



**Information for patients
undergoing peripheral
blood stem cell collection in
preparation for autologous
peripheral blood stem cell
transplantation**

Building healthier lives

What are peripheral blood stem cells?

Stem cells are immature parent cells which live in the bone marrow. From these stem cells, all of your blood cells including red cells, white cells, and platelets grow and develop. Stem cells can be encouraged to leave the bone marrow and enter your blood stream by using a natural growth hormone, granulocyte stimulating factor (GCSF). This is also known as mobilisation.

Why do we need to collect stem cells from you?

Chemotherapy suppresses the stem cells that live in the bone marrow and therefore all other cells that grow from the stem cells. Without stem cells, you become anaemic and are susceptible to bleeding and infections. By collecting and freezing your stem cells prior to chemotherapy, this enables us to safely give you higher doses of chemotherapy, as we can reinfuse the stem cells back to you after the chemotherapy to hasten the recovery of your bone marrow. Receiving your own stem cells back is called an autologous peripheral blood stem cell transplant.

What happens before the collection?

Before you undergo a stem cell collection (also known as apheresis or harvest), you will meet a specialist Apheresis Nurse. The nurse will explain the stem collection procedure and answer any questions that you may have. They will also organise to take a blood sample from you to test for infections such as HIV, hepatitis and syphilis, which need to be done before your cells can be collected, processed and stored. You will need to consent to these tests as your stem cell collection cannot take place without these tests being done. Also for females of childbearing potential, a pregnancy screen must be performed prior to starting the course of GCSF injections.

How do we get the stem cells ready to be collected?

To collect stem cells from your blood the doctor will prescribe a course of GCSF injections, a natural growth hormone that encourages

the stem cells from the bone marrow into the peripheral blood (this is known as mobilisation). The Apheresis Nurse will give you an appointment with the dates of when to commence GCSF injections, the doses required and the date your stem cell collection will take place. These are documented at the back of this leaflet.

- **GCSF mobilisation post-chemotherapy treatment**

If we are collecting stem cells after chemotherapy, the GCSF injections are usually given daily at roughly the same time. They start the day after chemotherapy, depending on the type of chemotherapy that you have received. When we prescribe the GCSF injections, we will tell you when you should start receiving the injections and for how long. You will need to attend hospital for blood tests on a Monday, Wednesday and Friday following your chemotherapy treatment so that we can monitor when you are ready for collection. Your Apheresis nurse will let you know when and where to have your blood tests done.

- **GCSF-only mobilisation**

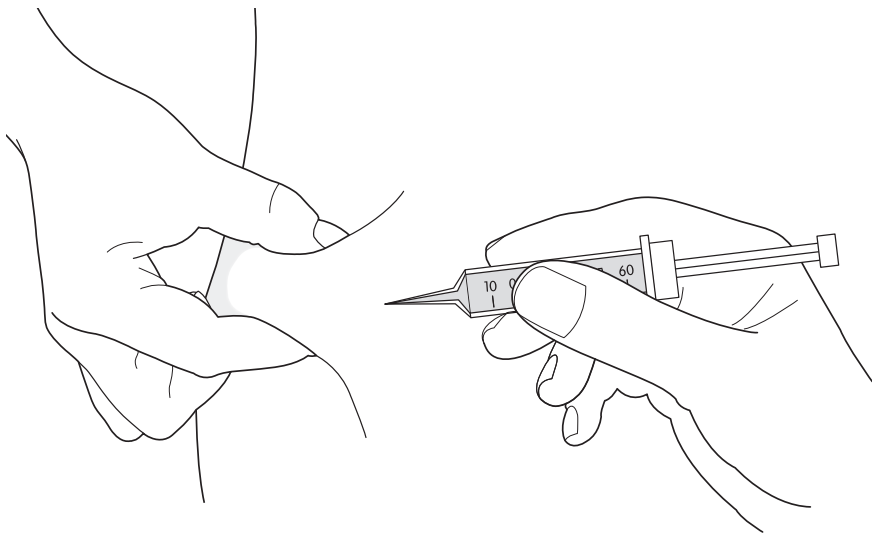
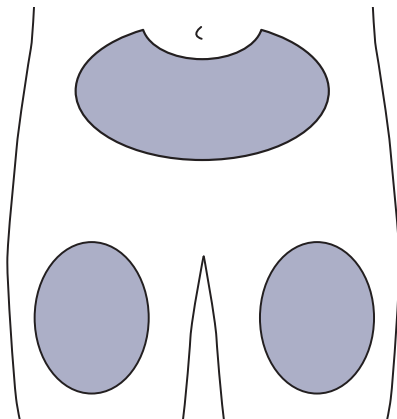
If the stem cells are to be collected using GCSF injections alone, the GCSF injections will be given daily at approximately the same time for four days. You will be given an appointment for stem cell collection five days from the start of the GCSF injections and asked to bring the fifth day's injection with you on the day of collection.

