Tissue Engineering - Part B: Reviews 2014 vol.20 N3, pages 206-210

Status and prospects of liver cirrhosis treatment by using bone marrow-derived cells and mesenchymal cells

Terai S., Takami T., Yamamoto N., Fujisawa K., Ishikawa T., Urata Y., Tanimoto H., Iwamoto T., Mizunaga Y., Matsuda T., Oono T., Marumoto M., Burganova G., Quintanilha L., Hidaka I., Marumoto Y., Saeki I., Uchida K., Yamasaki T., Tani K., Taura Y., Fujii Y., Nishina H., Okita K., Sakaida I.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

In 2003, we started autologous bone marrow cell infusion (ABMi) therapy for treating liver cirrhosis. ABMi therapy uses 400 mL of autologous bone marrow obtained under general anesthesia and infused mononuclear cells from the peripheral vein. The clinical study expanded and we treated liver cirrhosis induced by HCV and HBV infection and alcohol consumption. We found that the ABMi therapy was effective for cirrhosis patients and now we are treating patients with combined HIV and HCV infection and with metabolic syndrome-induced liver cirrhosis. Currently, to substantiate our findings that liver cirrhosis can be successfully treated by the ABMi therapy, we are conducting randomized multicenter clinical studies designated "Advanced medical technology B" for HCV-related liver cirrhosis in Japan. On the basis of our clinical study, we developed a proof-of-concept showing that infusion of bone marrow cells (BMCs) improved liver fibrosis and sequentially activated proliferation of hepatic progenitor cells and hepatocytes, further promoting restoration of liver functions. To treat patients with severe forms of liver cirrhosis, we continued translational research to develop less invasive therapies by using mesenchymal stem cells derived from bone marrow. We obtained a small quantity of BMCs under local anesthesia and expanded them into mesenchymal stem cells that will then be used for treating cirrhosis. In this review, we present our strategy to apply the results of our laboratory research to clinical studies.

http://dx.doi.org/10.1089/ten.teb.2013.0527