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O'Neal Comprehensive Cancer Center at UAB

Bone Marrow Transplantation for MDS

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Disclosures

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- Consulting and Advisory: IQVIA, Aptitude Health, AAMDSIF, NMDP

What will this presentation cover?

- Which MDS patients need or can receive a transplant?
- How do you prepare for a transplant?
- What happens during the transplant?
- What happens after the transplant?
- Side effects
- Conclusion

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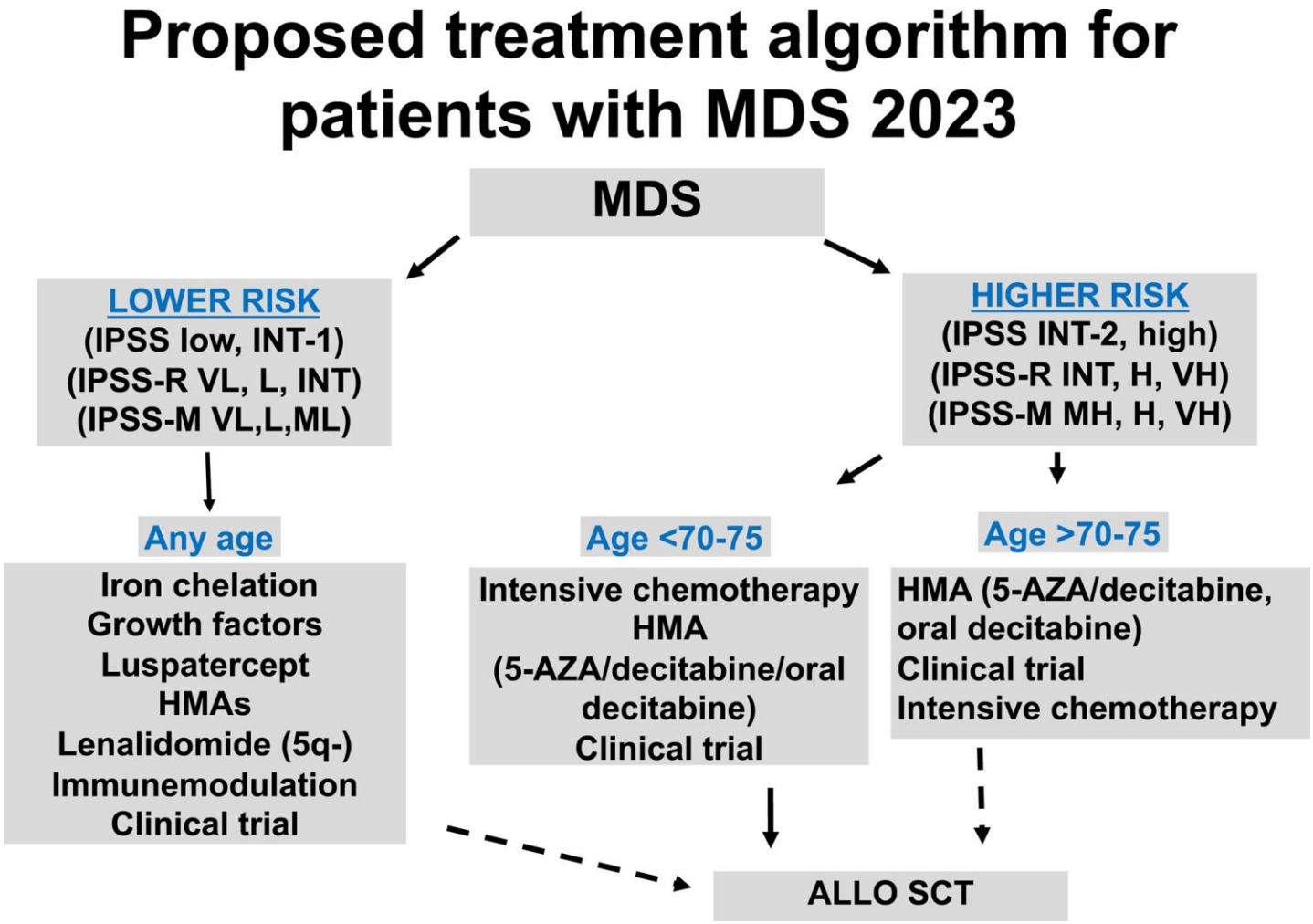
Who needs a transplant?

