Donating Bone Marrow [1]

Listen to theCancer.Net Podcast: Donating Bone Marrow[2], adapted from this content.

Each year, thousands of people with life-threatening diseases of the bone marrowâ€”such as leukemia, lymphoma, myeloma, aplastic anemia, and genetic and immune system disordersâ€”are in need of a bone marrow transplantation (a medical procedure in which diseased bone marrow is replaced by healthy bone marrow). Today, this procedure is more commonly called a stem cell transplant, rather than bone marrow transplant, because it is the blood stem cells that are typically being transplanted, not the actual bone marrow tissue.

In many cases, the bone marrow transplant represents a patient's best chance of survival and may offer a cure. Donating bone marrow or stem cells can save someone's life. And huge improvements in the process of bone marrow donation have made it as easy and painless as giving blood.

The importance of bone marrow

Bone marrow is the soft, spongy material found within the cavities of large bones. The bone marrow makes than more 20 billion new blood cells every day. Bone marrow stem cells are essential because they have the ability to mature into red blood cells (cells that carry oxygen to all parts of the body), white blood cells (cells that help the body fight infections and diseases), or platelets (cells that help blood clot and control bleeding). These functions are disrupted in patients with bone marrow diseases and certain types of cancer. In such cases, bone marrow transplantation may be needed.

An allogeneic transplantation (also known as an ALLO) uses stem cells from a donor. Learn more about the types and process of bone marrow transplantation [3].

Bone marrow tissue typing

Before an ALLO transplant, a matching donor must be found. The process of analyzing donor bone marrow is called typing. Human leukocyte antigens (HLA) are specific proteins found on the surface of white blood cells and throughout the body. The combination of these proteins make each person's bone marrow unique. HLA typing is a special blood test that identifies these proteins. A successful bone marrow transplant requires the donation of near-perfect, HLA-

matched bone marrow. HLA-matched bone marrow/blood stem cells given to a person during transplantation is less likely to result in graft-versus-host disease (GVHD, a complication in which the immune cells in the transplanted bone marrow recognize the recipient's body as foreign and attacks it). Learn more about GVHD [4].

Finding Donors

About 30% of patients in need of a bone marrow transplant can find an HLA-matched donor within their immediate family. Siblings (brothers and sisters) are usually tested first, since they have the highest likelihood of having HLA-matched bone marrow. Parents and children can also be tested, but the chances of a match are low. The remaining 70% of patients will try to find HLA-matched bone marrow from the worldwide pool of unrelated, volunteer donors.

The National Marrow Donor Program [5] (NMDP) is a nonprofit organization that helps doctors locate matching donors for people in need of a bone marrow transplant. The NMDP registers people who would be willing to donate bone marrow and records the HLA tissue type of each donor into a comprehensive, confidential database, called a registry. The NMDP is the largest registry. Other registries that specialize in finding donors for specific ethnic groups also exist. When a search for a donor is performed, every registry in the world is examined.

Because HLA tissue types are inherited (passed from parent to child), there is a better chance of finding a bone marrow match within the patient's same racial and ethnic group. People belonging to minority populations continue to be increasingly under-represented in the donor registry and, therefore, have less chance of finding HLA-matched bone marrow compared with white people. In particular, donors who are American Indian, Alaskan Native, Asian, black, Hispanic, Native Hawaiian or other Pacific Islander, and donors from multiple racial or ethnic backgrounds are urgently needed. Increasing donations from these minority populations will give more people a chance to recover from cancer or another bone marrow disease.

Who can donate bone marrow

The following are some general guidelines for bone marrow donation as recommended by the NMDP. These guidelines are put into place to protect the health and safety of the donor and the recipient. Donors are encouraged to contact their local NMDP center for specific details and to discuss donations with their health care team.

- To be listed in the registry, potential donors must be healthy and between the ages of 18 and 60.
- If matched with a person needing a transplant, each donor must pass a medical examination and be infection-free before donating bone marrow.
- Most people taking medications can still donate bone marrow as long as they are healthy and any medical conditions they have are under control at the time of the donation. Acceptable medications include birth control pills; thyroid medication; antihistamines; antibiotics; prescription eye drops; and topical medications, such as skin creams. Antianxiety and antidepressant drugs are allowed as long as the person's medical condition is under control. Talk with your doctor if you are concerned about a specific medication.
- People who cannot donate bone marrow include pregnant women, users of intravenous drugs that are not prescribed by a doctor, people who have had a positive blood test for

hepatitis B or hepatitis C, and those with specific medical conditions, such as most types of cancer or certain heart conditions.
- People with Lyme disease, malaria, or recent tattoos or piercings should wait at least a year before donating bone marrow.

