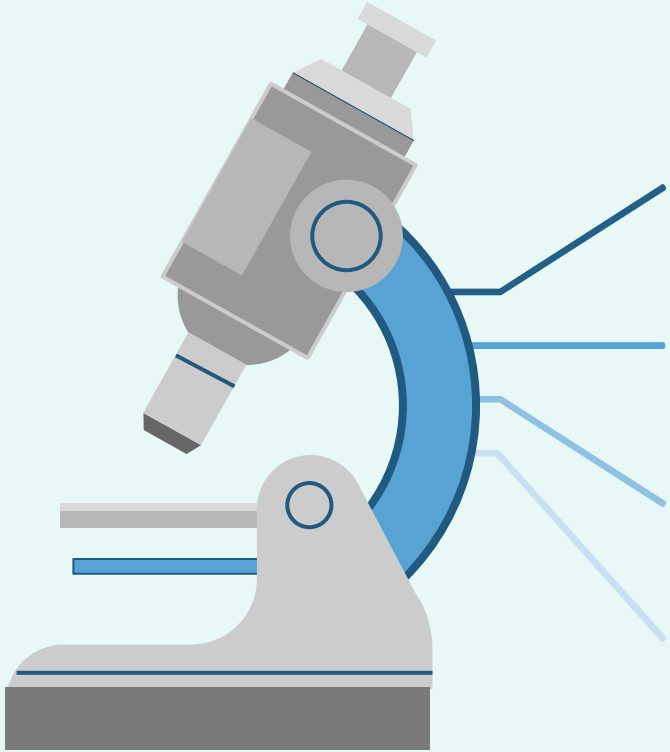
The wonderful World of Blasts!

Jennifer Mills
Clinical Scientist
Haematology and Transfusion

Session Aims



1. The anatomy of a blast.
2. When do we see blasts?
3. When is a blast not a blast?
4. When are blasts important?

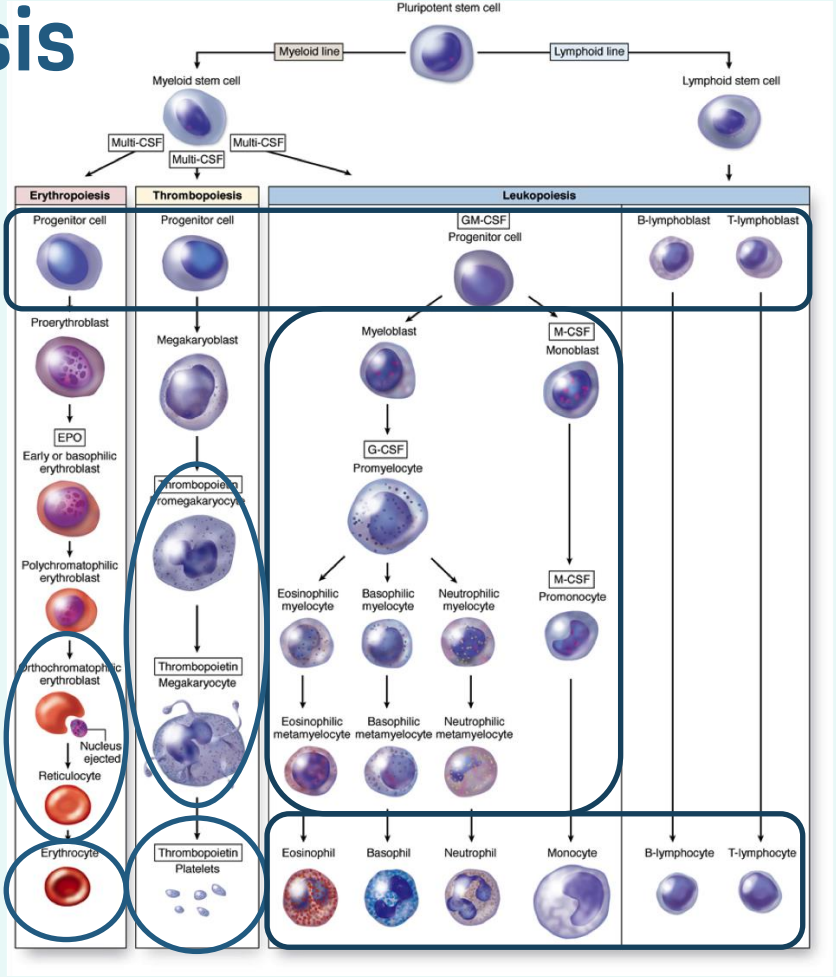
Haematopoiesis

All blood cells are made in the bone marrow, but only a few enter into peripheral blood (PB).

