Information for donors and relatives

Stem cell donation at Cellex

Before donating

The medical clarification of the donor for confirmation typing is effected by the medical team at CMS. This clarification is carried out by experienced doctors and medically trained personnel. This guarantees that there is at this stage no restriction on the donation from the medical point of view.

Donor protection is the top priority. As part of the coordination of the preliminary exam and the subsequent donation, the coordinators will help the donor and any companion with all organisational and scheduling issues relating to the donation (e.g. travel, accommodation, etc.) and thus ensure a smooth process for the preliminary exam and donation for all involved.

They will organise the complete process in close collaboration with the collection and transplant centres. If you have any medical questions about the stem cell donation, our team of doctors is there to help you. The transport of the stem cell products from the place of removal to the patient can also be organised by our experienced colleagues at CMT.

Preliminary examination

On average, two to four weeks prior to a stem cell donation, a preliminary examination will take place. During the medical consultation, the donor is once again informed in detail about the procedure and the possible side effects of stem cell mobilisation and stem cell donation. The preliminary examination programme also includes obtaining a medical history, a physical examination, an ECG and an ultrasound examination of the abdominal organs. In addition, blood samples are taken to determine general blood parameters and infection serology (hepatitis, HIV, syphilis, toxoplasmosis, etc.).
Extraction
Blood stem cells are located mainly in large flat bones and thus can be found in large numbers in the iliac crest, but also, for example, in the shoulder girdle, the breast bone and partly also in the cranial bone.

In principle, stem cells can be extracted in two ways: Either surgically from the iliac crest (bone marrow extraction) or on an outpatient basis by a process similar to a hemodialysis (peripheral stem cell collection).

Deciding whether peripheral or bone marrow stem cells are required for the transplant depends on several factors. In many cases, both extraction processes are possible. For certain medical conditions, however, one source of stem cells may clinically benefit the patient compared to the other. This decision is made by the attending physician of the patient. The physical conditions of the donor will, of course, also determine the type of stem cell extraction. In every situation the various possibilities are discussed during the preliminary exam and the wishes of the donor obviously take precedence. The unstimulated leukapheresis or DLI is also available which could be requested, for example, during an impending relapse of the illness, as a second donation from the transplant centre for the patient.

1. Peripheral stem cell collection
In approx. 80% of donation cases, the extraction of stem cells is carried out via a so-called peripheral stem cell apheresis.

The stem cells must first be stimulated so that they divide and are flushed into the blood. To do this, the donor will generally inject a so-called growth factor under the skin, both mornings and evenings, four days prior to the donation. On the fifth day, the donation day, the donor will inject the growth factor again in the morning. This growth factor, G-CSF (abbreviation for granulocyte colony stimulating factor) naturally occurs in the body and is a hormone-like preparation that affects blood formation. This mainly affects a subgroup of white blood cells (leukocytes) which in turn affects the granulocytes and their precursor cells. G-CSF causes the stem cells in the bone marrow to proliferate and flushes them into the flowing blood stream. During this time, flu-like symptoms may occur as side effects, especially bone and joint pain, which can be treated with non-blood thinning pain relievers such as Paracetamol.

Upon arrival at our facility there will be a quick health check. The donation is carried out by a cell separator. The cell separator uses centrifugal force to separate the blood into its individual components, which allows us to collect the cells in question from the blood. The donor is connected to the machine by a venous tube in both arms. These tubes are connected via a sterile, single-use system to the cell separator. The blood then leaves the body on one side, passes through the cell separator and is then fed back into the body on the other side via the second tube. A small portion of the blood, which contains the important cells for the patient, is removed and collected.
To prevent the blood from clotting during the procedure, an anticoagulant must be used. The anticoagulant used is generally one which is similar to citric acid which is quickly broken down again by the body. Many donors experience a short-term calcium deficiency with this substance which may cause tingling in the mouth and lip area or the fingers. If these symptoms occur they are immediately treated with calcium doses.

This procedure is performed on an outpatient basis and the donor remains connected to the unit for an average of four hours. During this entire time, he/she is constantly monitored by a doctor. During the cell collection, the donor sits in a comfortable chair and can watch TV, eat, drink and read to a limited extent.

After a maximum of 5 hours, the donor can leave Cellex and will receive a message during the afternoon whether a further donation is needed on the following day. This is only necessary in about 10% of cases. After the donation, some donors report feeling slightly tired and exhausted. Any side effects experienced before the procedure usually become less intense and often disappear as soon as the donor is hooked up to the cell separator.

This medical procedure has been carried out many times since 1988. Current research confirms that no long-term side effects have been reported to this day. The research continues with all donors being given a questionnaire for three years after the donation.

2. Bone marrow extraction

During a bone marrow extraction, a bone marrow-blood mixture is taken from the donor’s iliac crest under a general anaesthetic. This method is used in about a third of donors.

For a bone marrow extraction, the donor is admitted to the hospital after a small routine examination the day before. The actual donation is normally carried out early in the morning on the next day. Under general anaesthesia, the donor is turned onto his/her stomach and two surgeons will puncture the iliac crest on the left and right side. You can easily feel the potential donor sites yourself. If you are touching your iliac crest from the back, you will feel two small bony “knobs” left and right of the spine. Children often have two small dimples in these places. Two small incisions in the skin (approx. 0.5 cm) and some incisions in the pelvic bone are usually all that is needed. With a stable hollow needle the bone is punctured, then a needle is placed on the syringe and the bone marrow-blood mixture is mechanically drawn from the donor.
On average about 1000 ml are obtained. The exact extraction amount is determined by the required number of cells, with the donor’s weight determining the upper limit. A maximum extraction amount of 1500 ml must never be exceeded. This mixture contains approx. 5% of the total bone marrow which takes about two to four weeks for the body to regenerate.

After approx. 1 hour, the donor is brought back to the recovery room. He/she now lies on his/her back. Two small sand bags are placed under the puncture points to ensure that the bleeding puncture sites have pressure on them. As soon as the donor is moved back to his/her room, he/she can get up. The donor will spend another night in the hospital for observation purposes. All in all, the donor will spend approximately 48 hours in the hospital.

After the extraction, symptoms are often described as being similar to severe muscle soreness or a visible bruise in the lower back area which can last up to 14 days.

3. Donor Lymphocyte Infusion (DLI)

In the event of an early recurrence (relapse) after an allogeneic stem cell transplant, the patient often requires a gradual dose of donor lymphocytes. Donor lymphocytes are relatively “aggressive“ cells that can be used to “destroy“ the first emerging cancer cells and boost the patient’s immune system.

The extraction of donor lymphocytes is carried out in the same way as a peripheral stem cell donation. The donor again gets to sit in a comfortable chair with a venous tube attached to each arm. Blood leaves the body on one side, flows through the cell separator and then flows back into the donor’s body on the other arm.

The main difference between this and the peripheral stem cell donation is that no drug stimulation is required in advance, as mature lymphocytes always float freely in the blood and can be extracted in a single day. As a result there are very few side effects for the donor. After the donation, some donors report feeling slightly tired and exhausted. The donor lymphocytes are usually frozen in portions (cryopreserved) and given to the patient in stages.