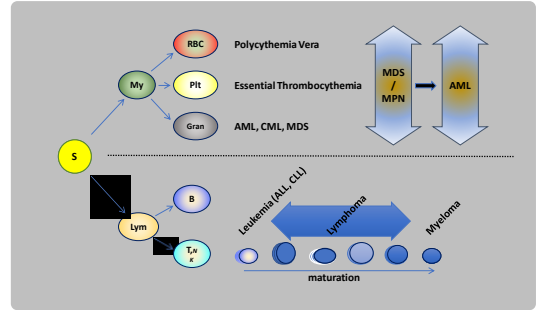


An Introduction to Bone Marrow Transplant

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Introduction to Blood Cancers



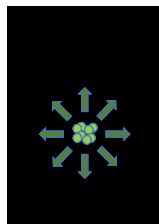
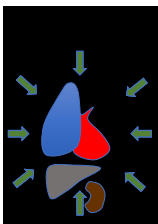
How is SCT/BMT different from other transplants

Difference between

solid organ

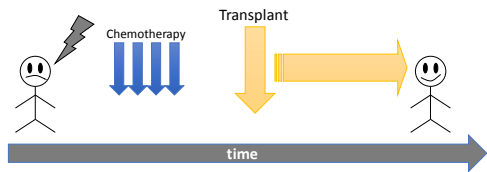
and
transplant

stem cell



Where does SCT fit in the treatment of blood cancers?

- Almost never done as a first step
- Is not offered instead of chemotherapy
- First, control the cancer with few cycles of chemotherapy
- Then, perform SCT



Types of Stem Cell Transplants

Autologous

- Stem cells obtained from the patient
- Stem cells frozen in lab before conditioning chemotherapy
- Rejection is never a problem
- Fast recovery
- For Myeloma and Lymphoma

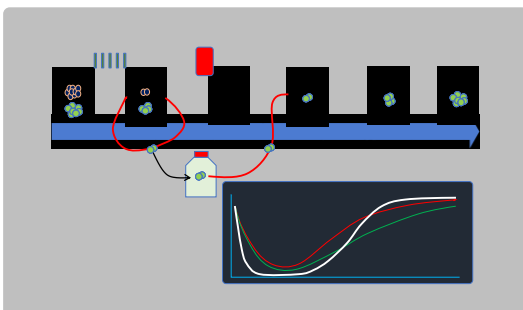
Allogeneic

- Stem cells from a donor
- Donor must 'match' (what do we mean by a match?)
- Rejection can occur in both directions (?)
- Takes longer for immune system to recover
- For other blood cancers like AML, ALL, MDS, etc.