Clarification

- Bone Marrow Transplant = Stem Cell Transplant
- For MDS we use exclusively “allogeneic” transplants
  - Cells are given from donor – as opposed to our own

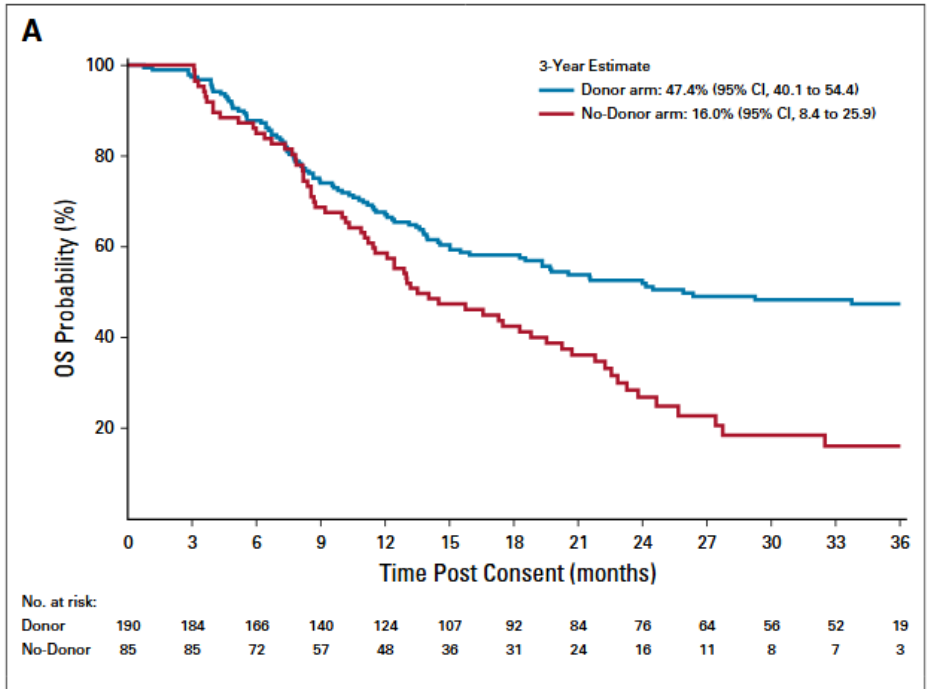
MDS Risk Stratification

MDS Treatment



Garcia-Manero et al. Am J Hematol. Jun 2023

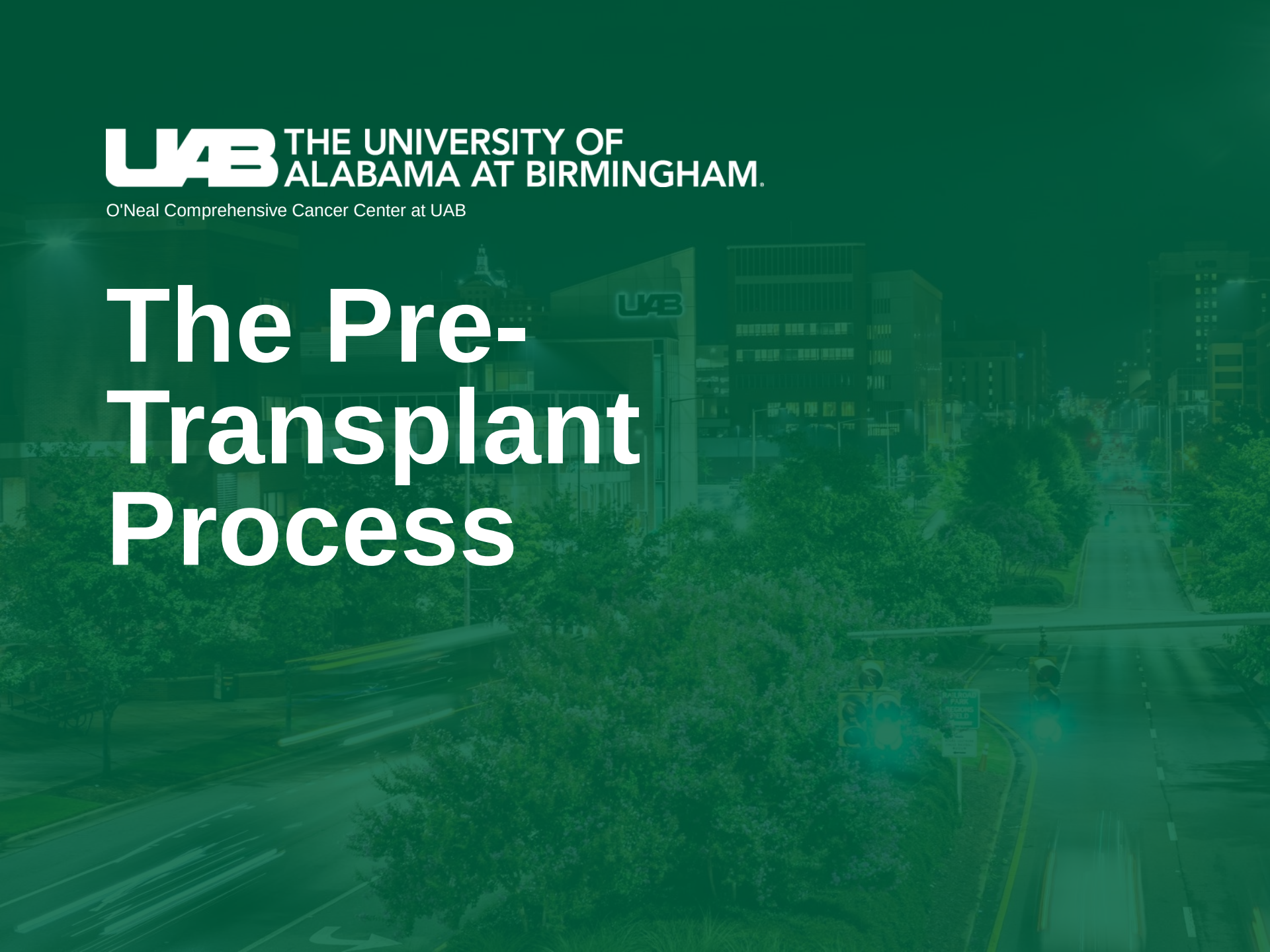
Why do we recommend transplant?



