Memorial Sloan Kettering Cancer Center

PATIENT & CAREGIVER EDUCATION

Human Leukocyte Antigen (HLA) Typing and Stem Cell Harvesting: Information for Donors

This information will help you understand your human leukocyte (LUKE-oh-site) antigen (HLA) typing and stem cell harvesting (collection). You're getting this information because you're being tested to see if you're a potential stem cell donor.

In this resource, the words "you" and "your" refer to either you or your child.

Donating stem cells is a 3-step process.

1. **HLA typing**. This is done to see if your stem cells are a good match for the recipient (the patient).
2. **Health screening**. If your HLA type matches the patient's, you'll have a health screening to make sure you're healthy enough to donate stem cells.
3. **Stem cell harvesting**. This is the procedure to collect some of your stem cells.

HLA typing

About HLA markers

HLA markers are proteins that are found on most cells in your body (see Figure 1). There are many HLA markers, and different people can have different patterns of the markers. HLA markers are inherited (passed from parents to their child), so your close family members (siblings, parents, and children) are most likely to have a pattern of HLA markers that's like yours.

HLA markers are a way for your immune system to tell which cells belong in your body and which ones don't. Your immune system knows which pattern of HLA markers is normal for your body. If it finds a cell that has a different pattern of markers, it will attack and kill the cell. That's why it's important that your HLA markers are as similar to the patient's as possible.

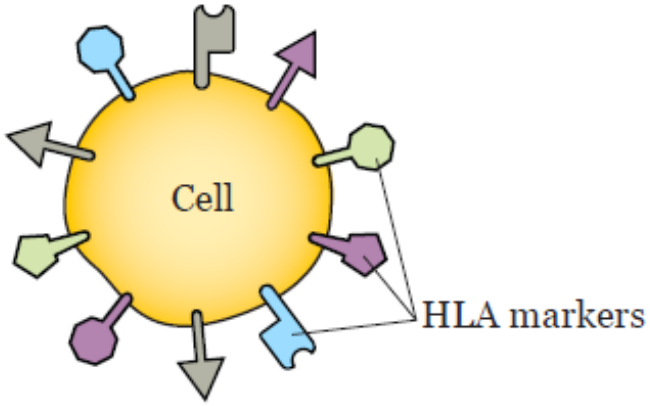

Figure 1. HLA markers

About HLA typing

Your HLA type can be tested in 2 ways:

- A blood test

- A swab of your cheek

If you'll be doing your HLA typing using a cheek swab sample, read *Instructions for Collecting and Returning HLA Samples Using Cheek Swabs* (www.mskcc.org/pe/instructions-hla-samples).

Results of your HLA typing

After MSK gets your HLA test sample, it usually takes about 1 to 2 weeks for your results to come back. If your results show your pattern of HLA markers is like the patient's, it means you're a potential donor. We'll contact you to tell you and to ask if we can tell the patient. We won't tell them unless you give permission.

If you want to check on the status of your results:

- If the patient is age 18 or older, call the Adult Stem Cell Transplant Related Donor Office at 646-608-3732.
- If the patient is younger than 18, call the Pediatric Stem Cell Transplant Related Donor Office at 212-639-8478.

Health screening

If you're willing to move forward with the donation process, you'll have some tests to make sure you're healthy enough to donate. These tests usually include a phone health screening and an in-person health screening. We

may also ask for copies of your medical records.

During the in-person health screening, you'll have a physical exam, an electrocardiogram (EKG), a chest x-ray, and blood tests. The donor office will contact you about scheduling an appointment for this testing. You won't need to pay for the appointment or tests.

Once we're sure you're healthy enough to donate, we'll ask for your permission to share any relevant health information with the patient and their healthcare team. We will not share any of your information without your permission.

Stem cell harvesting

Stem cells are immature cells that are the foundation of the blood cells in your body: the white blood cells that fight infection, red blood cells that carry oxygen, and platelets that stop you from bleeding. Most of your stem cells are found in your bone marrow. Bone marrow is a substance in the spaces in the center of the larger bones in your body. There are also some stem cells circulating in your blood.

There are 2 ways your stem cells can be harvested:

- Peripheral blood stem cell (PBSC) harvesting
- Bone marrow harvesting

Each method is described below. Once we've found out if you're a potential donor, a doctor, nurse practitioner (NP), or nurse will discuss these methods with you in more detail. You can also read *Allogeneic Donor Peripheral Blood Stem Cell Harvesting* (www.mskcc.org/pe/allogeneic-pbsc-harvesting) and *About Bone Marrow Harvesting* (www.mskcc.org/pe/bone-marrow-harvesting).

Peripheral blood stem cell harvesting

PBSC harvesting is the procedure used to collect stem cells from your blood. Peripheral blood is the blood that circulates in your blood vessels. It includes every type of blood cell.

Before your procedure

Stem cell mobilization and growth factor injections

Before we can collect stem cells from your blood, you'll need to take a medicine known as a growth factor. The growth factor medicine will cause your body to make more stem cells than usual. It also causes the stem cells to move into your bloodstream, where they can be collected more easily. This process is called mobilization.

