

## Blood Stem Cell Donation: A Model for Worldwide Cooperation in Transplantation

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Haematopoietic stem cell transplantation (HSCT) has been carried out for more than 50 years in over 50 countries.<sup>1</sup> Over a million patients have undergone this procedure, giving hope and a new lease of life to many patients with otherwise incurable or high-risk blood-related cancers and other diseases.<sup>2</sup> The procedure involves taking good blood stem cells from an individual and giving them to a patient who has just received a preparative regimen of high dose chemotherapy and/or radiation. These blood stem cells may be autologous if they are derived from the patient himself or allogeneic if obtained from another individual. While a human leukocyte antigen (HLA) matched sibling is the first choice as a donor of these blood stem cells, only a quarter of patients have a suitable and matched sibling donor, and an unrelated or mismatched donor may need to be used.

While many of the initial transplants were carried out using cells donated from the bone marrow, the last two decades have seen an increase in the use of blood stem cells obtained from the peripheral blood after these cells are mobilised into the peripheral blood with the use of granulocyte colony stimulating factor (G-CSF).<sup>3</sup> The use of umbilical cord blood as a source of cells for haematopoietic transplants has helped increase donor availability, especially since these cells appear to have a greater ability in tolerating mismatches during transplantation<sup>4</sup> and consequently, it was even suggested that fewer donors of cord blood are required to establish a significant pool of donors for transplantation for patients in need.<sup>5</sup>

In the last two years, we have seen the passing of two individuals who laid the pioneering groundwork for the worldwide practice of bone marrow transplantation—Dr E. Donnall Thomas and Dr John Goldman. Professor Thomas was awarded the Nobel Prize for being the founding father of the science of bone marrow transplantation and a true pioneer who founded a completely new field that has given hope to many patients. The world mourned his passing in 2012, which was also the year in which the one-millionth

HSCT was performed.<sup>6</sup> John Goldman was widely respected in the field of haematology and he was one of the pioneers who laid the foundation stones for the field of unrelated donor marrow transplantation.<sup>7</sup> Together with Professor Jon Van Rood, who made crucial discoveries in the role of HLA and laid the groundwork for the tissue typing that would make blood stem cell transplants possible, Professor Goldman set in motion the first steps in the creation of the World Marrow Donor Association (WMDA), with Donnall Thomas as its first President.

The WMDA is the de facto global organisation that many look to for standards and answers pertaining to unrelated donor blood stem cell donation. It also coordinates the activities of blood stem cell donor and cord blood registries around the world.<sup>8</sup> The WMDA plans and implements standards for blood stem cell registries and develops recommendations that help to ensure the safety of donors and patients around the world.<sup>9</sup> The Serious (Product) Events and Adverse Reactions (S(P)EAR) committee of the WMDA has contributed to the monitoring and enhancing the safety of our donors and recently launched a first-of-its-kind online reporting system for global vigilance and surveillance in unrelated donors who have donated blood stem cells for transplantation.<sup>10</sup>

The WMDA turned 25 years old in the year 2013 and, thanks to the groundwork laid down through the last two decades of hard work, it is now meeting its mission to “foster international collaboration to facilitate the exchange of high quality blood stem cells for clinical transplantation worldwide and to promote the interests of donors”.<sup>11,12</sup> The WMDA network now represents more than 73 donor registries, 160 cord blood banks, and 350 donor centres, which have more than 24 million donors listed in 55 different countries. Thanks to the concerted efforts of cord blood banks and blood stem cell registries around the world, transplant centres now report that there is now greater ease in finding a suitable unrelated donor or cord blood unit than

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a decade ago. Our patients now have good chances in finding a donor from another part of the world when one cannot be found in their own country. Our donors also have the exciting prospect of being able to save the life of another person in another corner of the globe. In fact, there are now around 33 stem cell products being transported every day across the world to facilitate transplants in another country. The extent, regularity, robustness and high standards of the over 12,000 haematopoietic stem cell donor products being exchanged across borders every year to save the lives of patients in need is truly staggering. Blood stem cell donation has indeed become a model for worldwide cooperation in transplantation.

HSCT procedures are now safer as well as more effective, and the medical community has come to accept HSCT as an established form of therapy. Many physicians now recognise that HSCT does not necessarily compete with newer therapies but serves as an important adjunct to newer drugs. In recent years, work done by researchers around the world has led to tremendous advances in HSCT. Rigorous clinical studies coordinated by worldwide networks like the Center for International Blood and Marrow Transplantation Research (CIBMTR)<sup>13</sup> and the advent of safer and more effective new drugs have now made transplants much safer and it is now possible to transplant older and sicker patients by reducing the risk of infectious and other complications. The advent of new technologies involving the expansion of haematopoietic stem cells<sup>14,15</sup> as well as the generation of cells with potential anti-leukaemia effects<sup>16,17</sup> have led to a whole new realm of possibilities for HSCT.

Through the coordinated efforts of many countries in improving the efficacy and safety of blood stem cell transplants, the future of HSCT is bright indeed.

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