Nakamura et al. JCO 2021

Conclusion

- High Risk MDS
- Low Risk MDS – who do not respond to treatment or progress
  - “You have to be a candidate”
  - Goal is to cure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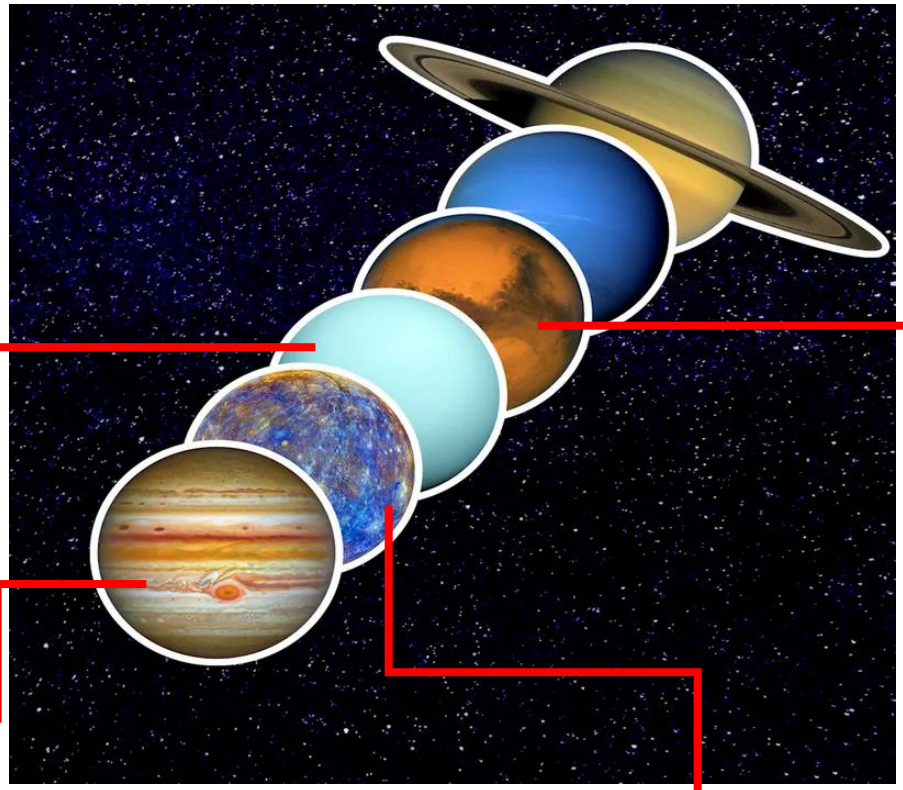
The Pre-Transplant Process

Planets Aligning



Patient is "fit"