How is GCSF given?

The GCSF injections are pre-filled syringes that should be stored in the fridge. They are injected just under the skin at a site that suits you (see step-by-step guide). Most patients prefer to do their own injections after being taught by the nursing staff. However, it is possible to make alternative arrangements if you do not wish to self-inject (e.g. a practice nurse, district nurse, Apheresis Nurse or even a reliable friend or relative can be taught). GCSF injections will be given daily but they should be given at approximately the same time each day. The most suitable places for the injections are the back of the arms, top of the thighs and the stomach.

Step-by-step guide to give GCSF

1. Wash and dry your hands carefully
2. Remove the correct number of pre-filled GCSF injections from their packaging. You may need several injections each day to make up the correct dose. Your Apheresis Nurse will explain what dose you need and it is also written at the back of this booklet
3. Choose your injection site.
Alternate your injection sites regularly to reduce discomfort and allow tissue recovery
4. With thumb and forefinger, grasp a 'pad' of flesh (this is subcutaneous or fatty tissue) and insert the needle at an angle of 90 degrees



5. Depress the plunger fully until you hear a click, then withdraw the needle from the skin. As the needle is removed, a safety cover will extend over the needle to prevent any accidental injury
6. Dispose of all used syringes into a yellow sharps disposal container immediately

7. Wash and dry your hands again
8. Bring any unused syringes and the yellow sharps container back to the Apheresis Unit on your stem cell collection day

You should not miss doses or stop the injections unless you are told to do so. This could affect the success of your stem cell collection.

Are there any side effects of GCSF?

The GCSF may cause some pulsating bone pain (as your bone marrow is being stimulated to produce stem cells) and make you feel a little like you have the flu. Taking simple painkillers such as paracetamol will help with this but please ensure you do not exceed the recommended daily dose. A warm bath may also help relieve the discomfort.

If you feel very unwell or have stomach, chest pain, or shoulder tip pain, please contact the hospital who prescribed your GCSF for further advice or go to your nearest accident and emergency department if outside of normal working hours.

In rare circumstances, splenic rupture (a ruptured spleen) may occur as a result of GCSF injections, therefore if you have any of the following, please go to your nearest accident and emergency department immediately:

- Any upper left side abdominal pain
- A feeling of fullness
- Any type of abdominal discomfort

When will my stem cells be collected?

You will need to attend the Apheresis Unit in the Centre for Clinical Haematology (CCH) at 08:00 on the day we expect your cells to be ready for collection. You will find your allocated date at the back of this booklet. On this day, you will have a blood test which will tell us if there are enough stem cells circulating in your blood stream to be collected. The results of this test take about two hours to come back. If your blood count is suitable you can proceed for stem cell collection.

If your blood count is not high enough, you will not be ready for stem

collection that day. We will give you an injection of Plerixafor and delay the collection until the following day. Plerixafor is only licensed for lymphoma and myeloma patients.

Plerixafor given with GCSF helps to release stem cells from the bone marrow into the blood stream. Plerixafor needs to be given by a nurse in the Apheresis Unit at 18:00 on that evening. You will need to stay for 30 minutes to be monitored for any reactions to the drug. The following day you will need to attend the Apheresis unit in CCH at 08:30 for stem cell collection. We appreciate this may be inconvenient for you but the timing of the drug is essential to ensure we do our best to achieve a successful stem cell collection.

If on the first day we do not collect enough stem cells, you will need to take more injections that evening and come back the next day or two for further collections.

Are there any side effects of Plerixafor?

While being treated with Plerixafor some of the most common side effects you may experience include diarrhoea, nausea, vomiting, fatigue, redness and swelling at the injection site, pain in your joints, headache and dizziness.

Less common side effects that have been reported in some patients include abdominal pain and swelling, excessive sweating, dry mouth, redness of the skin, stomach discomfort, constipation, indigestion, muscle or bone pain, reduced sensation or generally not feeling well. You should let your doctor know if you have difficulty breathing, eye swelling or hives shortly after your Plerixafor injection as these could be signs of an allergic reaction to Plerixafor. You should also let your doctor know if you feel lightheaded. Some patients have experienced a sudden drop in their blood pressure when standing from a lying or sitting position. Do not stand up abruptly from a lying or sitting position on days when you are taking Plerixafor. Allergic reactions and low blood pressure usually occur within one hour of Plerixafor administration.

How will my stem cells be collected?

We will place a needle in your arm and blood will be drawn out and into a machine called a cell separator. Here it will be spun and the stem cells separated out and collected in a bag. We will only need to collect about 300ml in total (less than a normal blood donation). The remaining blood will be returned to you through a needle or cannula in your other arm. The whole process usually takes approximately four to six hours. Once collected, the cells are sent to the National Blood Service Laboratory in Birmingham, counted, frozen and stored.



Please be aware that you may be required to attend the apheresis unit on several consecutive days to ensure that we have enough stem cells for your transplant.