Megakaryocytes are extremely uncommon in PB.

Red cell precursors are common in anaemia

These cells are normal in peripheral blood.



Anatomy of a Blast

Blasts are always concerning in peripheral blood!

It can be very hard to tell what kind of blasts they from appearance alone!

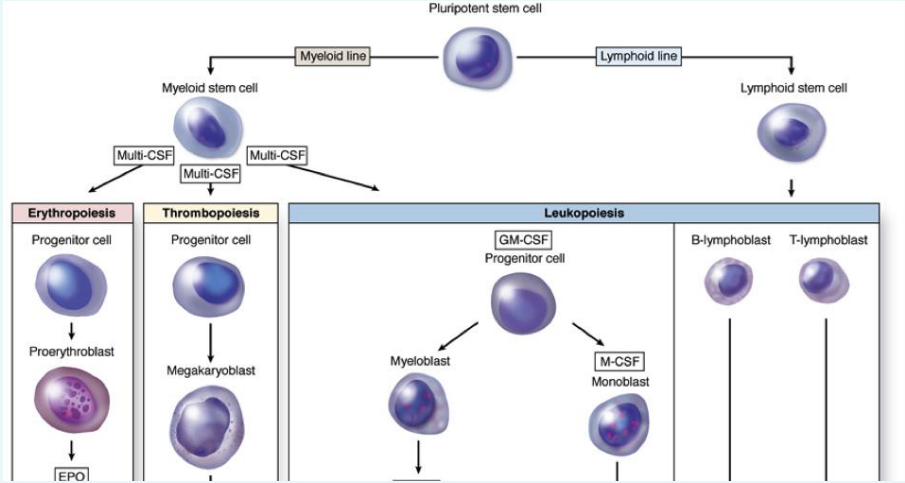
Myeloid precursors can be present in PB for many reasons- not all are malignant!

Anatomy of a Blast

What is a blast?

Blasts encompass a variety of different early stem cells.

Development is driven by key cytokines e.g. GCSF, EPO, IL-6.



All haematological cells originate from pluripotent stem cells.

As cells develop they gain features which help to identify them.

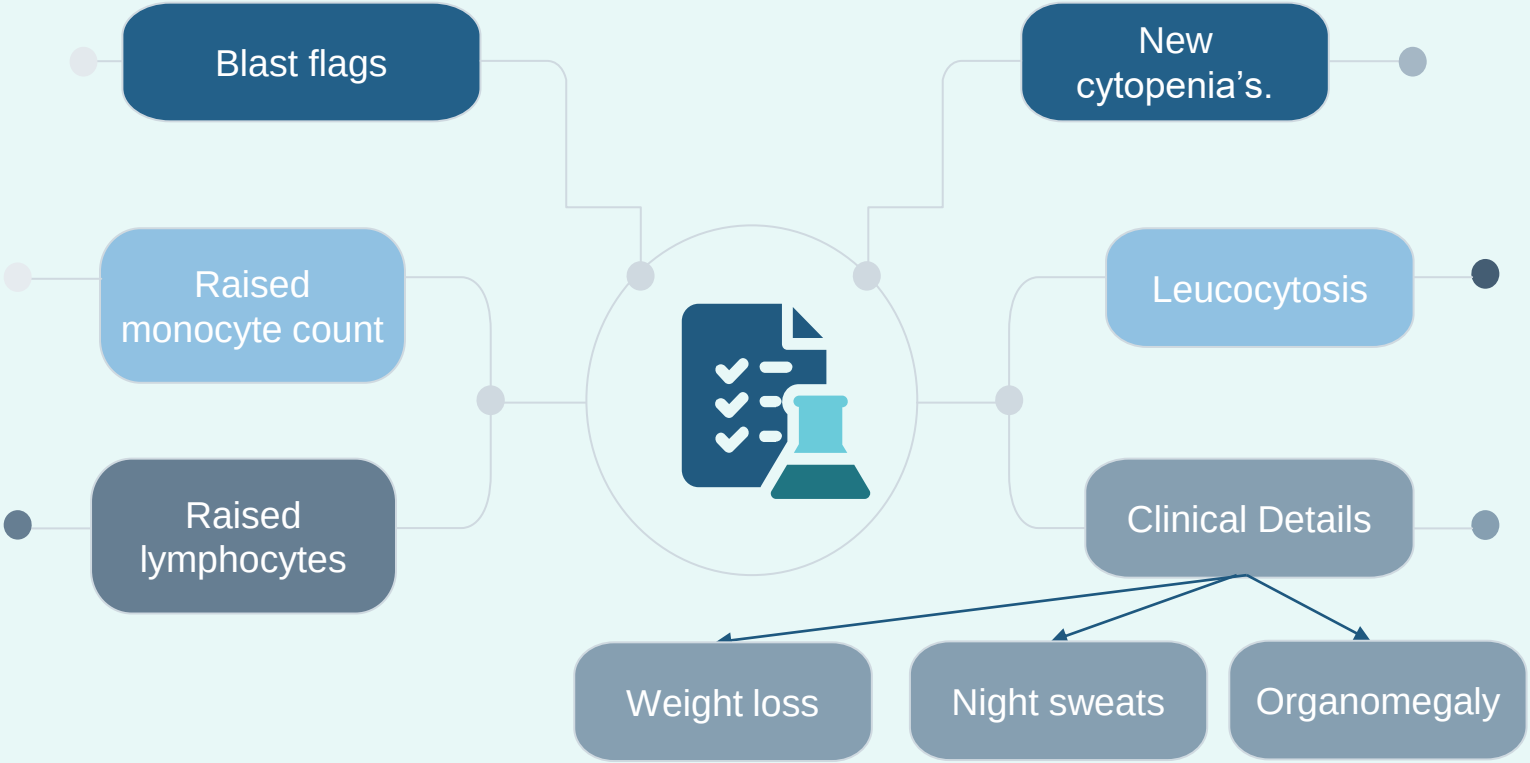
Blasts are normal in the marrow in small numbers

