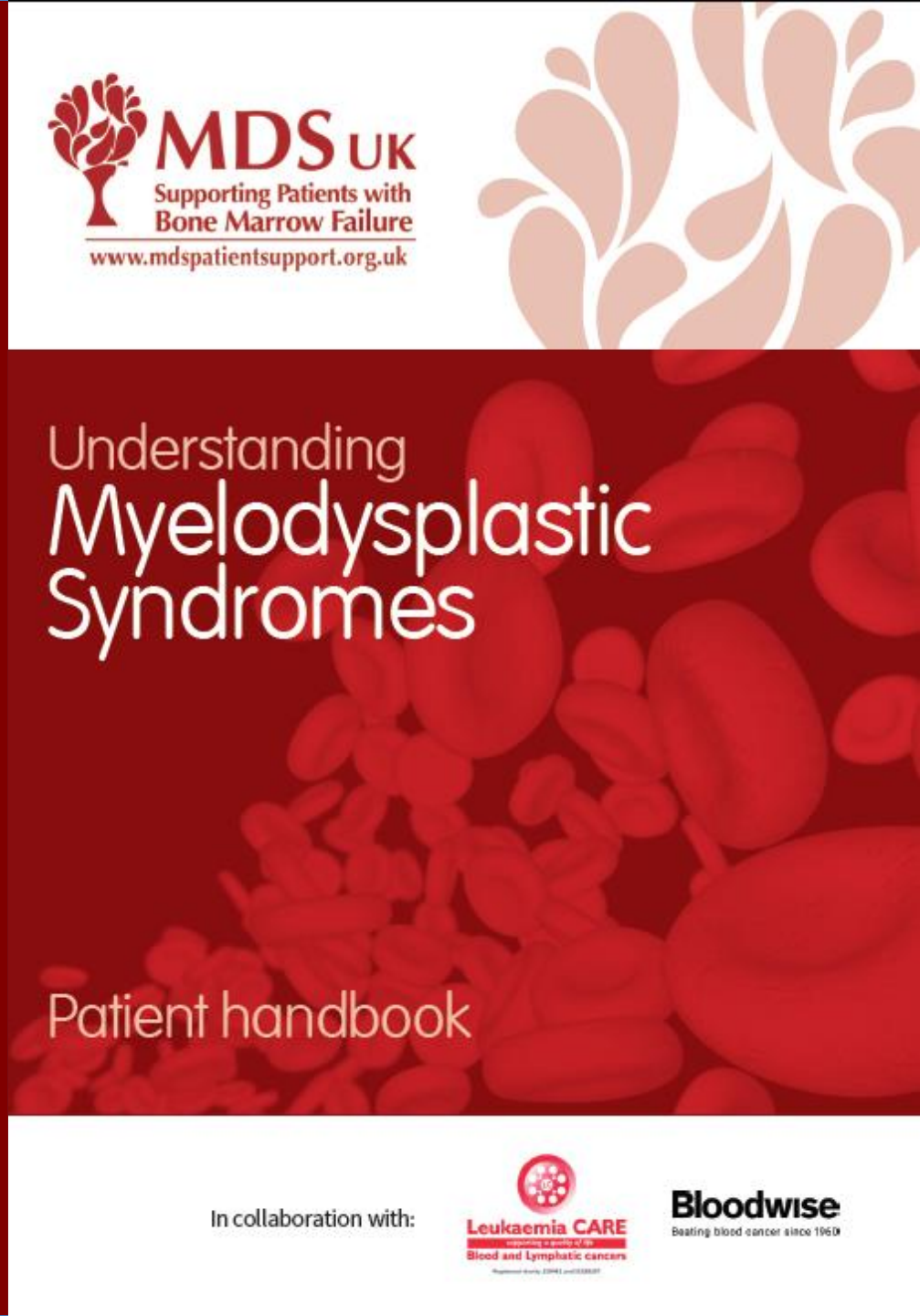
UNDERSTANDING BONE MARROW AND BLOOD

July 2016

Dr Ana Carvalhosa
Haematology Specialist Registrar
in Royal Bournemouth Hospital



Objectives

1. From bone marrow to blood…
   or from blood to bone marrow
   – what is this all about?

1. MDS – an introduction

Myelo	Where?
Dysplastic	How?
Syndrome	What types?