What complications might I expect whilst on the machine?

Most people have no problems during the collection and only very rarely do we need to stop the procedure. It is not painful but can be a little uncomfortable. It can also be quite tedious as you are unable to move around.

You may experience some tingling. This often occurs around the mouth initially and is caused by a low calcium level in your blood. This is caused by citric acid that is mixed with your blood while it is in the machine to prevent it from clotting. It is important to inform the nurses if you experience this and it is easily counteracted by giving you some calcium tablets to chew. Occasionally if the tingling does not improve

following the calcium tablets then calcium will be given intravenously (directly into your vein).

Very occasionally patients experience low blood pressure whilst on the machine. This is more likely if you have been taking tablets for high blood pressure so we will usually ask you not to take these on the morning of the procedure. Please check with the apheresis team if you take any other regular medication as these may also need to be paused for the procedure.

Sometimes we have difficulties with the flow of blood from the needle in your arm. This may be a problem if your veins are very small, or if you have had a lot of chemotherapy given through them in the past. Very rarely we have to put a temporary catheter into a large vein in the groin to get around this. This will only remain in place for the collection procedures. If we think that you may need one of these lines the doctor will discuss it with you. If a groin line is required, it will usually mean that you will need to stay in hospital for the line to be cared for and might also require low doses of a blood thinning drug to prevent clots from forming around the line. The line will be removed as soon as possible after we have collected sufficient stem cells.



Do I need to bring anything with me on the day or make any special arrangements?

You will be attached to the machine for most of the day so you may wish to bring something with you to occupy you during the procedure, such as a book or magazine. We also have some portable DVD players or you can bring your own electronic device as we have free WiFi available. Any such mobile devices are brought in at your own risk and should be used with your own headphones. You are welcome to bring a friend or relative with you to keep you company during the procedure. It is also advisable to wear comfortable clothes and loose or short sleeves that allow easy access to your arms.

You will be able to eat and drink normally during the day. We do provide tea, coffee, biscuits and lunch but feel free to bring in your own snacks too. Please be aware that we cannot disconnect you from the collection machine to go to the toilet until the procedure is finished. If you need the toilet during the procedure the apheresis team can help you use a bedpan or bottle.

You are likely to feel very tired after the procedure and therefore we advise that you do not drive and that you arrange for someone to take you home afterwards. If you need hospital transport at any time, please let us know.

Free parking (car park D only)

If you arrive by car please park in car park D and take the ticket as normal. Give your parking ticket to the Apheresis Team and they can give you an exit ticket so you can receive free parking. Directions can be found on the Trust's website: www.uhb.nhs.uk.

What happens after the collection?

Once the procedure is completed you will be monitored for a short time to ensure you feel well before going home. Your cells will be sent straight to the lab for counting and storage. You will need to remain contactable by phone once you leave the Apheresis Unit so that we

can let you know later that day if you have collected enough cells.

If we have not collected enough cells you will need to have another dose of GCSF (and maybe Plerixafor) that evening and come back to the Apheresis Unit the next day for another collection. Please be aware that some patients need to attend for up to four days in a row to ensure they collect enough cells for their stem cell transplant. The Apheresis team will let you know whether this is necessary or not.

If we are still unable to collect sufficient cells, despite our best efforts, your doctor may recommend a further attempt at collecting more cells at a later date or an alternative treatment plan.

Once all the collections have been completed, we will arrange for you to be seen in the outpatient clinic to discuss your future treatment plan.

What happens next?

Your cells will be stored at the stem cell laboratory until you are ready to have your transplant, when your cells will be given back to you just like a blood transfusion.



GCSF injection instructions and stem cell collection appointment sheet

Hospital number	Please make provision to ensure you can attend the Apheresis Unit in Birmingham for up to four consecutive days. You will not need to stay overnight unless you have requested accommodation
Surname	
Forename	
Date of birth	Referring centre

GCSF instructions and appointment details

The GCSF injections will start on	
They are likely to be given for days.	
You will receive GCSF once a day at	
The dose of each injection will be micrograms.	
Each dose will consist of vials.	
Blood tests required before collection	Yes / No
Please attend	
Please attend the Apheresis Unit, Centre for Clinical Haematology on	
at 08:00 for a blood test and possible stem cell collection.	
(Further instructions regarding GCSF injections and attending the unit will be given at this appointment)	

If you have any further questions or concerns please contact the
Apheresis team: Monday–Friday 08:00–18:00
Apheresis Unit (CCH): 0121 371 7820 or 7821

For emergencies outside of normal working hours please contact
Ward 625: 0121 371 6252 or 6293 or 6291 (24hrs)

If you require this information in another format, such as a different language, large print, braille or audio version please ask a member of staff or email **patientexperience@uhb.nhs.uk**.

Haematology

Queen Elizabeth Hospital Birmingham
Mindelsohn Way, Edgbaston
Birmingham, B15 2GW
Telephone: 0121 371 2000