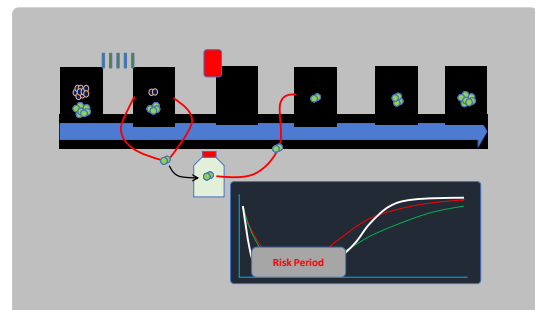
Autologous Stem Cell Transplant

From 'auto' – one's own

Autologous (Self) SCT

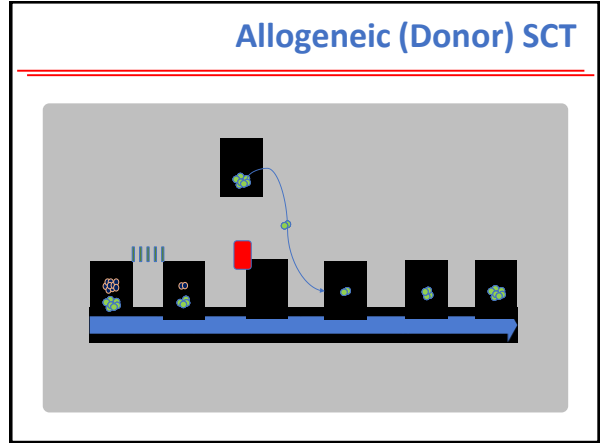


Autologous (Self) SCT



Allogeneic Stem Cell Transplant

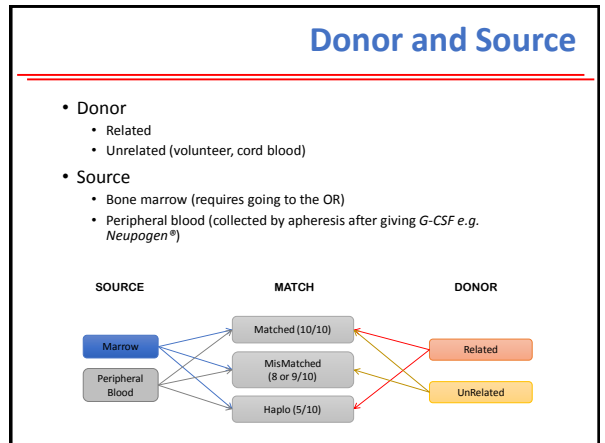
From a DONOR



Allogeneic (Donor) SCT

- 'Complicated one'
- Trying to treat with a 'double attack'
 - Chemotherapy
 - Immunotherapy (donor immune system fighting patient cancer)
- Cannot be done successfully without a great team

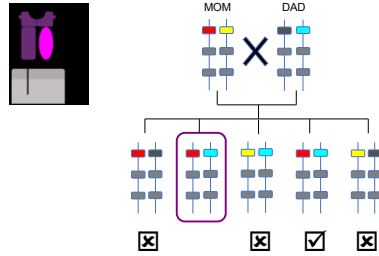
Compliant Patient
 + **Supportive Caregiver(s)**
 + **BMT providers**
 =
Great Team



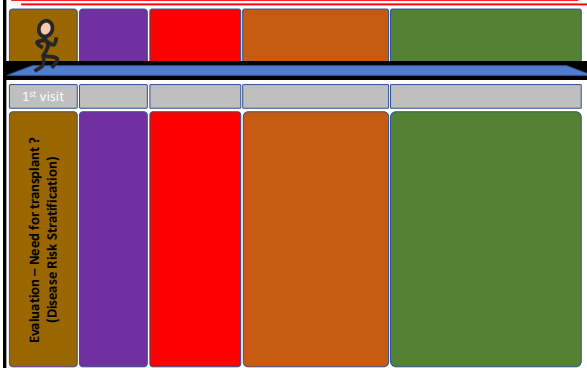
... a MATCH !!! ...

- What do we mean when we say that someone is a 'match'
 - Not blood type match
 - Match means at HLA loci
 - 6 main HLA loci – A, B, C, DP, DQ, DR on each set of chromosome – total 12
 - 5 of 6 (total 10) are important
 - So;
 - 10/10 = full match
 - 8 or 9/10 = mismatch
 - 5/10 = half match (haplo)

Matched Sibling Donor

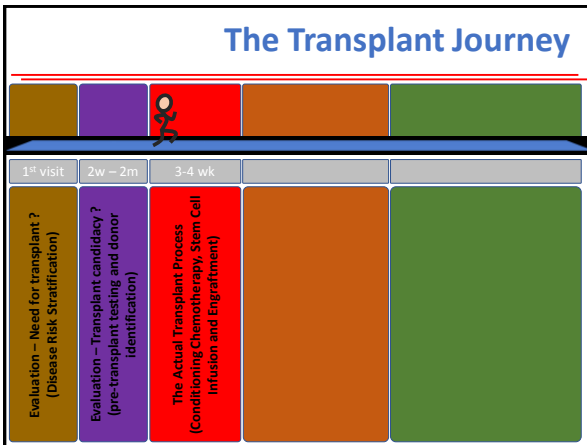
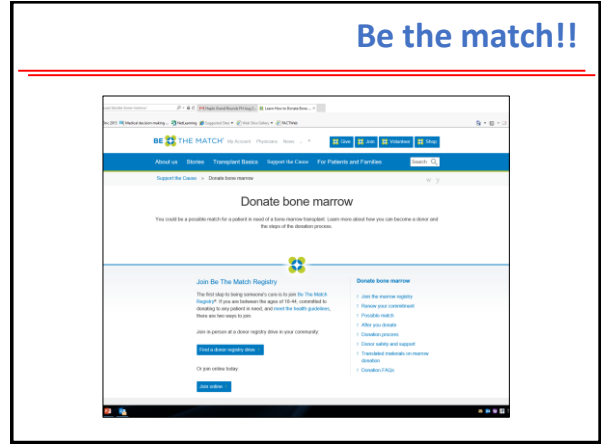
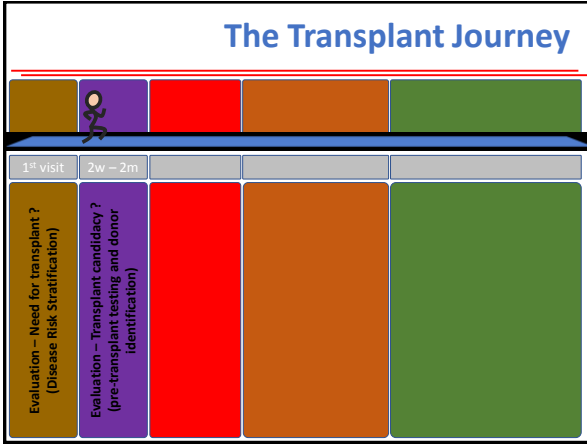