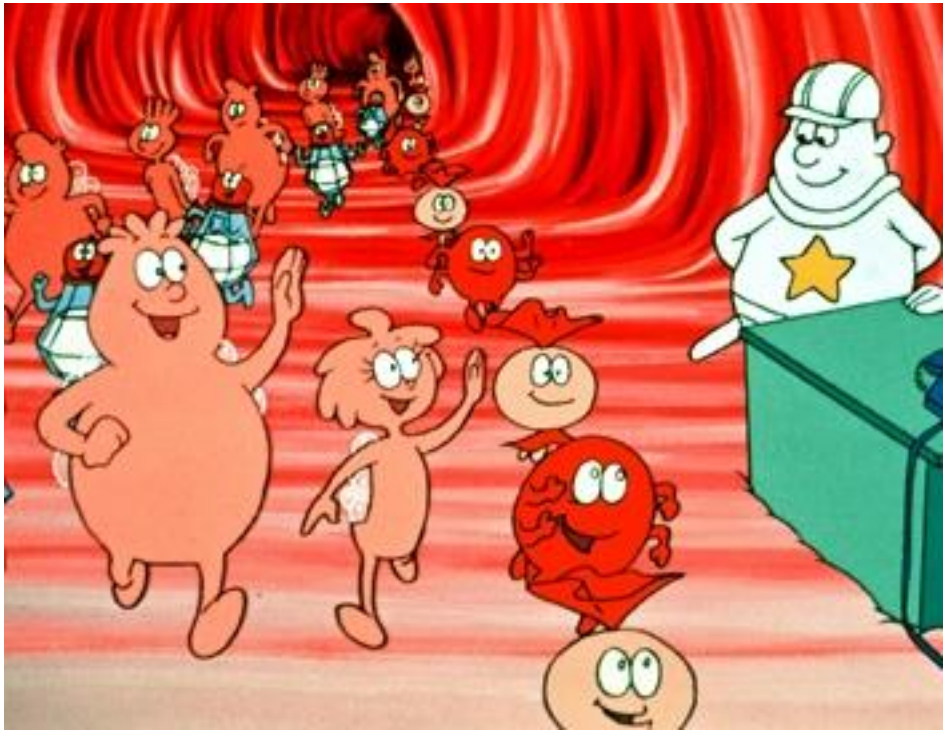
and what can we do with it?

“If you can’t explain it to a six year-old, you don’t understand it yourself”

Albert Einstein

Once upon a time …Life

Blood cells



Platelets (PLT)