This may include size, granules, cytoplasm colour, cell markers etc.

Genetic aberrancies can cause maturational arrest, resulting in increased blasts.

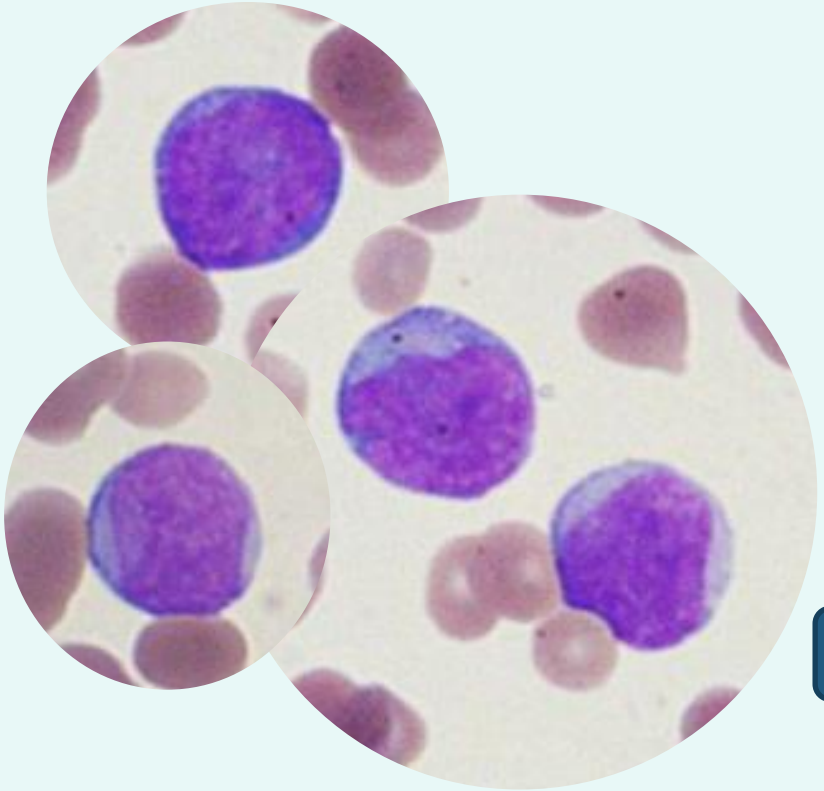
What FBC features make us suspicious?

