

Patient Education

UNDERSTANDING BONE AND BLOOD MARROW TRANSPLANTS

Bone marrow is the soft tissue inside the bones that makes blood-forming cells known as *blood stem cells*. These grow into *red blood cells* (carry oxygen throughout the body), *white blood cells* (help fight infections), or *platelets* (help control bleeding).

Healthy marrow and blood cells are needed to live. When a disease such as cancer affects the bone marrow, the bone marrow may not function, requiring a marrow or cord blood transplant in some patients. Thousands of people with blood cancers and diseases – such as leukemia, lymphoma, and sickle cell anemia – depend on a bone marrow or cord blood transplant for treatment.

Read below for more information about transplants. This “Patient Education” tear sheet was produced in collaboration with the National Marrow Donor Program (bethematch.org).

What Is a Blood or Marrow Transplant?

A bone marrow transplant (also known as a BMT) takes a donor’s healthy blood-forming cells and puts them into the patient’s bloodstream, where they relocate to a patient’s bones and begin to grow and make healthy red blood cells, white blood cells, and platelets. Cells can be acquired from the patient (*autologous transplant*) or donated from someone else (*allogeneic transplant*), either a family member (related donor), unrelated donor, or umbilical cord blood unit. Based on a patient’s disease and health status, the doctor will recommend either autologous or allogeneic transplant.

Donor cells can come from three sources:

- *Bone marrow*: soft, spongy tissue inside of bones
- *Peripheral blood stem cells (PBSC)*: blood-forming cells from the circulating blood
- *Cord blood*: the blood collected from the umbilical cord and placenta after a baby is born

Each patient needs a donor who is a close *human leukocyte antigen (HLA)* match. This is different than blood type, since HLA is part of DNA. HLA is a protein – or marker – found on most cells in the body. The best transplant outcome happens when the patient’s and donor’s HLA closely match because it:

- increases the likelihood of a successful transplant
- improves *engraftment* (when the donated cells start to grow and make new blood cells or platelets)
- reduces the risk of complications after transplant, especially *graft-versus-host disease (GVHD)*, which is a potentially serious complication that occurs when the immune cells, which are part of the donated marrow or cord blood, attack the body

Seventy percent of patients (7 out of 10) do not have a fully matched related donor.

How Does a Transplant Work?

During transplant, the donor’s healthy blood-forming cells are put into the patient’s bloodstream, where they move through the patient’s bloodstream and settle in the bones to produce new blood-forming cells.

Prior to transplant, patients will receive a preparative treatment (*conditioning regimen*) consisting of chemotherapy, with or without radiation, that is given in the days just prior to the infusion of blood-forming cells.

On transplant day, known as “day zero,” the replacement cells are put into the blood stream in a process

similar to getting blood or medicine through an intravenous catheter or tube. Around 30 to 100 days post-transplant, the new blood-forming cells will engraft and the patients will start to recover. The engraftment and early recovery period is longer for cord blood transplants.

Follow-Up Care

Post-transplant, follow-up care is important to detect any changes in health, including:

- the disease returning (*relapse*)
- new cancer
- problems due to treatment
- changes in quality of life (QOL)

When issues are caught early, there may be more treatment options. Follow-up care includes:

- **Long-term screening:** Complications from transplantation can develop long after a patient leaves a transplant center.
- **Vaccinations:** Transplant recipients may remain immunocompromised beyond two years after transplant, especially individuals with chronic GVHD. Therefore, patients should be routinely re-vaccinated after transplant until they regain immune competence. Transplant recipients also need to have their childhood vaccines repeated after recovering.
- **Watching for relapse:** Sometimes the disease comes back after transplant. If the disease does come back, options for care and therapy are based on the disease and the patient’s overall health.
- **Screening for GVHD (for those who received an allogeneic transplant):** Uncontrolled chronic GVHD is associated with increased non-relapse mortality, significant morbidity, and lower health-related QOL. Ongoing surveillance, management, and multidisciplinary care can resolve most cases of chronic GVHD within five years. Acute GVHD, often characterized by a red rash, diarrhea, and elevated liver tests, usually starts prior to 100 days post-treatment. When people develop GVHD symptoms in their mouth, eyes, skin, or other organs, it is called chronic GVHD. Chronic GVHD – an immune response of the donor-derived T cells against recipient tissues – occurs in 30 to 70 percent of patients receiving an allogeneic transplant.

Resources from the National Marrow Donor Program

Over the past 25 years, Be The Match®, operated by the National Marrow Donor Program (NMDP), has managed the largest and most diverse marrow registry in the world, working to save lives through transplant. NMDP has facilitated more than 74,000 marrow and cord blood transplants and nearly 6,400 transplants a year to give patients hope for a future. Be The Match continues to develop services and interactive technologies used by transplant experts around the world to reach more patients, while also developing new cellular therapies, advancing services to speed the transplant process, and improving treatments for post-transplant complications.

For more information about NMDP, visit bethematch.org.

For more patient information, visit bethematch.org/transplant-basics.

To get involved, visit bethematch.org/support-the-cause.