PLANER

Case study:
MD Anderson - a long term success story in cell transplantation

The MD Anderson Cancer Center in Texas is one of the largest in the world for stem cell transplants, performing over 865 procedures for adults and children each year, more than any other centre in the USA. The apheresis and stem cell collection unit is one of the most active facilities in the world, performing over 1,000 blood stem cell collections annually. The department of Stem Cell Transplantation and Cellular Therapy (SCT/CT) - see the team photo right - is a specialised unit for processing of autologous, allogeneic related and unrelated stem cells collected from peripheral blood, bone marrow and cord blood.

Controlled rate

The Cell Therapy Laboratory (CTL) at MD Anderson have had a number of Planer controlled rate freezers over the years and they currently use six Kryo 750s. These are in constant daily use and some of which have seen nearly ten years active service. The CTL Core Lab averages about 7-9 stem cell cryopreservation procedures per day and so frequently each CRF is used more than once per day. The record number of collections for cryopreservation in a given day is 17.

The centre uses four different freezing profiles in their programmable CRFs based on general cell type, the container and the volume being cryopreserved - 5 ml vials, 250 ml blood bags and 750ml blood bags. These profiles, some five ramps and some six, are pre-programmed and allocated to a specific sample.

Appendix B

PLANER CONTROLLED RATE FREEZER PROGRAMS

Program HPC, M-05: Program for HPC, A/HPC, M including selected cells in 5ml vials. Start temp 4°C

Step 1: Rate = -2.00° C/min	Temp = -4.00° C	Sample
Step 2: Rate = -35.00° C/min	Temp = -60.00° C	Chamber
Step 3: Rate = 8.00° C/min	Temp = -20.00° C	Chamber
Step 4: Rate = -2.50° C/min	Temp = -45.00° C	Chamber
Step 5: Rate = -10.00° C/min	Temp = -80.00° C	Sample

Program HPC, M-60: Program for HPC, M/HPC, C in 250ml bags. Start temp 12°C

Step 1: Rate= -2.00° C /min	Temp = -5.00° C	Sample
Step 2: Rate = -35.00° C /min	Temp = -50.00° C	Chamber
Step 3: Rate = 20.00° C/min	Temp = -20.00° C	Chamber
Step 4: Rate = -2.50° C/min	Temp = -45.00° C	Chamber
Step 5: Rate = -10.00° C /min	Temp= -80.00° C	Sample

Program HPC, A-60: Program for HPC, A/TC, T/TC in 250ml bags. Start temp 20 °C

Step 1: Rate = -10.00° C /min	Temp = 4.00° C	Chamber
Step 2: Rate = -5.00° C /min	Temp = -4.00° C	Sample
Step 3: Rate = -60.00° C /min	Temp = -80.00° C	Chamber
Step 4: Rate = 15.00° C /min	Temp = -35.00° C	Chamber
Step 5: Rate = -5.00° C /min	Temp = -35.00° C	Sample
Step 6: Rate = -10.00° C/min	Temp = -80.00° C	Sample

Program HPC, A-100: Program for HPC, A/TC, T/TC in 750ml bags. Start temp 20° C

Step 1: Rate = -10.00° C /min	Temp = 4.00° C	Chamber
Step 2: Rate = -5.00° C /min	Temp = -4.00° C	Sample
Step 3: Rate = -60.00° C /min	Temp = -85.00° C	Chamber
Step 4: Rate = 10.00° C /min	Temp = -40.00° C	Chamber
Step 5: Rate = -5.00° C /min	Temp = -35.00° C	Sample
Step 6: Rate = -10.00° C /min	Temp = -80.00° C	Sample

Freezing Profiles

These samples are predominantly hematopoietic stem cells originating from peripheral blood or bone marrow collections which are later thawed and given to patients undergoing treatment for cancer of the blood or immune system. Other samples include tumor specific therapeutic vaccines using carrier proteins and T cells manipulated to produce chimeric antigen receptors (CARs) which are aimed at helping a patient's own immune system kill cancer cells. It should be noted that a profile should always be validated for suitability for sample type, size and conditions.

Reference Bags

At MD Anderson, each cryopreservation procedure performed in the CRF has a mock bag that is prepared with the same DMSO concentration as the cell products being cryopreserved. The sample temperature probe is inserted into this mock bag and the temperature readings from this bag are used as a reference for how the cell products freeze during the procedure. To help maximise efficiency with such a large number of cryopreservation procedures, the CTL validated a process where multiple mock bags were prepared and are used repeatedly for up to 1 week. This process has saved the staff processing time since they do not have to prepare the mock bags for each run. It has also reduced wear and tear on the probes because they are not repeatedly inserted and removed from the mock bags during the week.

The GMP laboratory

In addition to all the activity produced by the Core Lab, the CRFs also get work via the Good Manufacturing Practice (GMP) laboratory. The work done in the GMP lab includes freezing of cells such as mesenchymal stem cells and antigen-presenting cells for cell banks, manufacturing and cryopreservation of various therapeutic vaccines for ongoing protocols and other manipulated and cultured cell types like natural killer cells.

The CTL lab has six Planer freezers

Additionally, the unit also offers patients immunotherapy, vaccine strategies and targeted therapies for various diseases maintaining an advanced cell processing laboratory that is dedicated to preparing safe and effective hematologic tissues for transplantation.

The CTL operates under the direction of Ian McNiece, PhD as Technical Director and Elizabeth J. Shpall, MD as Medical Director and Sarah Olchesky as supervisor of the CTL Core Lab.

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