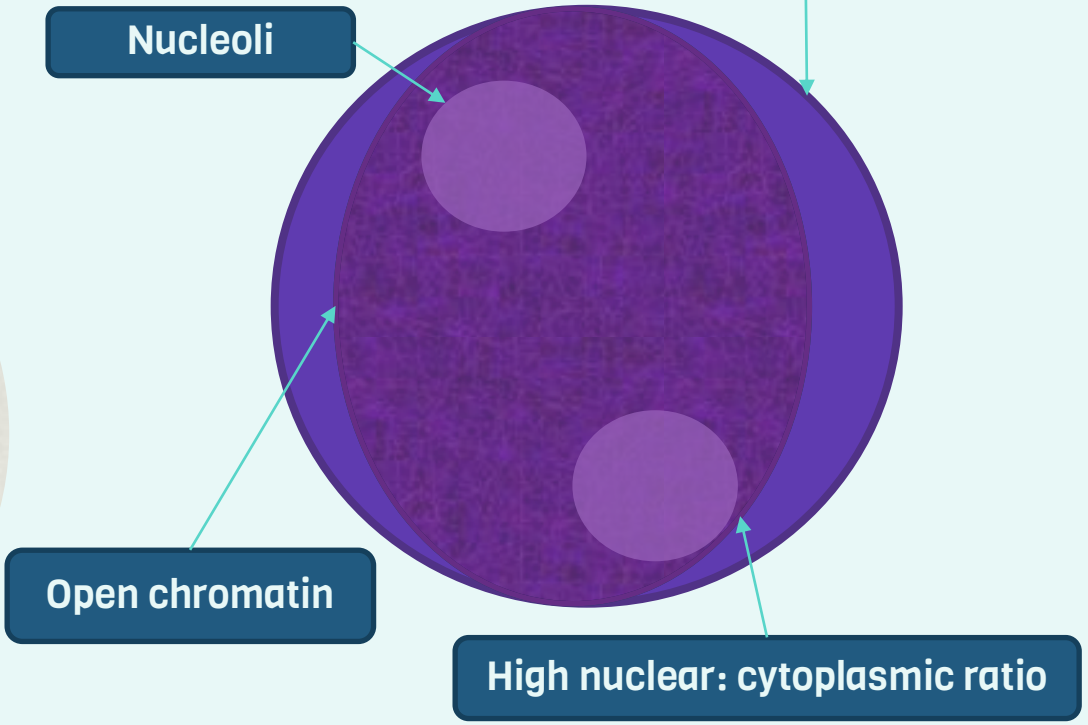
Anatomy of a Blast.



Anatomy of a blast

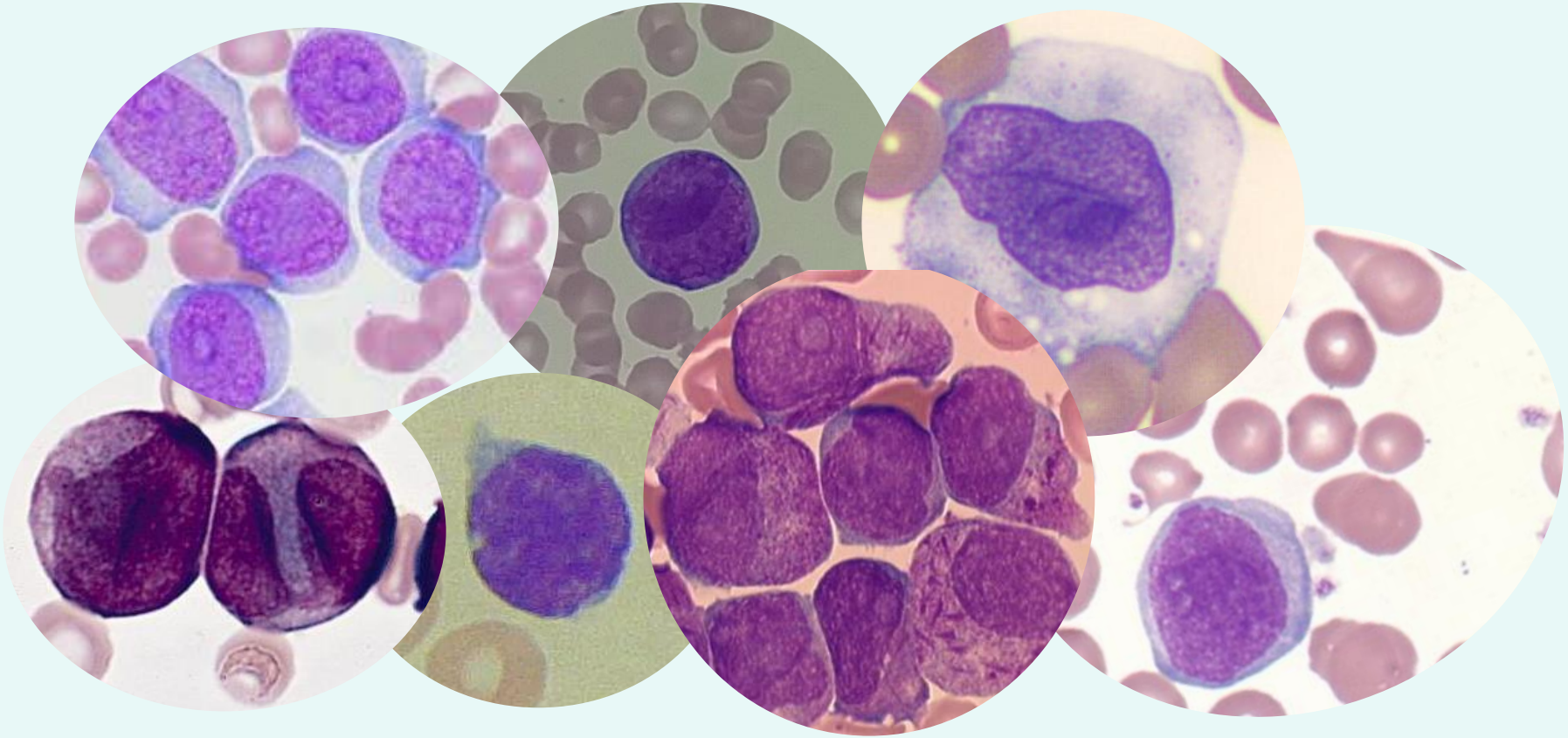
The Anatomy of a Blast.





