

## Bone Marrow Transplant

Many of you may have heard about bone marrow transplants. Only very few, however, know how it works. Some of you may think that donating bone marrow requires surgery and is risky. Despite the abundance of availability of information, it is not easy to understand the real facts and many people misunderstand it. This short document will try to explain the bone marrow transplant and its donation process in plain English, but is not meant to be medical advice.

Leukemia is said to be a cancer of the blood or bone marrow. It used to have no cure, but now, thanks for the advanced medical technology, it is not incurable.

Leukemia begins in the blood forming cells of the bone marrow. The blood has a limited life span. For example, the red blood cell lasts only about 120 days and new blood has to be produced all the time. The bone marrow in large bones produces the new blood cells. Bones are rigid and support the body. At the same time, they produce blood cells and store minerals required for muscle movement. Once the bone marrow start functioning abnormally, it makes a lot of abnormal blood cells, called leukemia cells. Over time, leukemia cells can crowd out the normal blood cells (red and white blood cells and platelets). Leukemia means white blood in Greek (leukos, "white"; haima, "blood"), because blood becomes less red, but it is not always true.

Leukemia is a broad term covering a spectrum of diseases, and caused in many different ways. There are several different types of leukemia, like acute or chronic, or lymphocytic or myelogenous. The type of treatment needed depends on many things, including the type of leukemia, how far along it is, and the age and the overall health of patient. Like other cancerous diseases, leukemia can be treated by chemotherapy, radiation, and recently, new medicine, Gleevec is found very effective with chronic myelogenous type. Depending on the individual patient, each treatment or combination of these is chosen. On the other hand, leukemia is quite different from other cancers and the surgery can't be operated to remove the cancerous cells, because it does not have solid tumors. Instead, very high dose of radiation or very powerful chemotherapy is used to kill cancerous cells. As a result of the side effects, the bone marrow of the patient is damaged and can't produce the new blood cells. It is a bone marrow transplant to restore this function. The special cells (called hematopoietic stem cells) that are normally found in the bone marrow are taken out from a healthy person, filtered, and given to the patient whose bone marrow can't produce the blood cells. The stem cells transplanted in the bone marrow of a patient can produce. The bone marrow transplant is not a transplant of the bone, but the cells in the blood of the bone marrow. It can be donated from the vein of a donor and received by the patient, just like blood transfusion through the vein.

The bone marrow transplant can be done in a few different ways. Currently in the USA, the most common method is called Peripheral Blood Stem Cell Transplantation, (PBSCT). The bone marrow transplantation, (BMT) was more common before and is still utilized in some cases. In some other countries, BMT is more common, or exclusively operated for the various reasons. It is not easy to say which is better, but PBSCT is much easier for the donor, because the donor suffers less with PBSCT. In the case of BMT, the stem cells are collected from bone marrow. The donor will go to the operating room and while asleep under anesthesia, a needle will be inserted into either the hip or the breastbone to take out some bone marrow (that is essentially the blood inside the bone). After awakening, he/she may feel some pain where the needle was inserted. It has to be repeated some time to collect the required volume, a half to one pint, and has to be done carefully. On the other hand, with PBSCT method, the stem cells are extracted from the peripheral blood (that is the blood in the limbs). It is similar to donating blood from the arm, and anesthesia is not required. The donor, however, has to take the medicine, called G-CSF, which increases stem cells in the blood, five days beforehand, since the blood outside bone marrow does not have lots of stem cells. A side effect of that medicine is a increase of white blood cells which can result in an increased tendency to clot. The medicine to prevent this side effect

may cause another side effect of numbness. These side effects may last several days at most and requires no hospitalization.