Caregiver/Social/ Insurance

Finding a donor

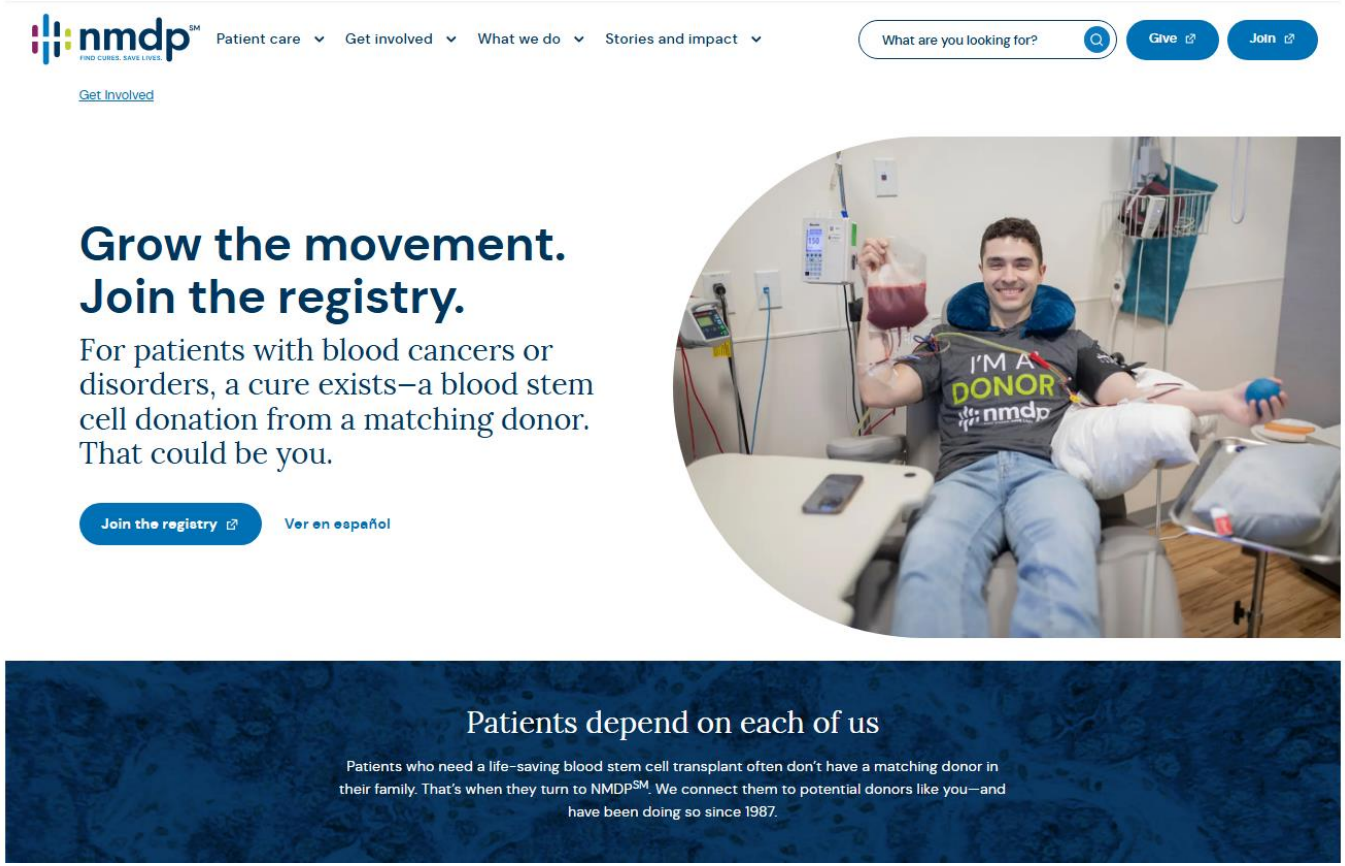
Cancer "under control"

Donor Search

- From Patient: blood draw and cheek swab
- Duration: 2-6 months
  - Ethnic minorities
  - Amount of 1st degree relatives
- We search through: Bone Marrow Donor Registry (NMDP) and test 1st degree relatives.
- Use of “half matches” or cord blood have increased donor pool
- In the current year, almost all patients that need and want a transplant can find a donor.
- Agreeing to a donor search does not equal agreeing to transplantation

