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Editorial

Immune Properties of Stem Cells and Interactions with the Immune System

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DESCRIPTION

The disease we today call Hodgkin lymphoma was named after Thomas Hodgkin, a physician at Guy's Hospital in London who in the 1830's did autopsies on 7 patients who died of an illness characterized by progressive lymphadenopathy. His description of these patients was presented at the Royal College of Physicians in 1832, and in 1856. Samuel Wilks referred to a group of similar patients as having "Hodgkin's disease." The discovery by Dorothy Reed and Sternberg at the turn of the 20th Century made it possible to recognize this specific type of lymphoma, known as Reed-Sternberg cells. The development of effective radiotherapy techniques and, more recently, effective combinations of chemotherapeutic agents have made Hodgkin lymphoma one of the most curable malignancies.

Mesenchymal Stem Cells (MSCs) are multipotent progenitor cells isolated by various relatively easily accessible tissues, such as bone marrow and cord blood. MSCs gained attention because of their ease for in vitro expansion together with their multilineage potential. More recently, in vitro and in vivo immunosuppressive properties have been ascribed to them, as they are able to modulate the function of all major immune cell populations, thus impeding immune responses. The underlying mechanisms of their differentiation and function are not thoroughly understood, but still they represent important candidates for tissue regeneration and manipulation of the immune response in graft rejection, graft versus host disease, and autoimmune disorders. Characteristics and immunogenic profile of MSCs, their interface with immune system and their potential use as immunosuppressive elements in cellular therapeutic protocols are reviewed in this chapter.

Now a day's more than 80% of all patients with Hodgkin lymphoma are cured and approximately 90% of those who present with early stage disease are cured. Given this excellent treatment outcome, it is important that patients be diagnosed in a timely manner so they can benefit from currently available treatments. Hodgkin lymphoma usually presents with lymphadenopathy in the neck, mediastinum, or axilla and is relatively easily diagnosed upon excisional biopsy with modern techniques. However, this is an illness that can present with obscure symptoms that can lead to great delay in diagnosis. Human embryonic stem cells (hESCs) can undergo unlimited self-renewal and differentiate into all cell types in human body, and therefore hold great potential for cell therapy of currently incurable diseases including neural degenerative diseases, heart failure, and macular degeneration. This potential is further underscored by the promising safety and efficacy data from the ongoing clinical trials of hESC-based therapy of macular degeneration. However, one main challenge for the clinical application of hESC-based therapy is the allogeneic immune rejection of hESC-derived cells by the recipient.

The unusual presentations of Hodgkin Lymphoma are not covered well in literature, particularly in literature that is oriented to primary care providers; it should be noted there has been literature oriented to oncologists discussing unusual presentations of Hodgkin Lymphoma. If primary care providers recognize these unusual presentations as possibly representing Hodgkin lymphoma, patients could be treated earlier, often with less extensive disease, and be spared prolonged and unpleasant periods of suffering from symptoms. This manuscript will present several illustrative cases of characteristic, but unusual, presentations of Hodgkin lymphoma.

The unique immunomodulatory properties of Mesenchymal Stem Cells (MSCs) make them an invaluable cell type for the repair of tissue/ organ damage caused by chronic inflammation or autoimmune disorders. Although they hold great promise in the treatment of immune disorders such as Graft Versus Host Disease (GvHD) and allergic disorders, there remain many challenges to overcome before their widespread clinical application. An understanding of the biological properties of MSCs will clarify the mechanisms of MSC-based transplantation for immunomodulation. In this review, we summarize the preclinical and clinical studies of MSCs from different adult tissues, discuss the current hurdles to their use and propose the future development of pluripotent stem cell-derived MSCs as an approach to immunomodulation therapy.

The breakthrough of the technology to generate autologous-induced pluripotent stem cells (iPSCs) by nuclear reprogramming of patient's somatic cells raised the possibility

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that autologous iPSC-derived cells can be transplanted into the patients without the concern of immune rejection. However, accumulating data indicate that certain iPSC-derived cells can be immunogenic. In addition, the genomic instability associated with iPSCs raises additional safety concern to use iPSC-derived cells in human cell therapy. In this review, we will discuss the mechanism underlying the immunogenicity of the pluripotent stem cells and recent progress in developing immune tolerance strategies of human pluripotent stem cell (hPSC)-derived allografts.

Mesenchymal Stem Cells (MSCs) are multipotent progenitor cells isolated by various relatively easily accessible tissues, such as bone marrow and cord blood. MSCs gained attention because of their ease for in vitro expansion together with their multilineage potential. The successful development of safe and effective immune tolerance strategy will greatly facilitate the clinical development of hPSC-based cell therapy.