Red cells (RBC) = erythrocytes

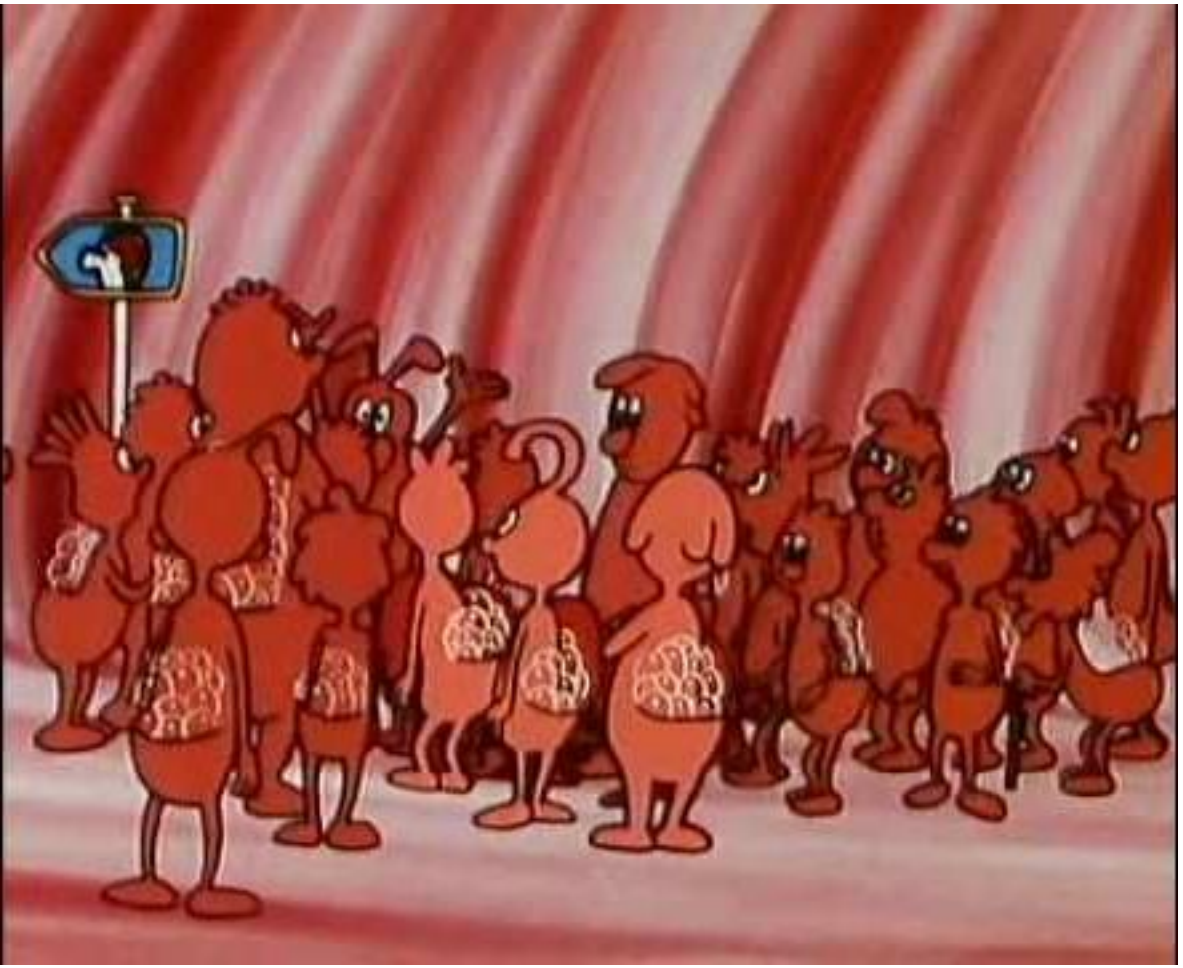
White (WBC)

- Neutrophils
- Eosinophils
- Basophils
- Monocytes

- Lymphocytes

→ What is their job?