Although it is just same as blood transfusion, it still is important to match the type of the donor and that of the patient. In the case of bone marrow transplant, BMT or PBSCT, a blood type (type A or B etc.) is not relevant. Instead, the type of white blood cell, called HLA is important. If a different type of blood is used in the bone marrow transplant, the blood type of patient may change into that of the donors. If the HLA types between the donor and that of recipient don't match, the transplant may not succeed. The siblings with the same parents may match about 25% of the time, but between a parent and child the probability is very low, as low as the unrelated. Between the unrelated, the probability of matching is higher in the same race, but is still one out of several hundreds. If of different races, it would be one out of tens of thousands. The children of mixed races, are considered different races unless they are of the same combination of mixed race. That is why it is extremely difficult to find matching donors, unless there is a match among siblings. Unfortunately, every year in this Bay Area too, patients die because a matched donor can't be found on time.

To alleviate this situation, the bone marrow bank was established. They register the HLA types of many volunteers and try to match the type among the hundreds of thousands of registrants, when the patient needs a bone marrow transplant. Because of the nature of the very low probability of matching, it is not meaningful to register for a specified patient. In the case a potential donor wants to be tested for a HLA type match to only one particular patient, it can be done personally with the doctor of that patient. The registration for the bank can be done so by anybody who is healthy enough to keep up at daily activities and between the age of eighteen and sixty. The registration itself is very simple, since extracting the blood is only after a matching patient is found. At the time of the registration, the potential donor can be sick, pregnant, or even diabetic. Please refer to the attached paper, Medical Guidelines for Joining the Registry.

At registration, you will be asked to provide personal information (bring your ID with you) and answer to questions about your medical conditions. You also have to supply the contact information for two persons who would know how to reach you in the future if your contact information changes. They should not be a family member living together who may move with you. You will then take a cell sample from your inside cheek by swabbing. That is the end of registration. A few weeks later, they will test your sample and your HLA type is registered in the data bank, and at the same time is mailed to you. Once you've registered, you will be contacted if you are a match for a patient in need of a transplant. You could be a match for a patient soon, many years from now or you may never be called. If you reach the age of sixty, you will be deleted from data bank.

Once a match is found, the registrant will be notified. Before stem cells are collected, the willingness to donate will be confirmed and the medical condition is examined. At the time, the registrant has the right to refuse the donation. Since it is the waste of time for the doctor and the patient, it is advisable to cancel the registration before a match is found, if you change your mind.

There are two organizations in this Bay Area to register. One is the nationwide organization named "BE THE MATCH", and another is specialized in this Bay Area, "Asian American Donor Program". The latter was established to promote registrants among Asians, since some Asian and mixed race patients die every year in this Bay Area, due to the small number of Asians registered despite the big Asian population. These two organizations are merged and AADP functions as a branch of "BE THE MATCH" to promote among Asians.

The registration can be done through either organization and will end up in the same data bank. You can register in one of three ways. First, you can register through the Web site without ever going out. Or, you can go to the office of the organizations. The addresses and telephone numbers are listed below. You need to make an appointment before you go. Or, finally you can visit one of their donor drives near you.

## Registration

1. You can register through Web site below without ever going out. You may stop in the middle of process and continue later. Once you fill in the registration, they will send you the kit which contains swabs several days later. Following the instructions, you collect the sample and send back the kit.

<http://www.aadp.org/pages/register.php>

[http://www.marrow.org/JOIN/Join\\_Now/join\\_now.html](http://www.marrow.org/JOIN/Join_Now/join_now.html)

2. You can visit their branch office whose addresses are below. You need to make an appointment beforehand.

### **Asian American Donor Program**

2169 Harbor Bay Parkway

Alameda, CA 94502

Tel ; (510) 568-3700

Web site: <http://www.AADP.org> Email: info@aadp.org

### **BE THE MATCH Marrow Registry City of Hope**

#### **National Marrow Donor Program Northern California & Northwest District**

1330 Broadway Street Suite 501

Oakland, CA 94612

Tel: (510) 834-8500

Web site: <http://BeTheMatch.org>

3. You can visit their donor drive near you. The date, place and time can be obtained from these web sites of the organizations above. It seems they often change the plan. It is advisable to make sure before your visit.