CONSENT TO PARTICIPATE IN RESEARCH

AUTOLOGOUS PERIPHERAL BLOOD STEM CELL TRANSPLANT FOR ACUTE NON-LYMPHOCYTIC LEUKEMIA (AML)

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You are invited to be in a clinical research study. Taking part in any clinical research involves risks and may provide some benefits. You need to understand these risks and benefits to make an informed decision about whether or not to be in this study. This research does not involve treatment and is data collection only.

At the University of Minnesota, transplants are primarily done for blood related cancers using someone other than the patient as a donor of the blood or bone marrow cells used for the transplant. For this reason, in order to learn more about the outcomes of transplants where patients are their own donors (autologous), you are being asked to allow routine clinical data to be collected and maintained in OnCore, the Masonic Cancer Center's (MCC) clinical database and specific transplant related endpoints in the University Of Minnesota Blood and Bone Marrow Transplantation (BMT) Database.

This form is called a consent form. The purpose of this form is to let you know about a research study being done here at the University of Minnesota Medical Center. It tells you about the purpose, risks and benefits, and describes what is involved in the study. It also tells you what other choices you have. Once you understand the study. You will be asked to sign this form if you wish to take part. To help you decide if you want to take part in this study, you should:

- Read this form.
- Write down your questions.
- Ask your doctor questions about the study.
- Have your doctor explain anything that you do not understand.
- Discuss it with your family or close friends.
- Take time to think about whether you want to take part in this study.

You will have a copy to keep as a record.

Although not part of this consent process, the description of a typical autologous transplant with the expected risks is attached to this document. Your doctor may alter this plan based on your individual disease and medical needs.

Research studies only include people who want to take part in the study. Please take time to make your decision. We encourage you to discuss your decision with your doctors, family, and friends. You will receive all appropriate medical care whether or not you decide to be in the study.

This study is being conducted by the University of Minnesota Medical Center. The principal investigators in charge of this study are Dr. Daniel Weisdorf, Dept of Medicine and Dr. Paul Orchard, Department of Pediatrics. If you need to contact Dr. Weisdorf or Dr. Orchard, please call 612-624-3101 or 612-626-1926 or write to MMC 286, 420 Delaware Street SE, Minneapolis, MN 55455.

Contact information for emergencies after hours or on weekends or holidays:
Call (612) 273-3000, the University of Minnesota Medical Center Switchboard operator. Ask to have the BMT Physician On Call paged.

Background Information

You have acute non-lymphocytic leukemia (AML), a cancer of the bone marrow. It is likely that the cancer will return despite treatment including chemotherapy. Because these diseases are unlikely to be cured with conventional treatment and your doctors expect your disease to progress after the treatment you have already received, you are invited to join this autologous transplant study. The therapy is designed to aggressively treat your disease and reduce the chances that it will recur. This approach uses high doses of chemotherapy in an attempt to reverse the disease process. Because this therapy eliminates normal bone marrow as a side effect, new bone marrow or stem cells must be supplied.

There are four steps to this treatment:

1. Priming – prepare the stem cells in your body for harvest
2. Harvest – remove stem cells from your body
3. Chemotherapy – treat your disease and prepare your body for transplant
4. Transplant – give you back the harvested cells

These steps are all standard treatment for AML. A treatment plan summary about each of these steps is in **Appendix A** of this consent.

Purpose of This Research

The primary purpose of this study is to record outcomes and patient characteristics in the Cancer Center's and BMT databases for patients who are undergoing an autologous transplant for the treatment of AML. The data will be analyzed for transplant "milestones" such as time to blood count recovery and how patients are doing at 3 months, 6 months, 1 year and 2 years after the transplant.

Potential Benefits

There may not be benefits to you or others from your taking part in this research. However, possible benefits to others include helping researchers learn new information that may help people in the future.

Risks/Discomforts
The only risk to agreeing to this data collection study is a small risk of loss of confidentiality. Your name and other direct identifiers will be stored in both the Cancer Center's database and the BMT database, although both of them reside on the University Of Minnesota computer server and are restricted in their access. No information directly identifying you will be presented or published by this study.

The risks of the standard of care treatment are listed in **Appendix B** of this document.

Compensation
In the event that this research activity results in an injury, treatment will be available, including first aid, emergency treatment and follow-up care as needed. Care for such injuries will be billed in the ordinary manner, to you or your insurance company. If you think that you have suffered a research related injury let the study physicians know right away.