Sign up for the NMDP donor registry

https://www.nmdp.org/get-involved/join-the-registry

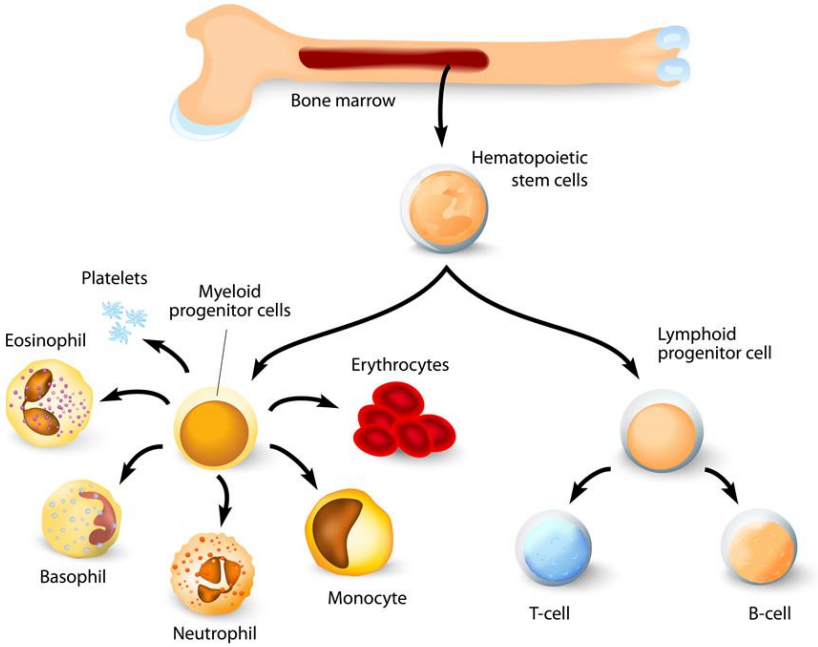


Donation Process

- Minimal to no risk for donor
- In adults, almost always use peripheral blood stem cells
  - Similar to plasma donation
- If you are determined to be a match (for family member or registry patient)

Step 1: Physical Exam and Questionnaire

Step 2: Stem Cell Mobilization



- 4-5 injections, once a day prior to donation
- Occasional mild body aches

Step 3: Stem Cell Apheresis

Stem Cell Donation from Blood

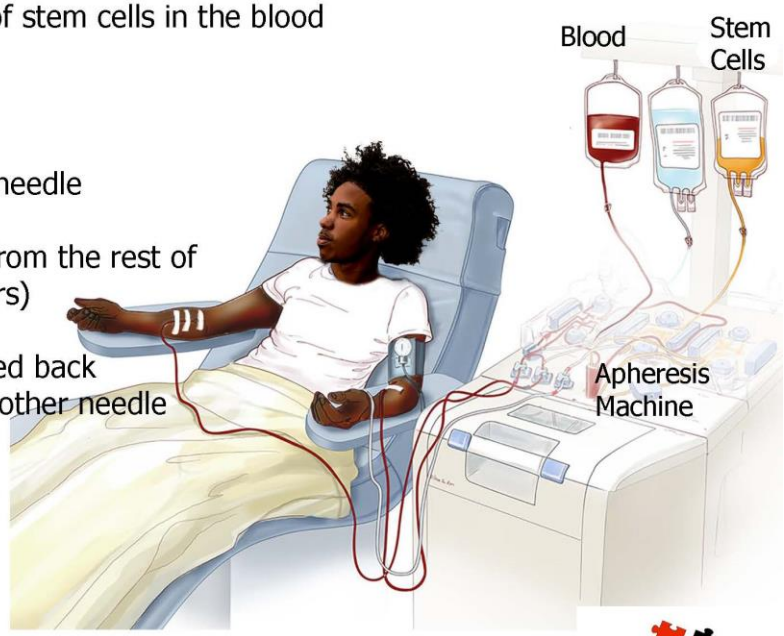
Prior to Donation

The donor receives daily doses of a growth factor, starting one week prior to donation

This increases the amount of stem cells in the blood

Day of Donation

1. Blood is drawn through a needle
2. Stem cells are separated from the rest of your blood (takes 4-6 hours)
3. Remaining blood is returned back into your body through another needle



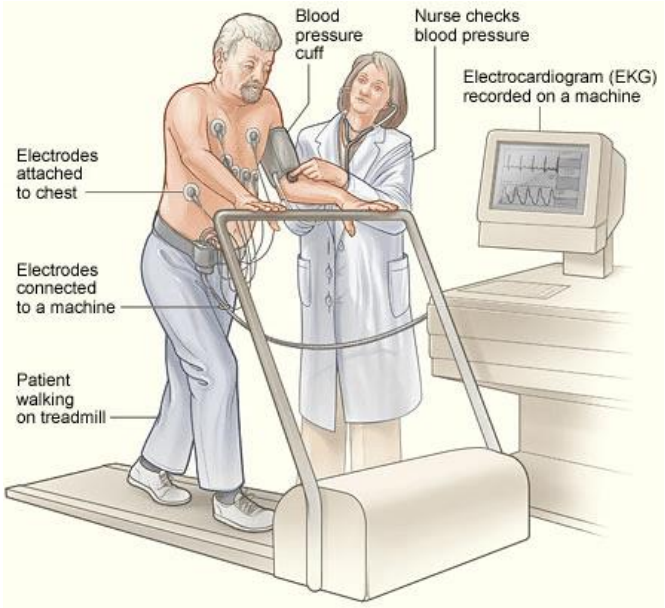
stem cell club

Disease Under Control

- Achieving a remission is ideal, but not needed in MDS
- Depends on risk stratification and blast%
  - Individualized decision
- Azacitidine, Decitabine, venetoclax or other as decided with your treating physician.

