

CHAPTER 1

BACKGROUND AND RATIONALE

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1.1 ALLOGENEIC UMBILICAL CORD BLOOD BANKING AND TRANSPLANTATION

1.1.1 Overview of Allogeneic Umbilical Cord Blood Transplantation

Bone marrow transplantation (BMT) from human leukocyte antigen (HLA)-identical sibling donors has been successfully utilized in the treatment of high-risk or recurrent hematological malignancies, bone marrow failure syndromes and selected hereditary immunodeficiency states and metabolic disorders. Use of allogeneic BMT has been limited both by the lack of suitable donors, and because of the risk of life-threatening complications that arise when donor and recipient are not immunologically identical, namely, graft failure and graft-versus-host disease (GVHD).

In an attempt to increase the availability of suitable donors and reduce the morbidity and mortality associated with allogeneic bone marrow transplantation, clinical investigators worldwide have evaluated placental and umbilical cord blood as an alternate source of hematopoietic stem and progenitor cells for transplantation (1-21).

As of June 2000, umbilical cord blood from sibling and unrelated donors has been used to reconstitute hematopoiesis in approximately 1200 patients with malignant and non-malignant disorders treated with myeloablative therapy. Reports from individual institutions and the International Cord Blood Transplant Registry (ICBTR) suggest that umbilical cord blood contains sufficient numbers of hematopoietic stem and progenitor cells for both early and late engraftment at least in recipients weighing less than 40 kilograms. Moreover, limited comparisons with young patients transplanted with bone marrow from sibling donors suggest that the risk of severe acute GVHD may be lower in those transplanted with umbilical cord blood (15, 19, 21). To date, too few patients have been transplanted to know what are the true risks and benefits of this stem cell source.

1.1.2 Overview of the Cord Blood Transplantation Study (COBLT)

Early successes with the transplantation of umbilical cord blood have prompted considerable investigation into this stem cell source. Numerous laboratory investigators have subsequently confirmed the high frequency of primitive hematopoietic progenitors and have begun to describe the functional capacities of the neonatal immune system. As a result of these clinical and laboratory observations, large scale banking of umbilical cord blood for clinical transplantation has been initiated in the U.S. and Europe. Two cord blood banks (CBBs) have been funded by the National Heart, Lung and Blood Institute (NHLBI) to collect and cryopreserve CBUs for use in umbilical cord blood transplantation.

CBUs from the NHLBI CBBs are available to all patients requiring a cord blood transplant who are eligible for the COBLT Transplantation Protocol. For patients not meeting the eligibility criteria for the COBLT Transplantation Protocol, CBUs are available through this COBLT Expanded Access Protocol.

CORD BLOOD TRANSPLANTATION STUDY EXPANDED ACCESS PROTOCOL

Participants in this study must provide consent for a locally IRB-approved protocol to qualify for receipt of this stem cell product. In addition, laboratory experience in receiving and thawing cryopreserved COBLT CBUs must be demonstrated.

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