chemokines, we assessed gene expression for the corresponding chemokine receptors. Ccl5 receptors, *Ccr1* (1.73 ± 0.65, young vs. 2.89 ± 0.75, old p=0.140), *Ccr3* (1.89 ± 0.73, young vs. 7.19 ± 4.74, old p=0.150), and *Ccr5* (1.11± 0.13, young vs. 2.46 ± 0.51, old p=0.017) exhibited trends for elevation. Furthermore, the receptor *Cxcr3* which corresponds to the *Cxcl10* chemokine had a relative gene expression of 1.26 ± 0.28 in young mice and 8.73 ± 4.96 in old mice (p=0.086). **CONCLUSION:** In conclusion, these data suggest that gene expression for both the Ccl5 and Cxcl10 chemokine pathways is upregulated in hearts of the old mice. Further, Ccl5 and Cxcl10 may be responsible for the increased T cell recruitment to the aging heart. These chemokines represent a potential treatment target to preserve cardiovascular health in the elderly.