The Transplant Journey



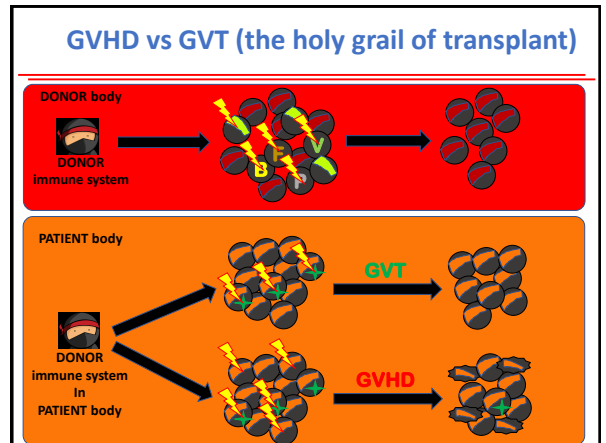
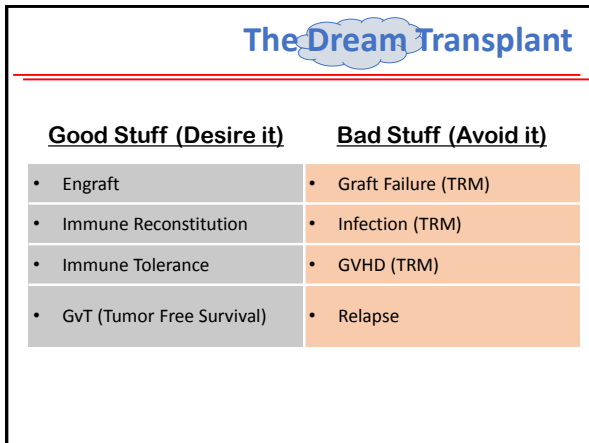
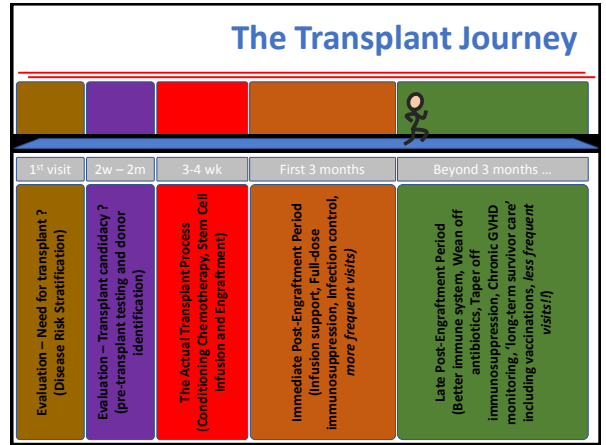
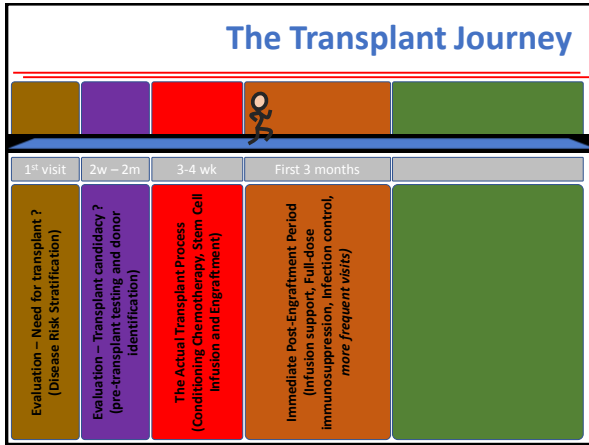
- General principles:
 - Do it if benefit >> risk
- Autologous SCT
 - Myeloma – upfront
 - Lymphoma – at relapse OR refractory (exception – MCL)
- Allogeneic SCT
 - Acute leukemia - risk stratify
 - Low risk AML ALL... at relapse
 - Other AML ALL... Upfront (AFTER induction)
 - Chronic leukemia – ONLY if refractory OR high risk gene abnormality predictive of aggressive behavior OR blast phase
 - CML – T315i mutation
 - CLL – p53 involvement
 - AA/MDS/MF/MPN – high'er' risk categories