How to register as a bone marrow donor

Registering to become a bone marrow donor is easy. Locate a donor center by visiting the National Marrow Donor Program's website [5] or calling the organization's toll-free number at 800-MARROW2 (627-7692). If you are unable to find a donor center in your area, you can register online, and a tissue-typing kit with instructions on how to register as a donor will be mailed to you.

Donor centers may charge a nominal fee ranging from $50 to $100, which is tax deductible. In some cases, there is no cost to the donor. Any additional costs are usually the responsibility of the patient receiving the bone marrow transplant.

At the time of registering, donors will be asked to fill out a short medical questionnaire and sign a consent form stating that they understand what it means to be registered as a bone marrow donor. Either a small sample of blood (about 1 tablespoon) or cells from inside the cheek (using a cotton swab) will be taken, and the sample will be analyzed to determine the donor's HLA type. This confidential information is then recorded in a national database and can be accessed by doctors from across the country when patients are in need of a transplant.

When a match is made, the NMDP will contact the donor with an HLA-matched bone marrow, and a new sample of blood will be taken and sent to the patient's transplant center to confirm the HLA match. Once the confirmation process is complete, a counselor from the NMDP will call the donor and schedule an appointment to discuss the risks, benefits, and procedure involved in bone marrow donation. Once the donor agrees to the procedure, the donor will be given a comprehensive medical exam to protect his or her health, as well as the health of the bone marrow recipient.

Donors are under no obligation after registration and can ask to have their name removed from the registry at any time. People who become part of a bone marrow registry should contact the registry if their contact information changes.

The donation process

Today, most donors undergo a peripheral blood stem cell (PBSC) collection. For five days leading up to the PBSC procedure, a donor receives injections (lasting 5 minutes a day) of a white blood cell growth hormone called G-CSF (Neupogen). On the fifth day, a needle is placed in each of the donor's arms, and blood is circulated through a machine, which collects the stem cells and returns the unused portion of the blood back to the donor. This collection takes about three hours and may be repeated on a second donation day. There is very little blood loss. Side effects with this type of procedure may include headaches, bone soreness, and the discomfort of needles in the arms during the process.

Although less common, a bone marrow harvest may be used. Bone marrow is taken from the donor's hip bone during surgery. This procedure is done with anesthesia (medication to block the

awareness of pain). Donors usually go home the same day and can return to normal activity within one week. Common side effects of this type of bone marrow donation can include nausea, headache, and fatigue. These side effects are most often related to the anesthesia. Donors may also experience bruising or discomfort in the lower back.

It is important to note that most donors have minimal side effects. Bone marrow that has been removed is replenished by the body within four to six weeks. A representative from the health care team will continue to contact the donor for several months after a bone marrow donation to make sure he or she has fully recovered from the procedure.

More Information

Understanding Bone Marrow and Stem Cell Transplantation [3]

Side Effects of Bone Marrow and Stem Cell Transplantation [4]

Additional Resources

www.ExploreBMT.org [6]

American Bone Marrow Donor Registry [7]

Blood and Marrow Transplant Information Network [8]

U.S. Department of Health and Human Services: Bone Marrow and Cord Blood Donation and Transplantation [9]

National Bone Marrow Transplant Link [10]

The Bone Marrow Foundation [11]

Links:
[1] http://www.cancer.net/navigating-cancer-care/diagnosing-cancer/tests-and-procedures/donating-bone-marrow
[2] http://www.cancer.net/sites/cancer.net/files/Donating_Bone_Marrow.mp3
[3] http://www.cancer.net/node/24717
[4] http://www.cancer.net/node/24674
[5] http://www.marrow.org/
[6] http://www.ExploreBMT.org
[7] http://www.abmdr.org
[8] http://www.bmtinfonet.org
[9] http://bloodcell.transplant.hrsa.gov
[10] http://www.nbmtlink.org
[11] http://www.bonemarrow.org