Patient is “fit”

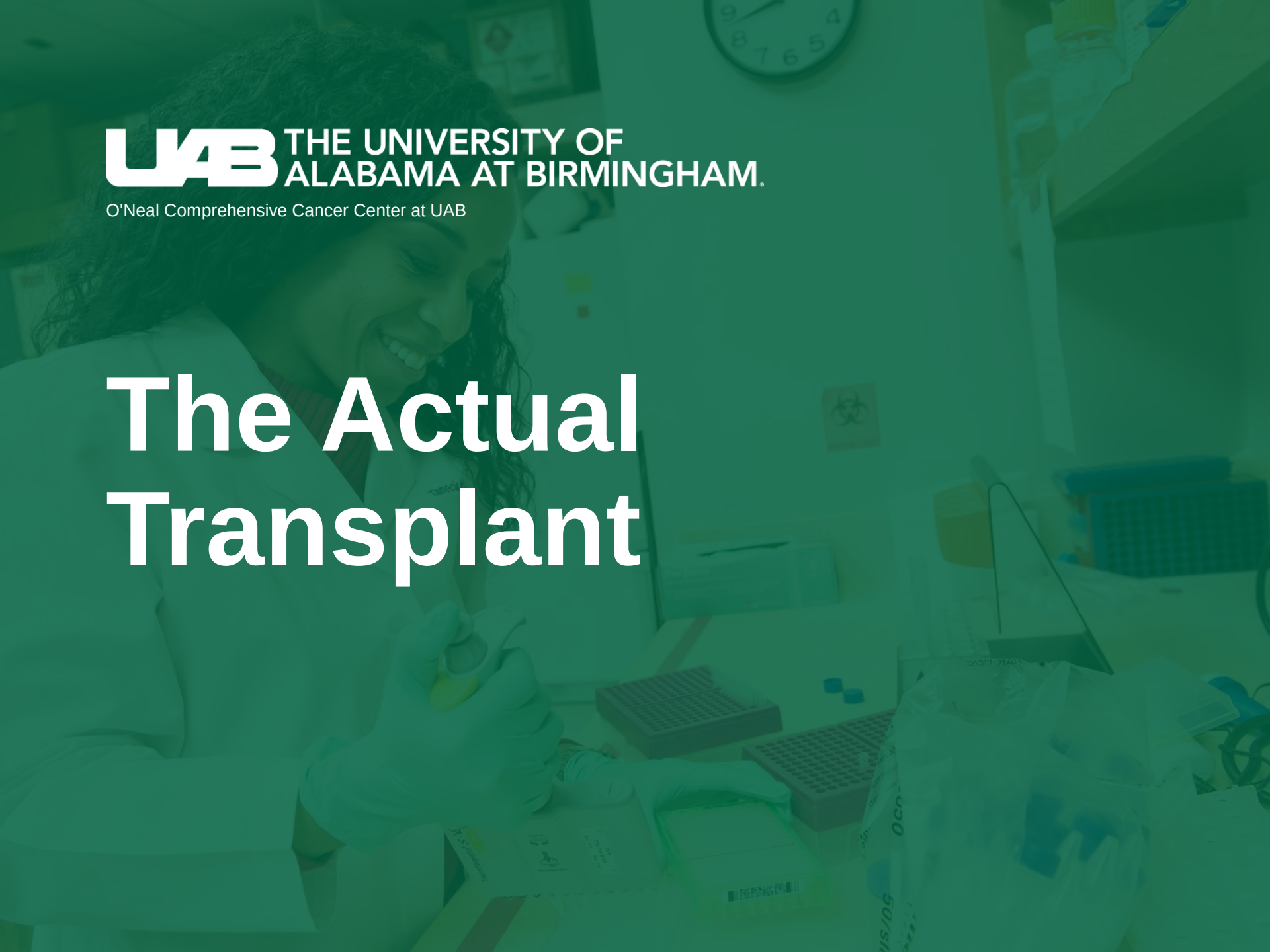
- Fitness is relative and age dependent
- The following tests will be repeated prior to your transplant
  - Heart ultrasound / Cardiac stress test
  - Spirometry (lung test)
  - Blood tests to evaluate kidney and liver function
  - CT scans
  - Additional testing depending on your symptoms and pre-existing conditions.
  - You might be required to see additional specialists (heart, lung, kidney, infection doctors) depending on what your tests show



Social Context

- Caregiver: Patients need a dedicated –full time – caregiver for at least 1 year after transplant
- Insurance: Most insurances (including Medicaid and Medicare) cover bone marrow transplant
  - But patient MUST be insured
- Social: Patients should be able to come to and from frequent appointments and adhere to medications
- Patients should NOT drink alcohol heavily, smoke/chew tobacco or partake in illegal/recreational drugs.