Benign hematologic conditions – Sickle, Thai
Non-hematologic conditions – breast CA, GCT, rheumatologic disorders



Conditioning Chemotherapy

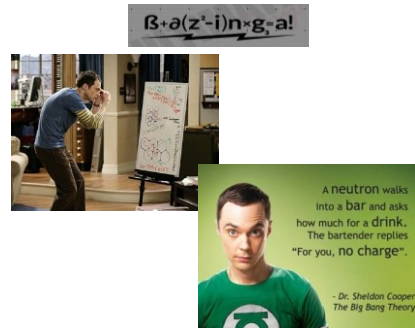
- Different from the chemotherapy given at time of diagnosis
- Given right before the stem cell transplant
- Purpose is to:
 - Remove any leftover disease
 - 'Make room' for the donor cells
 - Suppress host (patient) immune system
- Confusing classification
 - Myeloablative
 - Non-myeloablative
 - Reduced Intensity



Variables of the 'Transplant Equation'

- Indication (hematologic malignancy)
- State of the disease
 - CR
 - MRD / active disease
- Donor
 - Auto
 - Allo
 - related (full, haplo),
 - unrelated (10/10, 9/10, cord blood)
- Source
 - BM – less T-cells
 - PB – more T-cells
- Conditioning regimen
 - MA
 - NMA / RIC
- GVHD prophylaxis
 - what, when, how much
- ID prophylaxis
 - anti-microbials – what, when, how much

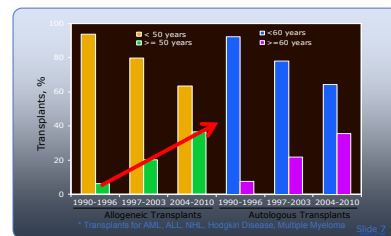
How do I answer "What are my chances?"



Complications of Allogeneic SCT

- Rejection
 - Donor stem cells never really 'take' in the patient's body
- Infections
 - Bacteria
 - Fungal
 - Viral
- Graft vs Host Disease (GVHD)
 - Donor cells thrive in patient's body but reject ('don't like being in there') and fight with patient's normal cells.
 - Skin
 - Liver
 - GI
 - Lungs
 - Eyes

Hmm ... sounds really complicated! Can it be done safely? YES



What's new?

- **New and widely available:**
 - Haplo-identical transplant
- **New and experimental:**
 - Graft engineering
 - Off the shelf donor cells
 - Stem Cell Expansion
 - Better anti-biotics
 - Antigen-specific T-cells for infection control
 - Better GVHD medications

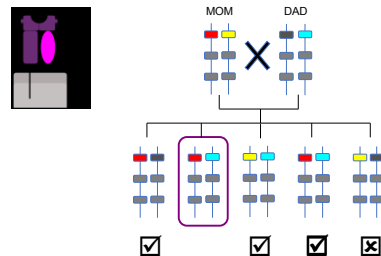
Donor Availability for Transplantation

- **Only 20-25%** of patients will have a matched **related donor** (10/10 allele match) for transplantation
- **Probability of finding** a matched unrelated donor (MUD) in the world wide registries varies with race/ethnicity of the recipient:
 - 50% Caucasians
 - 30% Hispanics
 - **10% or less for African-Americans or Asians**
- The likelihood of finding an unrelated donor - highest within their own race/ethnic group
- Time to transplantation with a MUD donor is up to **2-4 months**

Haploidentical Transplantation

- **Advantages of using a half matched related donor:**
 - **Almost universal donor availability;** >95% of patients will have a half matched donor in the immediate family (children, parents, siblings)
 - **Fast procurement of stem cells** – transplant possible within 2 weeks (when patient is in remission or at the time of maximum reduction of tumor burden)
 - **Donor remains available** to collect other cells for cellular therapy, if needed

Haplo-identical Donor



Questions ?