Protected Health Information (PHI)
Your PHI created or received for the purposes of this study is protected under the federal regulation known as HIPAA. Refer to the attached HIPAA authorization for details concerning the use of this information.

Confidentiality
All necessary steps will be undertaken to avoid identifying you in public presentations except after your request and with written consent to do so. The results of this study treatment may be published in scientific journals in the future, but no one (including you) will be identified. Information concerning your transplant course may be transmitted to appropriate national and international transplant registries, the Food and Drug Administration (FDA) and other authorized study organizations. However, you will not be identified by name in publications or reports released by such groups.

If you decide to participate in this study, some private health information about you will be stored in a computer database at the University of Minnesota Cancer Center. This information will include your name and medical record number, your date of birth, your diagnosis, your race/ethnicity, and information about your participation in this study. The purpose of storing this information is to assist the Cancer Center in creating reports about research and in making sure that research studies are being done correctly. Your information will not be used for any other purpose. There are no plans to erase information from the database. It will be stored indefinitely at the University of Minnesota Cancer Center.

Organizations that may inspect and/or copy your research for quality assurance and data analysis include:

- The University of Minnesota Institutional Review Board (IRB), a group of people who review the research study to protect your rights;

- The University of Minnesota Masonic Cancer Center and/or their designee
- Government agencies including the Food and Drug Administration (FDA), the Office for Human Research Protections, (OHRP), the National Cancer Institute (NCI). These agencies may review the research to see that it is being done safely and correctly.

If your records are copied for quality assurance or data analysis, your name and other identifiers will be blacked out on the copies to preserve confidentiality.

A description of this clinical trial will be available on http://www.ClinicalTrials.gov, as required by U.S. Law. This Web site will not include information that can identify you. At most, the Web site will include a summary of the results. You can search this Web site at any time.

Alternatives to Participation
You could receive the same treatment without participating in this data collection research study. Alternative treatments include a donor (allogeneic) transplant or additional chemotherapy. You may elect to receive other forms of treatment here or elsewhere. You can also choose to not receive treatment at this time.

Voluntary Nature of the Study
You are free to withdraw from participation in this study at any time, for any reason. However, withdrawal after initiation of treatment could be life-threatening or even fatal, and may not be reasonable. A decision not to participate or withdraw at a later time will not jeopardize your ability to receive medical care at present or in the future. Your decision to participate in this research is voluntary.

New Information
If during the course of this research study, significant new findings are discovered which might influence your willingness to continue, the researchers will inform you of those developments.

Questions
If you have any questions about this treatment, you are encouraged to contact Dr. Daniel Weisdorf (612-624-3101) or Dr. Paul Orchard (612-626-1926) in the Division of Bone Marrow Transplantation.

Contacts and Questions
This research has been reviewed and approved by an Institutional Review Board (IRB) within the Human Research Protections Program (HRPP). To share feedback privately with the HRPP about your research experience, call the Research Participants' Advocate Line at 612-625-1650 or go to www.irb.umn.edu/report.html. You are encouraged to contact the HRPP if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

Statement of Consent

I have read the above information and have had adequate opportunity to discuss my questions. I consent to participate in this study.

_____
Printed name of the subject

_____ _____
Signature of subject Date

I have explained fully the above objective of this study, what is to be expected, and the possible complications.

_____
Printed name of counseling physician

_____ _____
Signature of the counseling physician Date

IF USING A SHORT FORM TO CONSENT, THE WITNESS SIGNATURE BLOCK MUST BE COMPLETED BELOW:

My signature below documents that the information in the consent document and any other written and information was accurately explained to, and apparently understood by, the participant, and that consent was freely given by the participant.

_____ _____
Signature of Witness to Consent Process Date

_____
Printed Name of Person Witnessing Consent Process

Signature Block for Adult Unable to Consent:

Your signature documents your permission for the named participant to take part in this research.