Transplant is a Team Sport!



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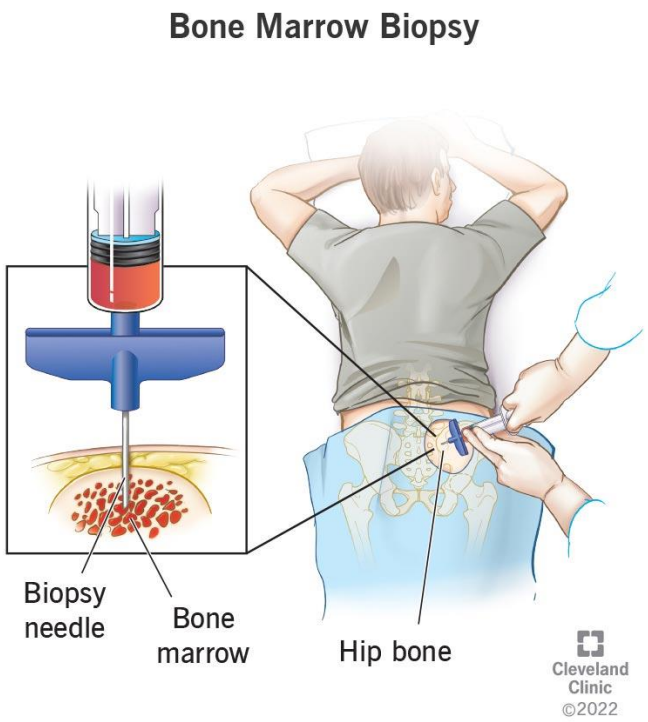
The Actual Transplant

Final Pre-Transplant Procedures

- Bone Marrow Biopsy: Most patients will have 1 repeat bone marrow biopsy prior to transplantation
  - To confirm disease is under control
- “Final” Appointment
  - You will sign consents agreeing to proceed
  - Doctor, Pharmacist and Nurse will go over details
  - You will be given a calendar



Patient: Dr. Seuss

MR #: 00000000 Months: High Dose Chemo Cocktail Type of Donor

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
27 OCTOBER	28	29	30 BONE MARROW BIOPSY Labs 8:00AM	31	1 NOVEMBER	2
3	4	5 BMT CLINIC PHARM EDU 11:30AM CONFIRM CALENDAR SIGN CONSENTS WITH DR. ESPINOZA 12:00PM NMDP SAMPLE	6	7	8	9
10	11	12 NOTHING TO EAT/DRINK AFTER 7AM LINE PLACEMENT TKC 4th floor CATH LAB COVID Test 2ND Floor Lab BRING A DRIVER!!	Day -7 13 TENTATIVE: ADMIT to BMT UNIT 11:00 AM	Day -6 14 CHEMO	Day -5 15 CHEMO	Day -4 16 CHEMO
Day -3 17 DECEMBER CHEMO	Day -2 18 CHEMO	Day -1 19 CHEMO DONOR COLLECTS	Day 0 20 Transplant Day!!	Day +1 21	Day +2 22 GVHD	Day +3 23 GVHD
Day +4 24 GVHD GVHD	Day +5 25	Day +6 26	Day +7 27	Day +8 28	Day +9 29	Day +10 30