Growth factor medicine include filgrastim (Neupogen®) and plerixafor (Mozobil®). Both of these medicines are given as an injection (shot) into the fatty tissue in your upper arms or thighs. You'll take either filgrastim alone or

both filgrastim and plerixafor.

A nurse can teach you to do the injections yourself, you can have a family member give them to you, or you can talk with your healthcare provider about making other arrangements. You'll need filgrastim injections daily for 5 to 6 days. If you're also taking plerixafor, those injections will be daily for 1 to 2 days.

Common side effects of these medicines include:

- Bone pain in your hips, breastbone, arms, legs, and lower back.
- Low-grade fevers of 99 °F to 100 °F (37.2 °C to 37.8 °C).
- Headaches.
- Flu-like symptoms, such as body aches and chills.

Regular or extra strength acetaminophen (Tylenol®) can help relieve these side effects. If acetaminophen doesn't help, contact your doctor's office. Your doctor or NP may need to prescribe something stronger.

Tunneled catheter placement

Before we collect your stem cells, a NP or nurse from our donor room will check your veins to make sure they're sturdy enough for the procedure. If they aren't, a healthcare provider from the Interventional Radiologist

Department will place a tunneled catheter into a large vein near your collarbone. A tunneled catheter is a type of central venous catheter (CVC). It will be used during your procedure and will be removed once your collection is complete. Your nurse will teach you how to care for it and will give you written information.

What to eat

As your stem cells are collected, your blood calcium levels may drop. We recommend that you eat dairy products and other foods that are rich in calcium (such as cheese, milk, ice cream, dark leafy greens, fortified cereals, or enriched grains) or take an over-the-counter calcium supplement, such as Tums®. This will help raise the calcium levels in your blood.

During your procedure

Your PBSC harvesting will take place in the Blood Donor Room at MSK. The address is:

> Blood Donor Room at MSK
> 1250 First Avenue (between East 67th and 68th streets)
> New York, NY 10065

You'll have appointments 2 days in a row. Each appointment usually takes 3 to 4 hours.

The harvesting is done while you're on a bed or a recliner

chair. You'll be connected to a machine by IV tubes in your arms or your tunneled catheter. Blood will be drawn through the tubes and sent through the machine. The machine will collect your stem cells and the rest of your blood will be returned to you.

After your procedure

Most people can return to their regular activities the day after their donation. We'll follow up with you after your procedure to see how you're feeling.

Bone marrow harvesting

Bone marrow harvesting is the procedure used to collect stem cells from your bone marrow. Bone marrow can be removed from different sites on your body, such as your breastbone and the front and back of your hips. These are called harvest sites. The most common harvest site is the back of your hips. You'll get general anesthesia (medicine to make you sleep) for your procedure.

Before your procedure

- You may need to give a unit (about a pint) of blood 2 weeks before your procedure. If needed, this blood will be given back to you in the recovery room. It will help increase your energy levels after the procedure.
- You'll need to have a responsible care partner take you

home after your procedure. This is because you'll probably be sleepy from the anesthesia.

Instructions for eating and drinking

To get ready for the anesthesia, you'll need to follow special instructions the night before and morning of your procedure.

- Stop eating at midnight (12 a.m.) the night before your procedure.
- Between midnight and 2 hours before your arrival time, do not eat or drink anything except certain clear liquids. Your care team will give you a list of the clear liquids you can have.
- Stop drinking 2 hours before your arrival time. This includes water.

If you take a GLP-1 medicine, tell your care team. You will need to follow different eating and drinking instructions.

During your procedure

Your bone marrow harvesting procedure will be done in the operating room. Since the harvest site is usually the back of your hip bones, you'll probably be lying on your stomach. Once you're asleep, your doctor will put a needle through your skin and into your bone to take out the marrow.

The amount of bone marrow that will be removed depends on the patient's weight and illness. Your weight and size may also limit how much you can donate.

Your body will naturally replace the bone marrow in 2 to 3 months after the procedure.

After your procedure

When you wake up, you'll be in the Post Anesthesia Care Unit (PACU). You may have some pain or soreness at your harvest sites. You'll get pain medicine to help with any discomfort. You'll also get a prescription for pain medicine to take at home, if needed.

Most people go home the same day as their bone marrow harvesting procedure. You should be back to feeling normal within 7 to 10 days, but many people feel better within a few days. You'll get pain medicine and specific instructions on how to care for yourself at home. We'll also follow up with you after your procedure to see how you're feeling.

You will not be able to do any strenuous exercise (such as running, jogging, or aerobics) or play any contact sports (such as football, soccer, or basketball) for 1 week after your procedure.

It's important to follow a well-balanced diet high in iron for

2 months after your procedure. To learn more, read *Iron in Your Diet* (www.mskcc.org/pe/iron-diet). Some people need to take an oral iron supplement for a little while after their procedure to help their bone marrow recover. If you do, your doctor or NP will give you a plan for taking the supplement.

If you have questions or concerns, contact your healthcare provider. A member of your care team will answer Monday through Friday from 9 a.m. to 5 p.m. Outside those hours, you can leave a message or talk with another MSK provider. There is always a doctor or nurse on call. If you're not sure how to reach your healthcare provider, call 212-639-2000.

For more resources, visit www.mskcc.org/pe to search our virtual library.

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