

# Therapeutic Apheresis Services

## Patient Information Leaflet – Peripheral Blood Stem Cell Collection (PBSC)

### Introduction

This leaflet has been prepared to give you some information about peripheral blood stem cell collection.

If you would like more information or if you have any questions, please ask the doctors and nurses in the NHS Blood and Transplant (NHSBT) Therapeutic Apheresis Services Unit.

When you have considered the information given in this leaflet, and after we have discussed the procedure and its possible risks with you, we will ask you to sign a consent form to indicate that you are happy for the collection to go ahead. Before any further collections we will again check that you are happy to proceed.

### What are Peripheral Blood Stem Cells?

Blood is made up of various different kinds of cells; examples of these are red cells, white cells and platelets. These cells are all carried round your body in fluid called plasma. All the different kinds of blood cell start out as a cell called a 'stem cell'. Stem cells are formed in the bone marrow and then receive chemical signals that tell them which kind of blood cell to become before entering the blood stream.

### Why do we use (need) Peripheral Blood Stem Cells?

When a person is healthy their body is constantly making new cells to replace old cells, but when somebody has cancer the process of making

new cells happens too quickly. Unfortunately the chemotherapy used to kill off the extra cells which the body does not need also kills off normal bone marrow cells and can leave that person short of white cells, red cells and platelets.

After you've had chemotherapy, giving you back stem cells that have been collected from the blood can kick start your bone marrow's ability to form the new blood cells which you need. The process of giving you back your own cells is called a 'stem cell transplant'. Stem cells can also be collected and frozen so that they are available for use at a later date, if further treatment is needed.

### How do we get stem cells into the blood stream?

In order to collect stem cells from the blood we need to get them to move out of the bone marrow. We call this process 'mobilising' the stem cells, and we do this by means of a process called 'priming'. This process involves a course of chemotherapy and blood growth factors Granulocyte Colony Stimulating Factor (G-CSF).



## What is G-CSF?

G-CSF is a hormone produced naturally by the body which helps produce stem cells in the bone marrow.

When it is given artificially it encourages stem cells to move from the bone marrow into the blood stream, where they can be collected.

G-CSF is given in the form of injections, which you get daily for a number of days before and until your stem cell collection is complete. The hospital treating you will supply you with the injections and arrange for them to be given.

## When do we collect the stem cells?

With chemotherapy, the white cell count may fall to a very low level before rising again. The best time to collect stem cells is when the white cell count in the blood begins to rise rapidly.

When G-CSF alone (without chemotherapy) is used the collection will start on day 5.

Blood counts are monitored in the days leading up to the collection dates. On the day we think the blood count should be high enough to start the collection, a further test called a CD34 test is done. This test is often carried out at the Therapeutic Apheresis Services Unit where the collection will take place. The CD34 test is used to count the number of stem cells in the blood. The test result will determine whether the collection goes ahead that day and it can take about an hour to obtain the result. If a collection is not going to be carried out another CD34 test may be performed the following day, and then each day until the level is high enough for us to collect the stem cells. There is a possibility the blood count may not reach a high enough level at all, in which case we will not be

able to collect the stem cells. If this happens your consultant will discuss with you what other options are available.