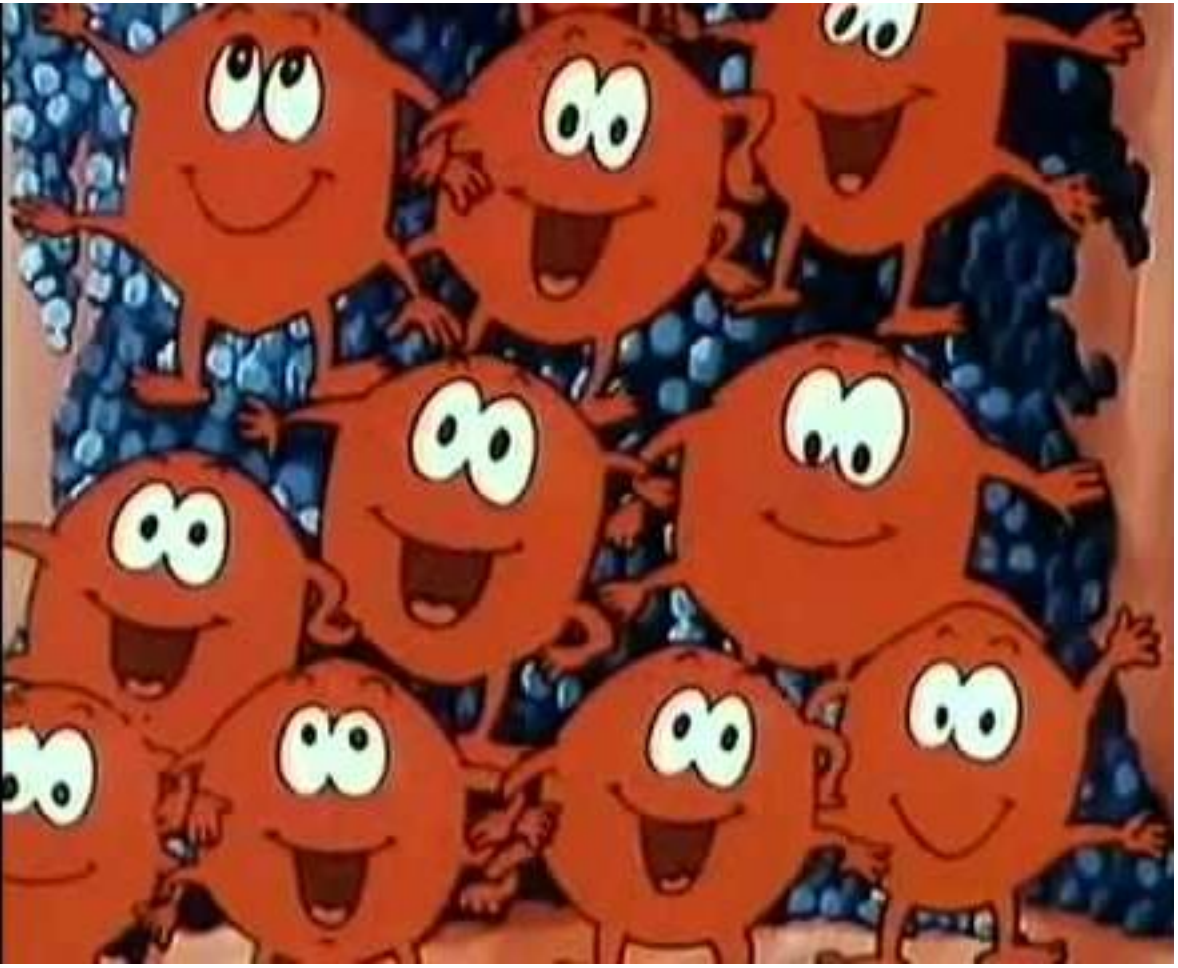
Blood cells



Red cells (RBC)
Red → haemoglobin

- **Their job**
  - carrying oxygen around the body → "fuel" for the body
- **When they are low**
  = anaemia
  - tiredness
  - shortness of breath
  - dizziness on standing
  - palpitations
- **What can be done about it**
  - transfusions
  - sometimes EPO (erythropoietin) injections

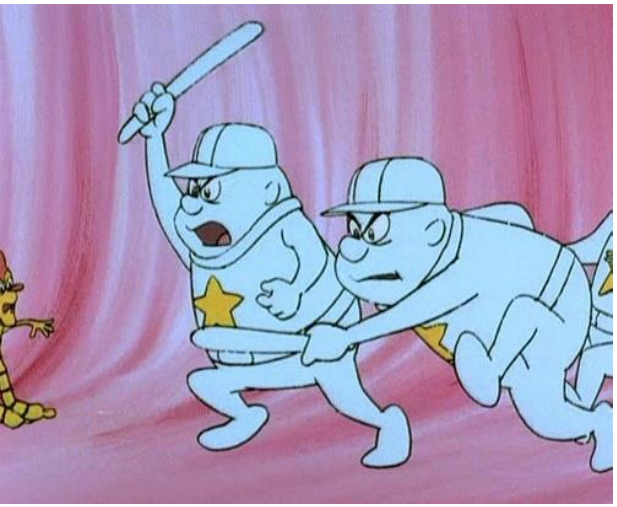
Blood cells



Platelets (PLT)

- **Their job**
  - forming plugs to stop bleeding after injury
- **When they are low**
  = thrombocytopaenia
  - abnormal bruising, bleeding
- **What can be done about it**
  - transfusions
  - sometimes tranexamic acid