Anatomy of a blast.

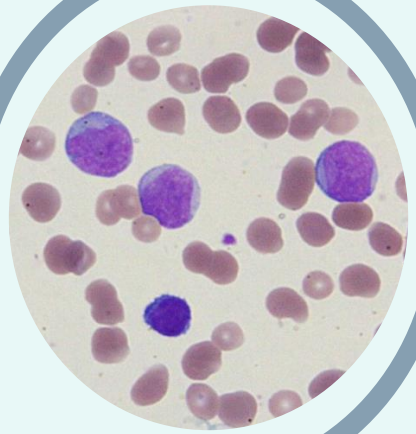
So all Blasts are the same, right?



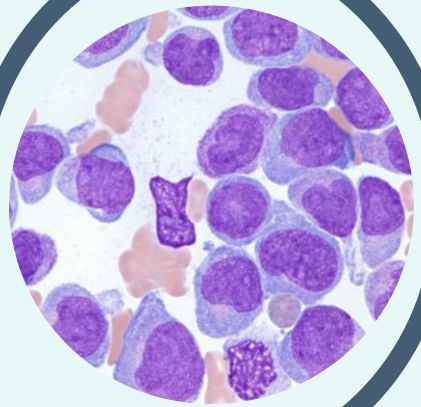
When do we see Blasts in Blood?

Leukemic Causes: Acute

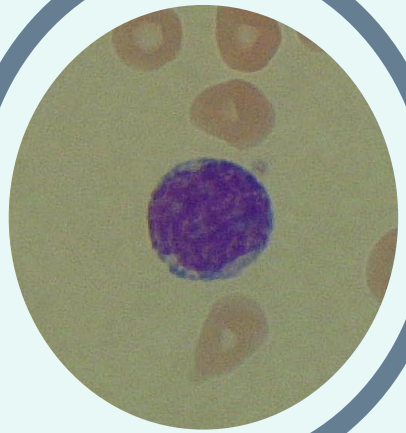
When do we see blasts?