_____
Printed Name of Participant

_____ _____
Signature of Legally Authorized Representative Date

_____ _____
Printed Name of Legally Authorized Representative Date

_____ _____
Signature of Person Obtaining Consent Date

_____ _____
Printed Name of Person Obtaining Consent Date

Appendix A: Procedures

Pre-transplant evaluation:
If you decide to take part in this study and have signed the informed consent, you will be evaluated to make sure it is safe for you to participate in the study. Before starting treatment in this study, your doctor will check your general health. You will have the following tests and evaluations to find out if you can participate:

- Medical history and physical examination, including height and weight.
- Blood tests (approximately 4 – 5 tablespoons)
  - 30 ml (2 tablespoons or 1 oz) of blood will be drawn to test for exposure to Hepatitis, and to have blood tests performed. You have the right to request to review the results of all tests. If your initial blood tests are abnormal, you will be notified of this. We will suggest that a Blood Bank physician contact your personal physician regarding possible further studies and the significance of any positive tests. We must also notify the Minnesota Department of Health if you are found to have Hepatitis. If you have Hepatitis we will refer you to the appropriate physicians and counselors.
- Urine tests
  - Electrocardiogram (ECG or EKG), a picture of the electrical action of the heart)
  - Echocardiogram (a picture of the heart in motion made using ultrasound or sound waves) or MUGA scan (a picture of your heart after a small amount of radioactive material is injected into the bloodstream through a vein) to evaluate your heart function
  - Pulmonary Function Test (PFT), which is a breathing test that tells how your lungs are working, measures the amount of air taken into your lungs and exhaled as you breath)
  - Bone marrow biopsies and aspirates. A bone marrow aspiration is a procedure where an area of the hipbone is numbed and a small sample of bone marrow is withdrawn. A bone marrow biopsy is similar to an aspiration, except a sample of bone is removed through the needle.
  - If you are a woman able to have children, a serum pregnancy test will also be performed. If you are pregnant, you will not be able to take part in this study.

Some additional tests may be done to evaluate your disease. These tests will help your doctor determine the amount of disease you have at the start of treatment and to follow the status of your disease throughout your treatment.

Treatment
If the pre-transplant evaluation demonstrates that transplantation treatment may be appropriate, the treatment course will be as follows.

1. **Catheter:** A large double-port catheter will be surgically put into a large vein leading towards your heart, if one is not already in place. This catheter will be used for giving chemotherapy and drawing blood. It will also be used for giving transfusions and antibiotics as needed during the transplant course. This type of catheter is routinely used for all transplant patients.

2. **Priming the Body for Stem Cell Harvest:** For harvesting of peripheral blood stem cells, in order to decrease the number of leukemic cells, increase the number of healthy, non-leukemic cells and increase the number and growth potential of peripheral blood stem cells, you will be given high doses (priming dose) of the anti-cancer agents, cyclophosphamide (1 day), etoposide (2 days), and dexamethasone (2 days) in the hospital. A daily injection of a blood growth factor called G-CSF (granulocyte-colony stimulating factor) begins after the chemotherapy is completed and is given on a daily basis in the clinic. As your marrow and peripheral blood cell counts are returning to normal levels a peripheral blood harvest will be performed.

3. **Stem Cell Mobilization:** To get the stem cells needed for the transplant, peripheral blood stem cells will be used if possible. If there is a reason that it is not safe to collect stem cells from the blood, bone marrow may be harvested in the operating room. A drug that increases the number of marrow cells, called GM-CSF (granulocyte-macrophage colony stimulating factor) will be given every day subcutaneously for 5 days in the clinic prior to collecting marrow to increase the number of marrow cells should this be necessary.

4. **Stem Cell Harvest:** Peripheral blood stem cells are collected by leukaphoresis (removal of white blood cells with a continuous flow centrifuge) in the Blood Bank Donor Center. At least four of these blood stem cell collection procedures (lasting 4-5 hours each) will be performed, unless fewer collections obtain enough cells. If enough cells are not obtained, then you will be scheduled for a bone marrow harvest in the operating room (you will be given a consent to sign for that procedure). You will have 1 week with no growth factors, followed by 1 dose subcutaneously every day for five days of GM-CSF (granulocyte-macrophage colony stimulating factor) as an outpatient before the marrow is harvested.

5. **Chemotherapy and Irradiation:** Before the transplant, to kill the leukemia cells you will undergo chemotherapy and radiation, or chemotherapy alone. The doctors will determine which of these treatments is best for you, depending on whether or not you are able to receive radiation.

    ____ **Chemotherapy and Irradiation:** You will be given total body irradiation twice daily for 4 days (7, 6, 5 and 4 days before the transplant) followed by high-dose chemotherapy (cyclophosphamide given 3 and 2 days before transplantation). You will then receive intravenous reinfusion

of all the previously collected and frozen stem cells. One day later, growth factor (G-CSF) treatment will begin in order to accelerate blood recovery.

____ **Chemotherapy Alone:** If you cannot receive radiation, chemotherapy may be substituted for radiation. In this case, busulfan will be given intravenously 7, 6, 5 and 4 days prior to the transplant in the hospital, followed by 2 days of cyclophosphamide (3 and 2 days before the transplant). After reinfusion of the stem cells, growth factor treatment will be given to accelerate blood recovery.