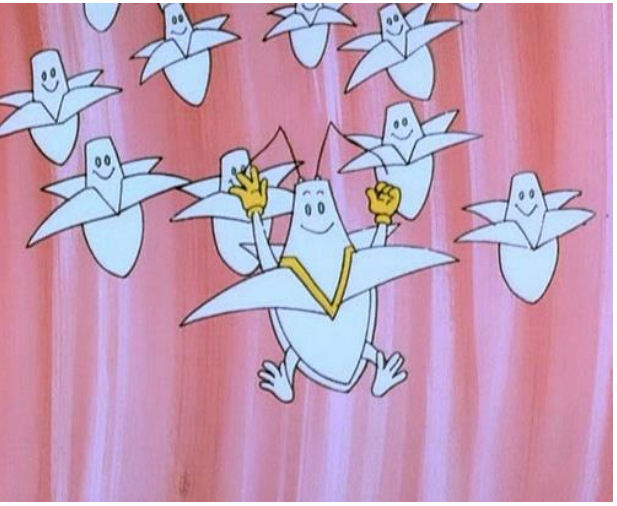
Blood cells

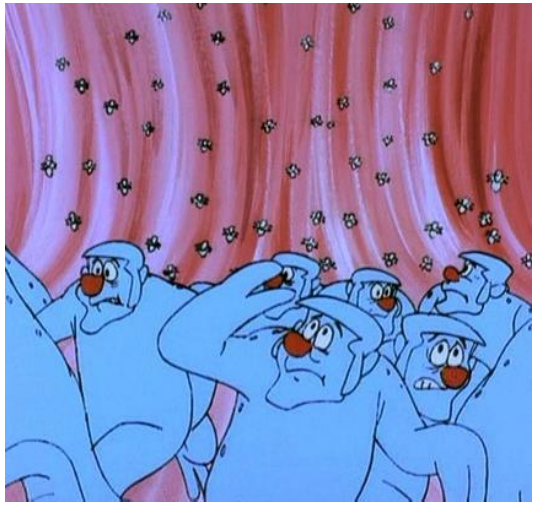


Big family

Neutrophils
Eosinophils
Basophils
Monocytes

Lymphocytes

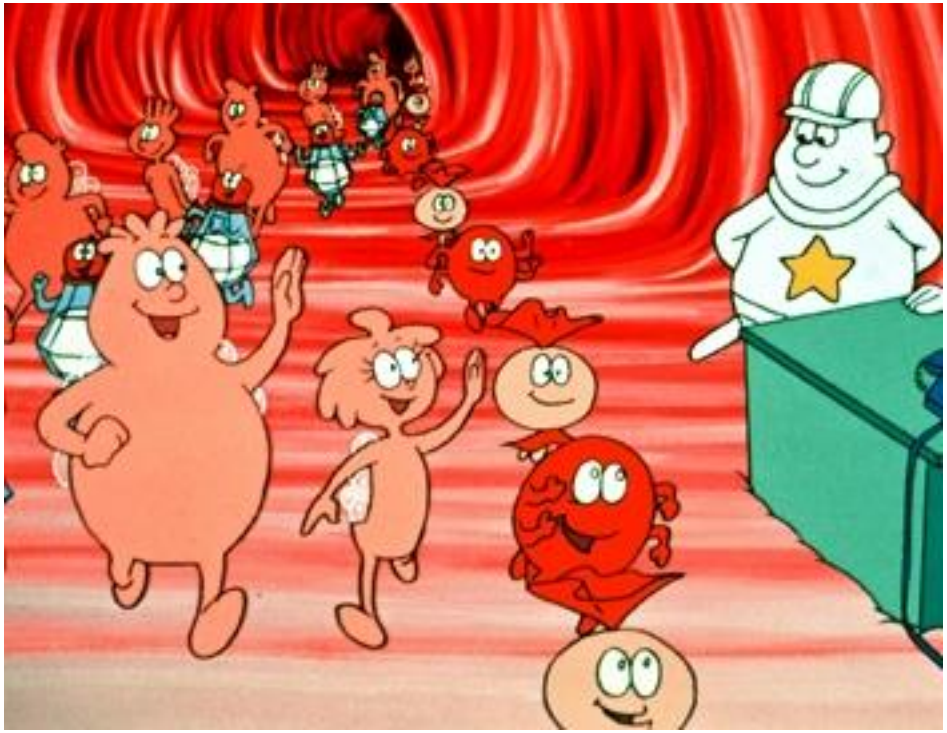




White cells (WBC)

- **Their job**
  - main job = fight infections
- **When they are low**
  = leucopaenia (neutropaenia)
  - infections
  - mouth ulcers
- **What can be done about it**
  - prevention
  - sometimes GCSF injections

Blood cells



Platelets (PLT)

Red cells (RBC) = erythrocytes

White (WBC)

