14.0 Stem Cell Laboratory Services

Contact Information:

To inquire about assisting with surgical harvesting of bone marrow, cellular therapy (CT) product processing, cryopreservation, storage, or any other lab services, please contact:

Vincent Zost, MT(ASCP)SBB
Stem Cell Laboratory Manager
2205 Highway 121
Bedford, TX 76021
Phone: (817) 412-5743
Fax : (817) 412-5746
vzost@carterbloodcare.org

To inquire about peripheral blood stem cell (PBSC) collections, please contact:

Clinical Apheresis
5550 LBJ Freeway, Suite 350
Dallas, TX 75240
Phone: (972) 788-0650

Comments

- A written physician order must be received by the Stem Cell Laboratory, prior to the initiation of processing any allo or autograft for transplantation.
- A contract is required between the facility and Carter BloodCare prior to any procedures being performed by the Stem Cell Laboratory.

14.1 Overview

All services listed below are provided by the Stem Cell Laboratory and Clinical Apheresis.

- Peripheral blood stem cell (PBSC) collections
- Assisting with surgical harvest of bone marrow
- Processing and cryopreservation
- Storage
- Thawing and infusion
- CD34 selection

14.2 Contract/Privileges

NOTE: Due to regulatory considerations, a current, signed stem cell services contract is required to initiate these services. Contract services include donor prescreening, collection of PBSC product, tracking of products from collection to distribution, processing components for transplantation and providing the

physician with a written consultation describing all cumulative cell counts (i.e., TNC/kg, CD34/kg, etc.).

If a signed contract is not in place, emergency privileges must be established for professional staff performing the procedures. A signed contract will be initiated as soon as possible.

14.3 Emergency Privileges

For emergency privileges several items must be completed prior to the procedure. A physician must agree to sponsor the professional staff. A facility administrator must give verbal approval for the procedure to be performed and provide basic billing information. To initiate emergency privileges, please contact Clinical Apheresis or a Carter BloodCare physician as soon as possible.

14.4 Product Collection, Processing, and Infusion

14.4.1 Collection of Peripheral Blood Stem Cells

Peripheral blood stem cell collection services are available for autologous and allogeneic, adult and pediatric donors and may be performed at an institution or at a predetermined Carter BloodCare Neighborhood Donor Center. Trained individuals, using either the COBE Spectra – Auto PBSC software or MNC Software, perform peripheral blood stem cell collections. The COBE Spectra – Auto PBSC software has several advantages over the MNC method of stem cell collection for pediatric donors. They include low extracorporeal volume (ECV), low component volume (yet highly concentrated with stem cells) and a low hematocrit which is ideal for major ABO incompatible allografts.

Donation of PBSCs is generally performed as an outpatient procedure and requires adequate preplanning. The autologous donor generally receives placement of a central venous catheter that can accommodate high volume flow rates, typically either a Quinton or a Pheres-Flow catheter. For healthy allogeneic donors, central line placement may or may not be necessary depending on the donor's peripheral access, desired flow rates and number of procedures required.

14.4.2 Institutional Responsibilities for PBSC Collection

The responsibilities of the institution requesting PBSC collection services include:

- Good communication with Carter BloodCare staff concerning procedure dates and times
- Catheter placement (when appropriate) and appropriate reports documenting clearance for use
- A written physician order for collection and processing, including endpoint of collection, prior to initiation of procedures (regulatory requirement)

- A Complete Blood Count (CBC) including differential count performed prior to each PBSC collection (Manual differential preferred)
- Administration of G-CSF
- Letter of donor suitability provided by donor's physician, stating the donor has been evaluated by medical history, physical exam and laboratory tests for the risk of apheresis donation. In addition, when appropriate, documentation of a pregnancy assessment on all female donors is required.
- Consent to process, freeze, and store CT products, when appropriate, prior to initiation of the procedure (regulatory requirement)
- Written prescription from physician authorizing collection for a specific time period

14.4.3 Donor Prescreen for PBSC Collection

All allogeneic donors must undergo a prescreening process within 30 days from the start of the first collection. This includes:

- Completion of the donor questionnaire
- Evaluation of peripheral access
- Routine testing for infectious diseases, ABO/Rh, antibody screen
- Pregnancy assessment for all female donors. This shall be performed preceding hematopoietic growth factor administration or myeloablative therapy of the recipient (regulatory requirement)
- GSH and major/minor crossmatch with transplant recipient.
- Consent for release of medical information

Carter BloodCare staff will work very closely with the client throughout the prescreening process.

Submit prescreen samples to:

Testing and Labeling Department
Carter BloodCare
2205 Highway 121
Bedford, TX 76021

Sample Inspection:

Please inspect each sample tube prior to collection to ensure:

- Information is clear and legible
- No defacement, tearing, or alteration of the label
- No broken or cracked tube
- The tube stopper is intact

Sample Labeling for CBC Samples:

Clearly label each specimen with the following information:

- Donor's full name as recorded in the medical records
- Donor's identification number (may be medical record number, social security number, birth date, or any other unique identification system utilized by the facility)
- Collection date/time
- Phlebotomist's initials
- Barcode donor unit number

Sample Labeling for Infectious Disease Testing

- Barcode donor unit number

Sample Delivery:

Samples are delivered by Carter BloodCare Staff or prearranged courier.