## How do we perform stem cell collections?

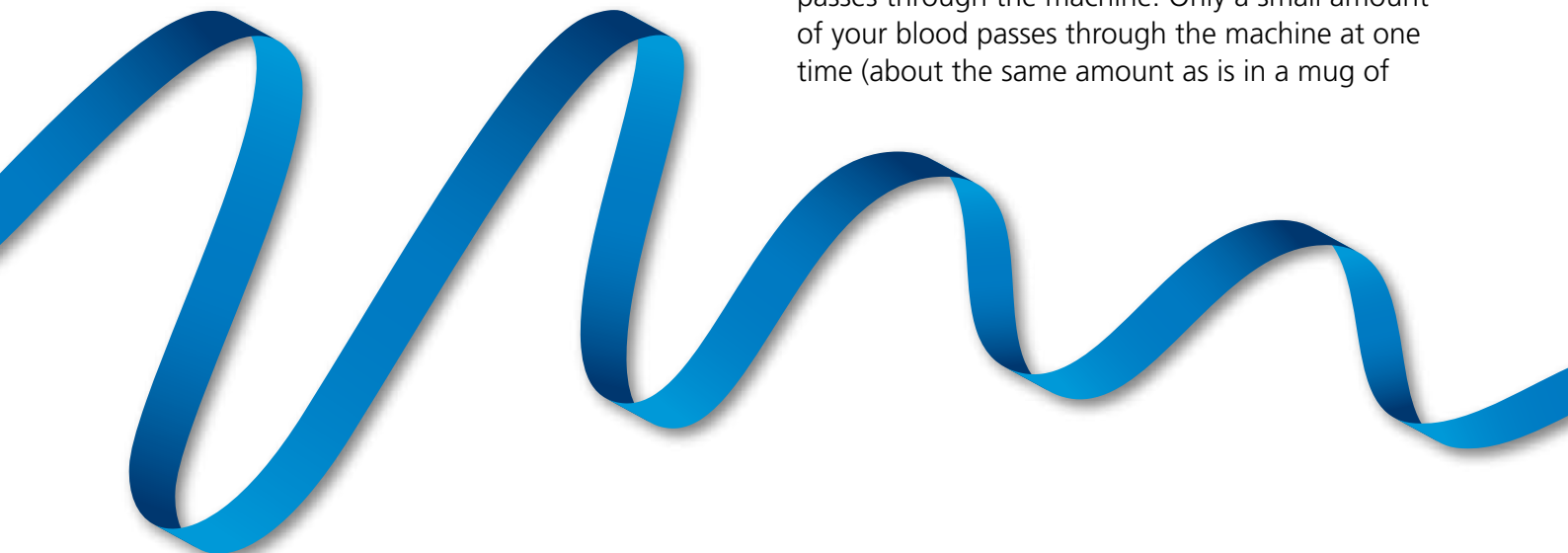
Stem cells are collected using a machine called a Blood Cell Separator which takes the stem cells out of your blood and returns the rest of your blood back to you.

Before the collection the nurses at the Therapeutic Apheresis Services Unit will check your blood pressure, pulse and temperature and make sure you are generally fit enough to have the procedure.

You will have had a number of blood tests done before the dates for your collection, including blood tests to check if you have been exposed to HIV, Hepatitis B, Hepatitis C, HTLV (Human T-Lymphotropic Virus) or syphilis.

These tests are routine and essential for everyone donating blood, even if they are donating for themselves. We may take more blood samples along with your stem cells on the day/s of your collection to again check your exposure to these viruses. You and your doctor will be informed if there are any abnormal results.

In order for us to collect the stem cells, a needle will be put into a large vein in each arm (unless you have already had a central venous catheter or central line inserted). If you wish you may have a small injection of local anaesthetic to numb the skin before we insert the needles. The machine will then draw blood in from the needle in one arm and return it through the needle in your other arm. The stem cells are collected from the blood as it passes through the machine. Only a small amount of your blood passes through the machine at one time (about the same amount as is in a mug of





coffee) and the stem cells are collected very slowly. It is essential that there is a steady flow of blood through the machine, and to ensure this we need to use healthy, good-sized veins.

If the veins in your arms are not suitable, you may need to have a special central line inserted into a larger vein in your neck or groin under a local or general anaesthetic. We can then remove and return blood through this line. If this is necessary you will be given more information about the type of line to be used, why it is needed and how it would be inserted.

## How long does it take?

Collecting stem cells usually takes three to five hours depending on how much blood we need to process through the machine and on the dose of stem cells requested by your doctor. We may also collect some plasma from your blood at the same time as we collect the stem cells to be used by the laboratory to help store the cells.

## What happens during the collection procedure?

Your safety and comfort are of the utmost importance to us and a trained nurse will look after you throughout the procedure.

The stem cells will be collected while you rest on a reclining chair or bed. We will try to make you as comfortable as possible and you should not hesitate to ask for anything you need during the procedure. For your comfort it is best to wear loose-fitting clothing.