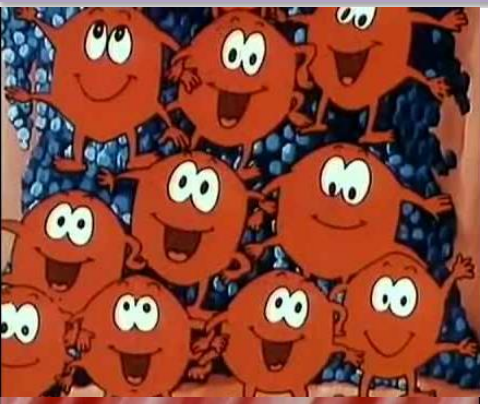
- Neutrophils
- Eosinophils
- Basophils
- Monocytes

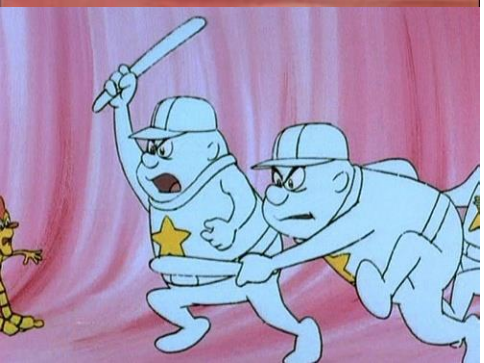
- Lymphocytes

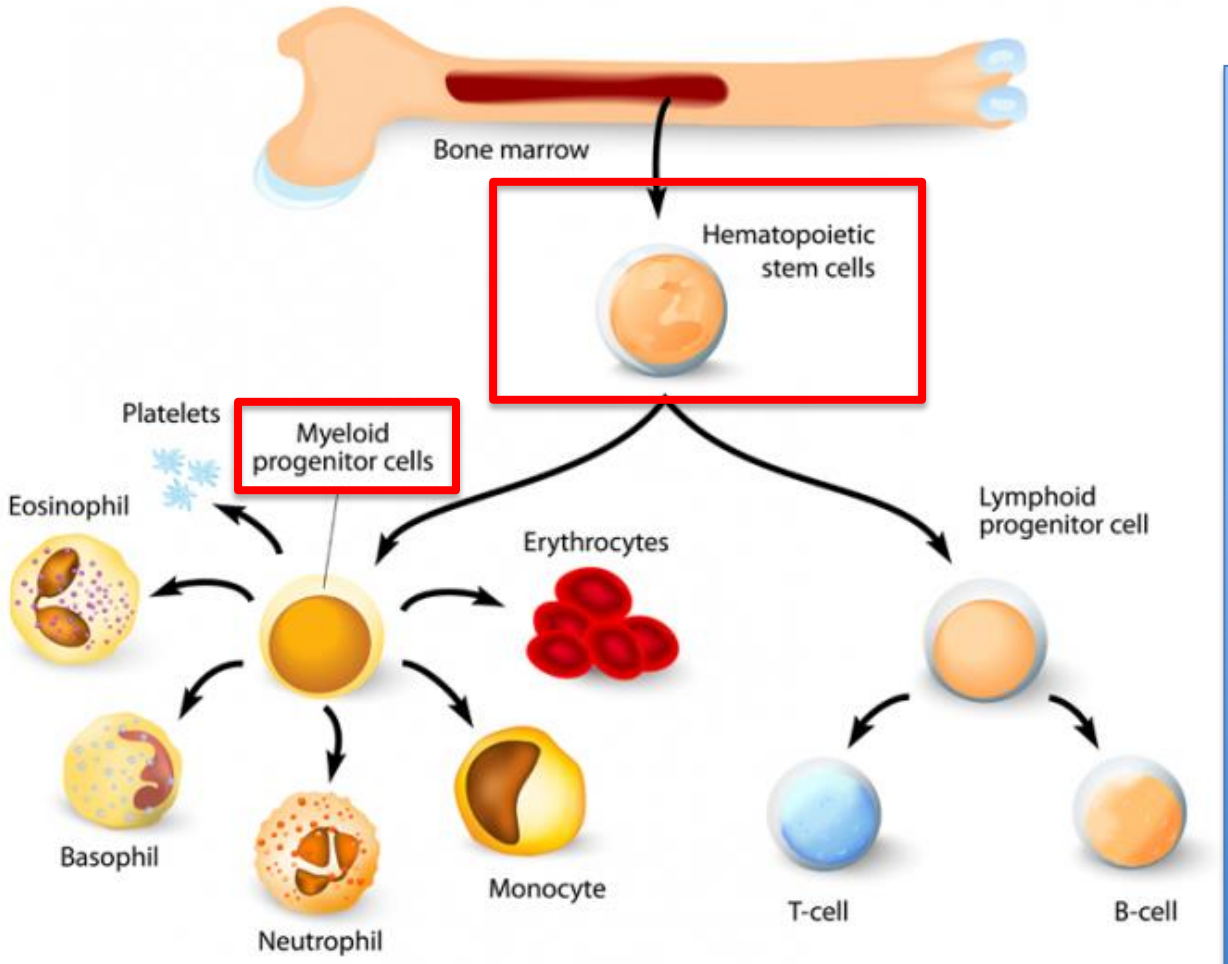
→ What is their job?

