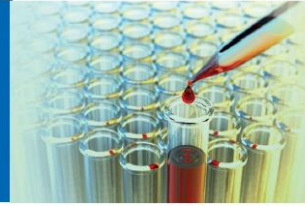


# 10



## Haematopoietic Stem Cell Transplantation and Stem Cell Plasticity



### Chapter summary

- Haematopoietic stem cell transplantation is a well-established procedure which has developed significantly since it was first performed in 1968.
- There are three main sources of haematopoietic stem cells, originating from bone marrow, umbilical cord blood, and peripheral blood, which have slightly different advantages and limitations during the transplant procedure.
- Stem cells can be harvested from the patient (autologous), an identical twin (syngeneic) or an HLA-matched individual who may or may not be related to the patient (allogeneic).

- Harvested cells are processed, cryopreserved, and stored for transplantation at a later date.
- Cells are identified by surface markers such as CD34 and are enumerated to ensure enough cells are harvested for transplantation; for some transplants like umbilical cord blood, this is particularly important.
- Patients require conditioning therapy comprising chemotherapy with or without radiotherapy to prepare their bone marrow for infusion of donor cells, this can be reduced in intensity for particularly old or ill patients.
- Whilst a life-saving curative option for many haematological malignancies, it is also a life-threatening procedure that may be performed when there are no other options; stem cells transplants also have several short and long term complications with graft failure and GvHD representing significant problems.
- Stem cells can be used for transplantation to correct malfunctioning cells in several conditions including cancer, but plasticity of stem cells has offered novel personalized therapies in other conditions like cardiac arrest, ischaemic brain injury, and treatment for diabetes.