

Platform Technologies

Method for generating immunomodulatory cells, the cells prepared therefrom, and use thereof

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Autoimmune diseases are common diseases that can cause severe symptoms and death, and their incidence is on the rise. Graft rejection is also a severe clinical issue leading to failure of organ transplantation. Both are caused by un-controlled immune responses against self or graft antigens. Recent development in the regulation of immune system has demonstrated the importance of immunomodulatory cells to balance the immune network. Thus, methods of effective generation of immune-modulating cells *ex vivo* or *in vivo* can be applied to treat autoimmune diseases or prolong graft transplantation.

The invention discloses a simple and rapid method to generate either *in vitro* or *in vivo* two populations of immunomodulatory mononuclear cells from peripheral blood cells using mesenchymal stem cells (MSCs) or proteins of mesenchymal stem cells including hepatocyte growth factor (HGF). The animal studies have demonstrated that injection of HGF into mice can lead to the increase of mononuclear cells with immune-suppression activity.

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Immunosuppressive cells and methods of making and using thereof

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Immunosuppressive agents are often used to treat in graft transplantation and autoimmune diseases, but the non-specificity immunosuppressive effects also increase the risk of serious infections. Furthermore, long-term use of immunosuppressive agents also increases the risk of cancer.

The invention discloses a platform to establish a rapid and stable production process of bone marrow-derived suppressor cells from human peripheral blood. These cells obtained from this technology can be used to suppress an immune response, regulate angiogenesis associated with tumorigenesis, treat an autoimmune disorder, treat an inflammatory disorder, or treat graft-versus-host diseases (GVHD). Advantages of this platform compared to the existing technologies are: (1) convenience samples acquisition, (2) specific immunosuppression which can avoid the adverse effects of infection caused by decreased overall immunity, or sequelae of sputum cancer, (3) long-lasting immunosuppressive effects in patients.

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