

MSCs and inflammation: not only a guardian role

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The literature on the relation between mesenchymal stem cells (MSCs) and inflammation is continuing to expand at a rapid rate with over 600 entries in PubMed under “MSCs and inflammation” starting from 2002.

Inflammation is an essential part of the malignant microenvironment. Chemokines, leukocyte infiltration and cytokines are crucial elements, which contribute to cancer-related inflammation. Attracted by chemokines, MSCs are recruited at injury sites. After exposure to inflammatory factors in the local microenvironment, MSCs secrete several cytokines and vascular endothelial growth factor, which promote immunosuppression, angiogenesis and tumor growth. Here we compare by RT-PCR the expression of selected genes, related to inflammation, on MSCs derived from control (C-MSCs) and inflamed tissues (I-MSCs). First of all, an immunohistochemistry using anti-CD43 antibody was performed to better test the status of inflammation at the moment of tissues' collection. CD43 is known as marker of inflammation, since it is expressed by most T cells, activated B cells, basophils, macrophages, monocytes and NK cells. Its expression was absent in “control” tissues, while it was strong in the “inflamed”. Subsequently, RNA was extracted, retro-transcribed and used for quantitative PCR. The genes were selected according to their role in inflammation: IL6 and IL8 (known as pro-inflammatory interleukins), TNF α (involved in systemic inflammation), CXCL2 (secreted by monocytes and macrophages and is chemotactic for polymorphonuclear leukocytes), CCL20 (strongly chemotactic for lymphocytes, its expression is induced by inflammatory cytokines), IFN γ (an important activator of macrophages) and TGF β 1 (promoting immunosuppression). Quantification of mRNA expression was calculated with the $2^{-\Delta\Delta Ct}$ method, where $\Delta Ct = Ct$ (gene of interest) – Ct (control gene) and $\Delta(\Delta Ct) = \Delta Ct$ (I-MSCs) – ΔCt (C-MSCs). The results revealed that the expression of all tested genes was higher in MSCs derived from inflamed tissues than in MSCs from control tissues (expressed as 1). This study underlines how MSCs are not inert guardians on inflammation, but as they play an active role.

Keywords

MSCs, inflammation, tumour microenvironment, interleukins.