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Bone marrow/bone pre-metastatic niche for breast cancer cells colonization: The role of mesenchymal stromal cells

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Abstract

Breast cancer is one of the most common oncological pathologies in women worldwide. While its early diagnosis has considerably improved, about 70 % of advanced patients develop bone metastases with a high mortality rate. Several authors demonstrated that primary breast cancer cells prepare their future metastatic niche -known as the pre-metastatic niche- to turn it into an "optimal soil" for colonization. The role of the different cellular components of the bone marrow/bone niche in bone metastasis has been well described. However, studying the changes that occur in this microenvironment before tumor cells arrival has become a novel research field. Therefore, the purpose of this review is to describe the current knowledge about the modulation of the normal bone marrow/bone niche by the primary breast tumor, in particular, highlighting the role of mesenchymal stem/stromal cells in transforming this soil into a pre-metastatic niche for breast cancer cells colonization.

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Review of the potential of mesenchymal stem cells for the treatment of infectious diseases

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Abstract

The therapeutic value of mesenchymal stem cells (MSCs) for the treatment of infectious diseases and the repair of disease-induced tissue damage has been explored extensively. MSCs inhibit inflammation, reduce pathogen load and tissue damage encountered during infectious diseases through the secretion of antimicrobial factors for pathogen clearance and they phagocytose certain bacteria themselves. MSCs dampen tissue damage during infection by downregulating the levels of pro-inflammatory cytokines, and inhibiting the excessive recruitment of neutrophils and proliferation of T cells at the site of injury. MSCs aid in the regeneration of damaged tissue by differentiating into the damaged cell types or by releasing paracrine factors that direct tissue regeneration, differentiation, and wound healing. In this review, we discuss in detail the various mechanisms by which MSCs help combat pathogens, tissue damage associated with infectious diseases, and challenges in utilizing MSCs for therapy.