

Allogeneic Placental/Umbilical Cord Blood Transplantation and Its Impact on Regenerative Medicine

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Abstract

Several worldwide cord blood bank networks, such as NETCORD or Asia CORD, for clinical hemopoietic stem cell transplantation have already become active, and numbers of the preserved cord blood units clinically available and of the transplanted patients are now rapidly increasing. The accumulating data through the activity confirm that the placental/umbilical cord blood transplantation (PUCBT) can dissolve the problem originated from the restricted donor numbers heritable to bone marrow transplantation (BMT) and that PUCBT has some advantages over BMT, particularly in terms of quick access and incidence of severe GVHD. Moreover our current data suggesting that it could be used safely and efficiently for adult patients as well promises expanding of PUCBT indication in the future. In this sense major concerns at present are how to efficiently recruit the preserved cord blood units for cost reduction and how to enhance platelet recovery for short hospitalization. In addition we should pay attention to the fact that the placental and umbilical cord tissues including cord blood are one of the possible sources for mesenchymal stem cells (MSC) with low allo-immunogenicity which can generate blood vessel, bone, cartilage, muscle, and nerve, etc. The newborn baby-derived MSC, unlike the stem cells of embryo origin, do not raise ethical and safety issues for their future use for regenerative medicine. This means that the placental and umbilical cord tissues belonging to individual babies are not the medical waste any longer. The most urgent and important subjects assigned to clinical scientists may be to establish cell lines from these tissues and to investigate their immunological and biological properties in detail, particularly focusing on their comparison to the bone marrow-derived MSC.