→ Where do they come from?

Bone marrow






Bone marrow
Hematopoietic stem cells
Platelets
Myeloid progenitor cells
Eosinophil
Erythrocytes
Lymphoid progenitor cell
Basophil
Neutrophil
Monocyte
T-cell
B-cell
Bone marrow
Blood

MDS

Myelo	Where?	Bone marrow → type of bone marrow cancer → bone marrow biopsy required
Dysplastic	How?	Based on 1. what the cells look like in the blood and bone marrow (BM) 2. the "cytogenetics" (BM)

Myelo + dysplastic → low number of cells in the blood (cytopaenia)

Syndrome	What types?	Based on 1. What the cells look like 2. Number of immature cells (blasts) 3. Most affected family (RBC, PLT, WBC) → **2016 WHO classification of MDS**

Name	Dysplastic lineages	Cytopenias*
MDS with single lineage dysplasia (MDS-SLD)	1	1 or 2
MDS with multilineage dysplasia (MDS-MLD)	2 or 3	1-3
MDS with ring sideroblasts (MDS-RS)		
MDS-RS with single lineage dysplasia (MDS-RS-SLD)	1	1 or 2
MDS-RS with multilineage dysplasia (MDS-RS-MLD)	2 or 3	1-3
MDS with isolated del(5q)	1-3	1-2
MDS with excess blasts (MDS-EB)		
MDS-EB-1	0-3	1-3
MDS-EB-2	0-3	1-3
MDS, unclassifiable (MDS-U)		

Prognosis

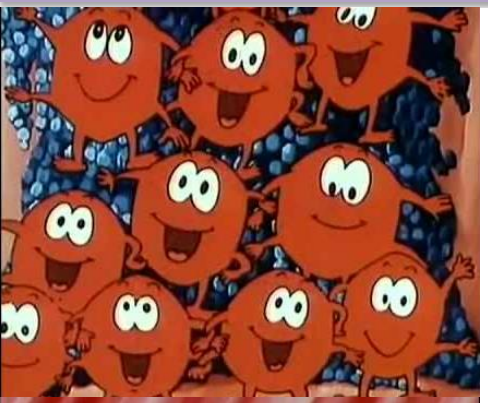
Prognosis

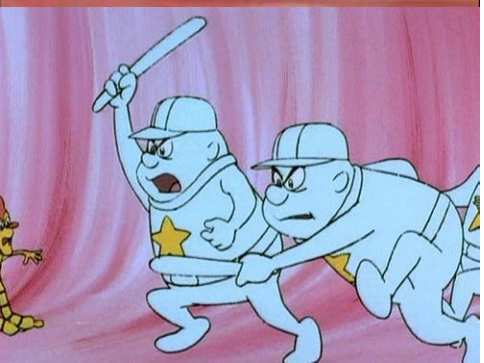
- different markers of prognosis related to:
  - general fitness, age
  - the MDS itself (blood counts, blasts, cytogenetics)