6. Transplant Day: On transplant day you will receive the stem cell transplant, which is given intravenously through your line.

Follow-up and Care After the Transplant

Frequent physical exams and blood tests will be done to check for blood count recovery and to look for side effects. During the first 2-3 weeks after the transplant, up to 2 tablespoons of blood will be drawn daily. Appropriate supportive care is given to all patients after a transplant. This may include transfusions of red blood cells or platelets, antibiotics to prevent or treat infections and drugs to encourage bone marrow recovery.

Blood will be drawn less frequently as blood counts improve. Milestone blood samples are taken at day 21, 28, day 100, 1 year and as required by medical status yearly for 2 years after transplant. Bone marrow aspirations are performed on day 28, 6 months, one year, and 2 years if medically necessary.

After blood count recovery and discharge from the hospital, at least weekly follow-up visits in the outpatient clinic will occur for the 1st 3 months after the transplant. Routine clinic follow-up is required at 6, 12 and 24 months after the transplant with at least yearly contact (in person, by phone or mail) after that.

Appendix B - Risks of Standard Treatment

Transplant risks: Many of the risks involved in being in this study are the basic risks of undergoing a bone marrow or stem-cell transplant in the first place. You'd have those risks even if you had a transplant without being in a study.

RISKS OF STEM CELL TRANSPLANTATION
The following problems may occur as a result of the transplantation of stem cells; these are risks that would be present whether such a transplant was done as part of a study or not:

1. **Slow recovery of blood counts.** The red blood cells, white blood cells and platelets can be slow to recover after stem cell transplantation. Until your counts recover you will be dependent on blood and platelet transfusions, and will be at risk for bleeding and infection. Although infections can be treated with antibiotics, occasionally they can be very dangerous or fatal.
2. **Graft Failure.** The stem cells (the "graft") may fail to grow up inside your body at all. If graft failure occurs, this will result in low blood counts for a long period of time and can be fatal. Should this happen, you may be able to receive a second transplant with stem cells from another person (e.g. a different umbilical cord blood donor or a matched or mismatched parent or brother or sister).

3. Other complications that can result from the transplantation procedure not specifically related to one specific drug or the stem cells or this study include:

    A. **Damage to the vital organs in your body.** This could result in malfunction of any organ in your body such as heart, lungs, liver, gut, kidneys and bladder, brain etc. The lungs and the liver are particularly vulnerable. Some patients will experience severe lung problems due to infections and/or due to a reaction of the lungs to the chemotherapy and radiation. Some patients can suffer veno-occlusive disease of the liver (VOD). This is a complication that may result from high doses of chemotherapy and/or radiation. Patients who have VOD become jaundiced (yellowish skin), have liver function abnormalities, abdominal swelling, and abdominal pain. Although many patients recover completely, these complications may result in organ failure and permanent damage or even death.

    B. **Serious infections.** Full and complete recovery of your immune system may take many months following the initial recovery of your white cell count. During this time, there is an increased risk of infections. You will be prescribed certain medications to reduce the chance of those infections. However, preventative treatments are not always effective. If you have an infection, you may have to stay in the hospital longer or be re-hospitalized after transplant. Infections can be fatal.

C. **Recurrence of disease.** Your disease may recur even if the transplant is initially successful.

D. **Risk to the Unborn:** The treatments in this study have NOT been proven to be safe at any stage of pregnancy. Therefore, if you are pregnant or nursing, you are not eligible for this study. Women who have the potential of becoming pregnant must use some form of effective birth control. Effective birth control would be defined as the following: 1) refraining from all acts of vaginal intercourse (ABSTINENCE); 2) consistent use of birth control pills; 3) injectable birth control methods (Depo-Provera, Norplant); 4) tubal sterilization or male partner who has undergone a vasectomy; 5) placement of an IUD (intrauterine device); and, 6) use, with every act of intercourse, of a diaphragm with contraceptive jelly and/or condoms with contraceptive foam.

E. **Sterility and Future Childbearing Potential for Men and Women:** Chemotherapy and/or irradiation may affect fertility. Male patients may become sterile (unable to produce sperm). Female patients may find that their menstrual cycle becomes irregular or stops permanently. However, this DOES NOT MEAN THAT YOU CANNOT BECOME PREGNANT, and you must use some effective method of birth control. Damage to reproductive tissue may result in birth defects or permanent inability to father a child or become pregnant. You should discuss these risks and options in detail with your doctor before entering this study.