Sample Requirements:

All samples must be submitted with a current infectious disease tube collection form. Infectious disease testing sample requirements are dependent on the type of collection being performed. See the Test Information Chart for test details and sample requirements. Carter BloodCare staff will advise the facility on the testing being performed. Specific requirements are listed below:

Test	Sample Requirements
Processing Profile (Adult and Pediatric Donors)	(1) 6 mL serum (red top) tube and (2) 6 mL EDTA (purple top) tube (1) 6 mL EDTA (pink top) tube
Minimum	6 mL serum (red top) 6 mL EDTA plasma (purple top)

NOTE: Testing is available on pediatric donor samples when the ideal number of tubes is unable to be collected. Please be aware this testing fee is substantially higher and turnaround time for test results is longer.

14.4.4 Assisting with Surgical Harvest of Bone Marrow

The Stem Cell Laboratory staff members have been trained in aseptic technique and have the ability to assist the transplant physician in the operating room during bone marrow harvest procedures. Two staff members are available for each procedure and perform the following functions:

- Prepare bone marrow harvest media and deliver media to the operating room (100 mL of Plasma-Lyte A® pH 7.4 and 10,000 units of preservative free heparin for every 1,000 mL of bone marrow harvested).
- Provide sterile commercially available container for collected marrow.
- Monitor volume of harvested marrow during procedure.
- Irrigate collection syringes with heparinized media during procedure.
- Filter marrow in the operating room using a series of decreasing size inline filters.
- Appropriately label product in the operating room according to regulatory standards.
- Transport the product to the processing laboratory.

14.4.5 Processing and Cryopreservation

The Stem Cell Laboratory at Carter BloodCare has expertise in processing autologous and allogeneic PBSCs and bone marrow when a major or minor ABO incompatibility exists. In addition, they have the ability to process cryopreserved cord blood allografts. Board certified medical technologists, who have received specialized training in stem cell processing, routinely evaluate each product for the following:

- Volume
- Cell viability
- Bacterial and fungal contamination
- TNC and TNC/kg
- Total CD34 and CD34/kg
- Total CD3 and CD3/kg (allogeneic donors only)
- Other evaluations upon request (i.e., minimal residual disease for neuroblastoma, etc.)

Prior to cryopreservation, an agreement to process, freeze and store CT products must exist between the requesting facility, Carter BloodCare and the recipient.

Cryopreservation is performed using a cryoprotectant solution containing 10% DMSO, an electrolyte solution (Plasma-Lyte A®, pH 7.4) and a source of protein (25% human albumin). An equal amount of cryoprotectant and cells are added to each freezing bag. The bags are placed in a freezing press, monitored by a “ribbon probe” thermocouple and frozen using a controlled rate freezing system until the cells reach approximately–90^{o}C.

The Stem Cell lab also has the CliniMacs device for magnetic cell selection. Magnetic cell selection is used for CD34 selection of CT products (T-cell depletion).

14.4.6 Product Storage

Once the cells are frozen, they are removed from the freezing chamber, sealed in an overwrap bag, placed in an aluminum cassette and stored in the vapor phase of liquid nitrogen at approximately -150^{o}C or colder.

Grafts positive for Hepatitis B, Hepatitis C or other infectious disease markers are also stored in vapor phase, but are placed in a separate designated biohazard freezer.

Storage agreements are for a period of two (2) years, although an annual storage fee is applied after the first year. For surviving patients, if cells remain stored after the agreement expires, the intended transplant recipient and the transplant physician are notified. No cells are discarded without the written approval of the transplant physician, regardless of when the signed agreement to store the cells expires.

14.4.7 Thawing and Infusion

A Stem Cell Laboratory technologist will personally deliver all requested frozen stem cells to the recipient's bedside at the time of transplantation. Frozen cells are transported at -150^{o}C or colder using a liquid nitrogen dry shipper. On the day of transplant, the technologist reports to the recipient's bedside with the frozen graft, a preheated 37^{o}C water bath, and a lab cart stocked with all necessary supplies required for bedside thawing and infusion.

Each stem cell product is compared with the physician's order to ensure proper patient identification. The bags are thawed, one at a time at the patient's bedside, using gentle agitation in a 37^{o}C water bath. Once the product is thawed, the overwrap bag is removed and a bag sampling spike and a blood administration set containing an inline 170-260 micron filter is inserted into the entry ports. The product is then issued to the infusionist. Once the cells have been checked for proper identification, according to hospital policy, they may be infused.

NOTE: Use of a leukoreduction or microaggregate filter and irradiation of any CT product is strictly prohibited.