S53-1 A model culture system for cutaneous mast cells

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Mast cells originate in the hematopoietic stem cells, and their terminal differentiation occurs in the tissues where they ultimately reside, indicating that the tissue microenvironment should have a major impact on differentiation of mast cells. It should be required for precise understanding of mast cell functions to take into consideration the heterogeneity of tissue mast cells. We have established a model culture system for murine cutaneous mast cells, in which bone marrow-derived mast cells are co-cultured with a fibroblastic cell line in the presence of stem cell factor. We investigated the changes in gene expression during the culture period and identified the gene population, of which expression profiles were characteristic of mast cell maturation. We focused on the role of CD44, the primary receptor for hyaluronan, in mast cells, since cutaneous tissues contain a large amount of hyaluronan as a constituent of the extracellular matrix. CD44 was induced in mast cells during the co-culture period. In cultured mast cells lacking CD44, impaired proliferation was observed. A significant decrease in the number of mast cells was found in the cutaneous tissues of the CD44-deficient mice. Furthermore, transplanted cultured mast cells in the cutaneous tissues of mast cell-deficient, W/W^V mice, proliferated after implantation, whereas such increase in the number of mast cells was not observed in the case of implantation of mast cells lacking CD44. It is interesting to note that CD44 is involved in regulation of mast cells, since the extracellular matrix containing hyaluronan are damaged upon aging or chronic inflammation.