F. **Central Venous Catheter:** There has been considerable experience with central venous catheter use. The most common complications are clotting and local infection which sometimes lead to a generalized infection in the blood. Clotting may require the catheter to be removed or treatment with a fibrinolytic agent (medicines that dissolve blood clots). Infections will be treated with antibiotics, and sometimes, removal of the catheter is required. Occasionally, skin redness at the catheter exit site occurs, this may require antibiotic treatment. There is also a small risk of puncturing the lung at the time of the catheter insertion. If this occurs, placement of a temporary chest tube to reinflate the lung may be required. There are no long-term effects once the lung puncture has resolved.

Priming risks: The three-day treatment with chemotherapy (Cyclophosphamide, Etoposide, and Dexamethasone) to obtain peripheral blood stem cells can produce substantial nausea and vomiting, as well as an increased risk of infections. All patients undergoing transplant develop major suppression of their blood counts requiring transfusions of red cells and platelets and extreme vulnerability to life-threatening infections. Along with the above mentioned side effects, hair loss, mouth sores and infertility are expected after this intensity of treatment. Some patients may develop

injury to the heart or lungs which might become life-threatening or fatal. Bladder irritation from cyclophosphamide (hemorrhagic cystitis) may cause urinary pain or bleeding. Another risk is eventual relapse of the leukemia despite the transplant.

Chemotherapy Risks: To allow the new bone marrow to "take" or grow after transplantation, you will receive radiation, cyclophosphamide and growth factors. The major side-effects of chemotherapy and radiation are nausea, vomiting, diarrhea, hair loss and mouth sores. Your blood counts (red cells, white cells and platelets) will be lowered and red cell and platelet transfusions will be needed to maintain safe blood counts. Also, various kinds of infections may be possible and high fever or other signs or symptoms of serious or life-threatening infections may develop. Your doctors will watch for infection or bleeding problems and treat them as needed.

The priming/chemotherapy drugs may cause the following side effects:

Cyclophosphamide

Common occurs in more than 20% of patients	**Less Common** occurs in 5 to 20% of patients	**Rare** occurs in fewer than 5% of patients
▪ Decreased white blood cell count with increased risk of infection ▪ Hair loss ▪ Nausea ▪ Vomiting ▪ Loss of appetite ▪ Sores in mouth or on lips ▪ Diarrhea ▪ Stopping of menstrual periods in women ▪ Decreased sperm production in men	▪ Decreased platelet count (mild) with increased risk of bleeding ▪ Blood in urine ▪ Darkening of nail beds ▪ Acne ▪ Tiredness ▪ Fetal changes if you become pregnant while taking cyclophosphamide	▪ Scarring of lung tissue, with cough and shortness of breath ▪ Heart changes with high doses

Etoposide

Common occurs in more than 20% of patients	**Less Common** occurs in 5 to 20% of patients	**Rare** occurs in fewer than 5% of patients
• Decreased white blood cell count with increased risk of infection • Decreased platelet count with increased risk of bleeding ▪ Mild nausea ▪ Mild vomiting ▪ Loss of appetite	▪ Constipation ▪ Diarrhea ▪ Pain in stomach ▪ Radiation recall skin changes	▪ Decrease in blood pressure ▪ Difficulty breathing during drug infusion ▪ Rash ▪ Itching ▪ Heart changes ▪ Numbness and

Common occurs in more than 20% of patients	Less Common occurs in 5 to 20% of patients	Rare occurs in fewer than 5% of patients
▪ Changes in taste including metallic taste of foods ▪ Hair loss ▪ Fetal damage if pregnancy occurs while taking this drug		tingling in hands and/or feet related to nerve irritation or damage ▪ Fever ▪ Chills ▪ Allergic reactions

Dexamethasone

Common occurs in more than 20% of patients	Less Common occurs in 5 to 20% of patients	Rare occurs in fewer than 5% of patients
▪ Weight gain ▪ Sodium and fluid retention with swelling of ankles, increased blood pressure, congestive heart failure ▪ Depression ▪ Increased blood sugar ▪ Increased appetite ▪ Sleep disturbance ▪ Increased risk of infection ▪ Bruising of the skin ▪ Mood changes ▪ Delayed wound healing	▪ Decrease in serum potassium (symptoms are loss of appetite, muscle twitching, increased thrist, increased urination) ▪ Fracture of weak bones ▪ Fungal infections(white patches in mouth, vagina) ▪ Sweating ▪ Diarrhea ▪ Nausea ▪ Headache ▪ Increased heart rate ▪ Loss of calcium from bones	▪ Cataracts ▪ Personality changes ▪ Blurred vision ▪ Stomach ulcer which may bleed (hemorrhage)