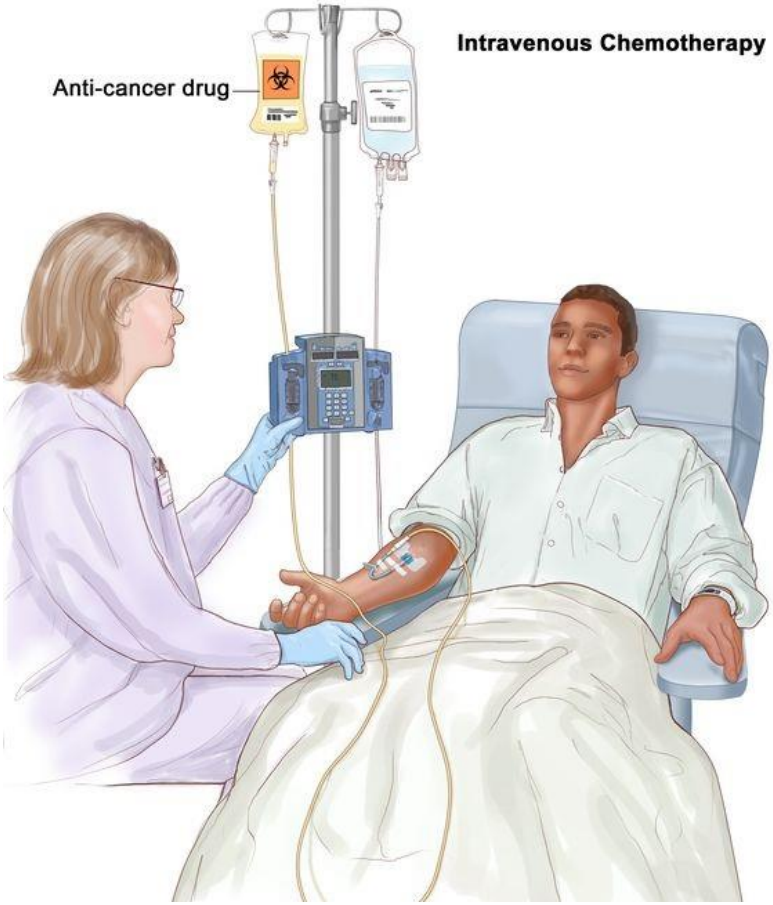
Reminder: *Outpatient Care Requires A Caregiver*
TBI: Total Body Irradiation

BMT Clinic – 5th Floor Kirklin Clinic PHONE: 0000000000
BMT Unit – 8th Floor Women/Infants Center PHONE: 0000000000

Admit into Hospital – BMT unit

High Dose Chemotherapy

- Kills remaining cancer cells and your old “normal” cells
- Makes “space” for upcoming donor cells
- Also known as conditioning regimen



Transplant Day – Donor cells are infused

- Glorified blood transfusion
- Might experience some chills and nausea
- Smells funny
- Known as Day 0

Anti-Rejection (GVHD) Medications

- Started either before or after cells depending on specific patient
- Lower immunity for several months to years after transplant
- Are ***crucial***
- Require therapeutic drug monitoring as outpatient
- Are “not forever”

Continued inpatient care

- Daily evaluation and labs
- Transfusions, antibiotics and other supportive care as needed
- On average 30 days of inpatient stay
- Discharged after donor cells “come online”

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Post-Transplant Care

Continued outpatient care

- Twice a week until day 60-100
- Specialized labs, transfusions and IV meds as needed
- Out-of-town patients relocate to Bham at least until day 100
- Visits space out over time
- You will take ***lots*** of pills
- Bone marrow biopsies will be repeated at day 100 and day 365 at the minumum
- On average patients need 1 year to recover

Long Term Follow-up

- Organ testing will be repeated even if you don't have symptoms – detect toxicity early
  - Heart, lungs, bone density, hormones, etc
- Patients usually considered "cured" after 5 years
- You will always need to follow up with transplant clinic
  - Over time might just be once a year
- You are slightly more susceptible to "normal diseases" and should work to prevent them
  - Heart attacks
  - Stroke
  - Diabetes
  - Other cancers: breast, colon, prostate, etc
  - Infections: influenza, covid,etc

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Side Effects

The Ugly – Non-Lethal Side Effects

- Nausea/Vomiting/Diarrhea
- Fatigue
- Weight Loss/ low appetite
- Hair loss
- Mucosal ulcers
- Pain
- Loss of fertility/libido
- Anxiety/Depression

- Most are transient, but can take up to 1 year to resolve
- Treated supportively

The Bad – Potentially Lethal

Infection

Bleeding

Organ Damage/ Failure

Graft Versus Host Disease

Relapse

- Infection
  - You will be on preventative antibiotic, antivirals and antifungals
  - Risk is greater in the first 100 days, but remains higher than a “normal” person
- Bleeding
  - Related to low platelets early after transplant
  - Will need transfusions early on
  - Can be lethal if massive/internal
- Organ Damage/Failure
  - Due to high dose chemo, other medications, infection or GVHD
  - Any organ can be affected: heart, lung, liver, kidney
- Graft Versus Host Disease
  - Can vary from mild to life threatening inflammation of certain organs: skin, gut, liver, lung
  - Donor Cells attacking “you”
  - Better prevention strategies and treatments available
- Relapse
  - Cure is not guaranteed
  - Risk is higher in the 1st year
  - You might benefit from low dose chemotherapy post transplant based on discussion with your doctor

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Conclusion

Why do a bone marrow transplant?

- Decision up to individual patient
- Offers only possibility of cure
  - Other treatments will only keep it at bay
- ~40-50% of patients survive long-term
- We are working to improve every day!

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Thank you!