Stromal cell

Stromal cells are connective tissue cells of any organ, for example in the uterine mucosa (endometrium), prostate, bone marrow, and the ovary. They are cells that support the function of the parenchymal cells of that organ. Fibroblasts and pericytes are among the most common types of stromal cells.

The interaction between stromal cells and tumor cells is known to play a major role in cancer growth and progression.

In addition, by regulating locally cytokine networks (e.g. M-CSF, LIF), bone marrow stromal cells have been described to be involved in human haematopoiesis and inflammatory processes.

Stromal cells (in the dermis layer) adjacent to the epidermis (the very top layer of the skin) release growth factors that promote cell division. This keeps the epidermis regenerating from the bottom while the top layer of cells on the epidermis are constantly being “sloughed” off of the body. Certain types of skin cancers (basal cell carcinomas) cannot spread throughout the body because the cancer cells require nearby stromal cells to continue their division. The loss of these stromal growth factors when the cancer moves throughout the body prevents the cancer from invading other organs.

The influence of the tumor microenvironment on malignant transformation of bone marrow stromal cells (BMSCs) was studied after allografting a mixture of enhanced green fluorescent protein (EGFP)-labeled BMSCs and C6 glioma cells into the rat brain to understand the influence of the cellular environment, especially the tumor environment, on the transformation of grafted BMSCs in the rat brain. We performed intracerebral transplantation in the rat brain using EGFP-labeled BMSCs coinjected with C6 tumor cells. After transplantation, the EGFP-labeled cells were isolated from the tumor using fluorescence-activated cell sorting, and the characteristics of the recovered cells were investigated. Glioma-specific biomarkers of the sorted cells and the biological characteristics of the tumors were analyzed. The BMSCs isolated from the cografts were transformed into glioma CSCs, as indicated by the marked expression of the glioma marker GFAP in glioma cells, and of Nestin and CD133 in neural stem cells and CSCs, as well as rapid cell growth, decreased level of the tumor suppressor gene p53, increased level of the oncogene murine double minute gene 2 (MDM2), and recapitulation of glioma tissues in the brain. These data suggest that BMSCs can be transformed into CSCs, which can be further directed toward glioma formation under certain conditions, supporting the notion that the tumor microenvironment is involved in transforming normal BMSCs into glial CSCs [1)].

Bone-marrow mesenchymal stem cell

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He Q, Zou X, Duan D, Liu Y, Xu Q. Malignant transformation of bone marrow stromal cells induced by the brain glioma niche in rats. Mol Cell Biochem. 2015 Nov 21. [Epub ahead of print] PubMed PMID: 26590986.