BUSULFAN (for subjects not receiving TBI):

Common occurs in more than 20% of patients	Less Common occurs in 5 to 20% of patients	Rare occurs in fewer than 5% of patients
▪ Nausea and vomiting ▪ Fever ▪ Headache ▪ Bloody nose ▪ Fewer red and white blood cells and platelets in the blood ▪ Dizziness ▪ Difficulty sleeping ▪ Mood changes including depression and anxiety ▪ Rash with itching and/or hives ▪ Pain and inflammation in the vein through which the drug is given ▪ Back pain or pain in the abdomen ▪ Diarrhea or constipation ▪ Rectal pain or discomfort ▪ Loss of Appetite ▪ A fast heart beat which may cause pain in the chest ▪ Shortness of breath ▪ Fluid build-up in the tissues usually of the lower legs ▪ Inflammation and/or sores in the mouth, throat and/or esophagus ▪ Absence or decrease in the number of sperm and/or damage to the testis which may be temporary or permanent which may decrease the ability to have children in the future ▪ Absence of menstrual cycles (periods) and damage to the ovaries that may decrease the ability to have children in the future ▪ Lower levels of certain salts in the blood such as calcium, magnesium, phosphate, and	▪Weight gain ▪Confusion ▪Temporary hair loss or thinning ▪Aches and pains in the muscles and joints ▪Increased levels of creatinine in the blood which could mean kidney damage ▪Darkening of the skin ▪Elevation in the blood of certain enzymes found in the liver ▪Inflammation or damage to the liver which can be severe and life-threatening and which may lead to an enlarged liver and spleen, bleeding from the veins in the esophagus (the passage that leads from the throat to the stomach), a yellow appearing skin, and fluid collection in the abdomen which makes it look larger. ▪Damage to the bladder which can lead to large amounts of blood in the urine, pain and the urge to urinate frequently and also scarring of the bladder ▪Elevation in uric acid in the blood ▪Redness and burning at sites which have	▪ Convulsions ▪ Vomiting blood ▪ Bleeding into the lungs ▪ A new cancer or leukemia resulting from this treatment ▪ Abnormal heart rate ▪ Damage to the adrenal glands that may affect the hormones that maintain blood pressure and prevent shock in stressful situations ▪ Damage to the lungs that can lead to fluid in the lungs and/or scarring of the lung tissue, cough, and affect your ability to breath and the levels of oxygen in your blood. ▪ Scarring of the heart muscle which could lead to heart failure ▪ Damage to the bone which could lead to arthritis pain and weakness of the bone

Common occurs in more than 20% of patients	**Less Common** occurs in 5 to 20% of patients	**Rare** occurs in fewer than 5% of patients
sodium ▪ High blood sugar which may require treatment ▪ Elevation in the blood of bilirubin found in the liver ▪ A feeling of discomfort or not feeling well and/or tiredness	received radiation in the past ▪Cataracts later in life ▪Enlargement of the breast	

G-CSF

Common occurs in more than 20% of patients	**Less Common** occurs in 5 to 20% of patients	**Rare** occurs in fewer than 5% of patients
• Ache or pain inside the bones	▪ Local irritation at injection site ▪ Increased levels of liver enzymes and uric acid in the blood, low number of platelets in the blood ▪ fever	▪ Allergic reaction, low fever ▪ Enlargement of the spleen and even splenic rupture ▪ worsening of pre-existing skin rashes, ▪ hair loss ▪ Inflammation of a blood vessel in the skin

Risks of Total Body Irradiation

The immediate effects of irradiation may include nausea, vomiting, diarrhea, loss of appetite, painful swelling of the salivary gland under the jaw for a few days, and temporary hair loss. TBI may lower your blood counts. TBI has been associated with causing sterility. Although TBI can theoretically cause abnormalities in children born to transplant survivors, the incidence of genetic abnormalities has not been reported to be greater than the general population. However, this is a potential risk and birth control should be used for at least one year after transplant to minimize risks of conceiving. In addition, there may be a small increased risk of developing other cancers in the future as a consequence of having received TBI and chemotherapy. Cancers that are caused by treatment with chemotherapy or radiation are often fatal.