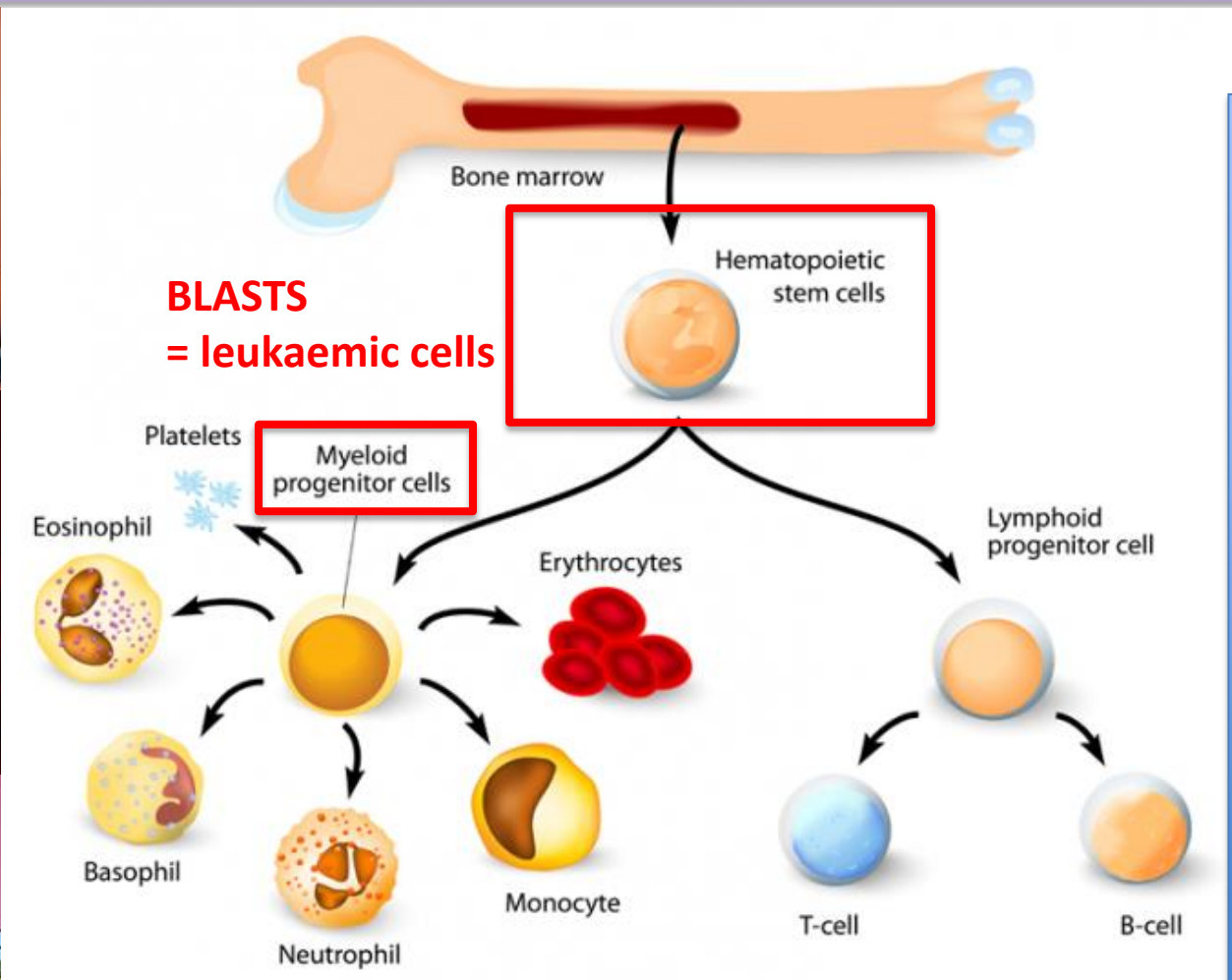
    → IPSS-R score

- Risk = development of acute myeloid leukaemia (AML)

Bone marrow






Bone marrow
Hematopoietic stem cells
BLASTS
= leukaemic cells
Platelets
Myeloid progenitor cells
Eosinophil
Erythrocytes
Lymphoid progenitor cell
Basophil
Neutrophil
Monocyte
T-cell
B-cell
Bone marrow
++++
Blood

Treatment

Each patient is unique.

Rare to cure MDS… but usually “controllable”.

4 big categories of medical treatment

- supportive care — Symptom control
  - transfusions of RBC and PLT
  - EPO +/- GCSF injections
  - treatment of infections
- non-intensive chemotherapy — Slow down progression
  - azacitidine
- intensive chemotherapy
- stem cell transplant — Only curative treatment

Treatment

You are not your disease.

But will have to learn how to live with it…

Family and friends
Support group
Macmillan team
Cancer support nurse
Clinical nurse specialist
Doctors