A stem cell collection is normally an outpatient procedure, but sometimes you may have to be admitted to hospital for one day or for several days, for example if a central line is being inserted. If this is the case all necessary arrangements will be made for you.

As your blood enters the cell separator, an anticoagulant (blood thinner) solution is added to it to stop it clotting in the machine. This can cause any of the following symptoms:

- tingling in your lips, nose or fingers
- a metallic taste in your mouth
- nausea and/or a 'shaky' vibrating sensation that may or may not be unpleasant.

Such side-effects are caused by the solution temporarily lowering the body's calcium levels. Some people experience a 'heavy' feeling in the arm as their blood is removed. You may also feel some vibration around the site of the needle. These symptoms will stop once the procedure is finished. If you experience any symptoms that cause you concern or distress let the nurse know as soon as they occur so that we can deal with them at once.

Some red cells and platelets will be removed from your blood along with the stem cells. This is an unavoidable part of the procedure, and on rare occasions a drop in the platelet count might require that platelets are transfused before or after the collection.

Occasionally we cannot return the blood that is in the machine back to you which means you will lose some red cells as a result. The machine only holds a relatively small amount of blood at any one time, and this loss should not cause any problems. We will however routinely check your blood count before and after the procedure to ensure that the levels remain safe.

## How can I prepare for the treatment?

It is important to have something to eat and drink before the procedure and you can eat and drink normally during and after a stem cell collection. Please bring some food with you as the day can be very long. Food such as sandwiches and rolls are easiest to eat when attached to the machine.

We can offer a limited range of hot and cold drinks and savoury and sweet snacks such as crisps or biscuits. We have no facilities for preparing hot food, however there are catering outlets in the hospitals near most of our units which you may like to visit before or after the procedure.

Once you are connected to the machine you will be unable to visit the toilet so please go immediately before your treatment starts. Assistance will be provided if you do need to use the toilet once you are attached to the machine. Commodes, urinals and bed pans are available for use.

You are welcome to bring a friend or relative to sit with you during the stem cell collection. Try to avoid bringing children as you will be attached to a machine and therefore will be unable to attend fully to their needs. If you do have to bring children with you it is preferable that another adult accompanies you to take care of them.

## How many stem cell collections are required?

The number of procedures will depend on the number of cells your consultant has requested and on how well the stem cells mobilise into the bloodstream. This may mean that one single procedure is enough, or that you may need to have two or three. We will know within a few hours how many cells have been collected and this result will determine whether you need to attend the following day.

Occasionally it is not possible to collect enough stem cells. If your blood count does not reach a high enough level we may not attempt a collection at all. Sometimes we may start collections but not achieve a high enough dose. If either of these situations occurs, your consultant will discuss future options with you.

## How will I feel after treatment?

Some people feel tired after the procedure, so it is advisable that a friend or relative takes you home afterwards. If this is a problem it may be possible for transport to be arranged. Please inform your nurse or doctor in advance so that they can help with arrangements if needed. **You should not drive yourself home.** You should not do any hard physical exercise for the rest of the day.

## What happens next?

Your cells may be given back to you soon after collection or they can be frozen. After they are frozen stem cells can be stored for many years. Your consultant will have discussed the follow up to your treatment with you and if and when cells are to be returned to you. If you have any further questions please do not hesitate to contact the Therapeutic Apheresis Services team or your doctor.

Please Note: It is important to arrive on time for your appointment as another patient may be booked for treatment after you.

Please do not hesitate to phone us if you have any questions or concerns. We are here to help you.

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### NHS Blood and Transplant

NHS Blood and Transplant (NHSBT) saves and improves lives by providing a safe, reliable and efficient supply of blood and associated services to the NHS in England and North Wales. We are the organ donor organisation for the UK and are responsible for matching and allocating donated organs. We rely on thousands of members of the public who voluntarily donate their blood, organs, tissues and stem cells.

#### For more information

Visit [nhsbt.nhs.uk](https://nhsbt.nhs.uk)

Email [enquiries@nhsbt.nhs.uk](mailto:enquiries@nhsbt.nhs.uk)

Call **0300 123 23 23**