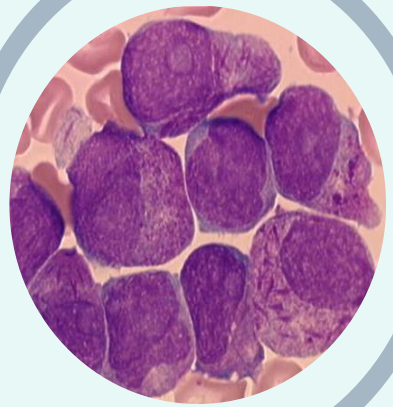
Acute Myeloid Leukaemia



Acute Myelomonocytic Leukaemia



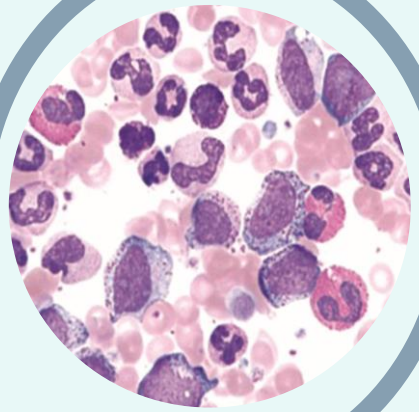
Acute Lymphoblastic Leukaemia



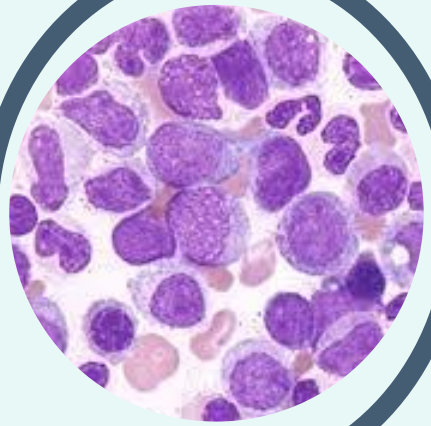
Acute Promyelocytic Leukaemia

Leukemic Causes: Chronic

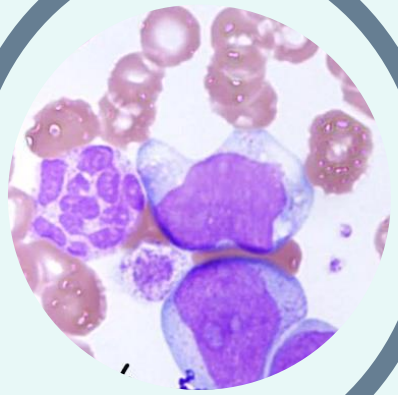
When do we see blasts?



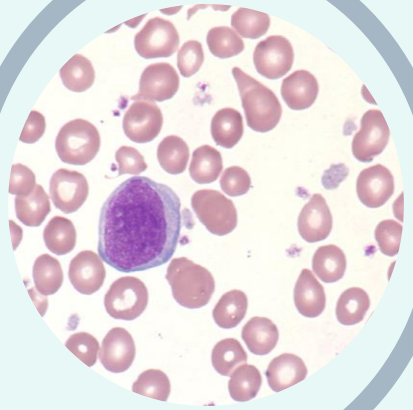
Chronic Myeloid Leukaemia



Chronic Myelomonocytic Leukaemia



Myelodysplastic Syndrome



Myelofibrosis

Myelodsyplasia and Blasts

When do we see blasts?

MDS classifications are discrete, but can have a spectrum-like presentation or pattern of development.

MDS-SLD

1 linneage affected.

Peripheral blasts: <1%
Marrow blasts: <5%

MDS-MLD

2-3 linneages affected.

Peripheral blasts: <1%
Marrow blasts: <5%

There are other categories of MDS, but in these cases, blasts are <5% in the bone marrow.

MDS-EB1

1+ lineages affected.

Peripheral blasts: 2-5%
Marrow blasts: 5-10%

MDS with excess blasts (MDS-EB) are considered high risk, but patient's may not progress to AML for many years.

MDS-EB2

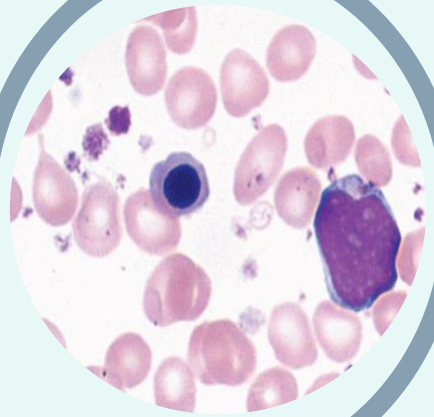
1+ lineages affected.

Peripheral blasts: 5-19%
Marrow blasts: 10-19%

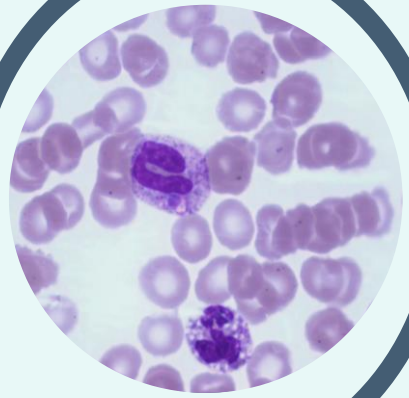
Once blasts are >20% in the bone marrow, MDS becomes AML. PB blasts may increase and cytopenia's may develop/worsen.

Non-Leukemic Causes

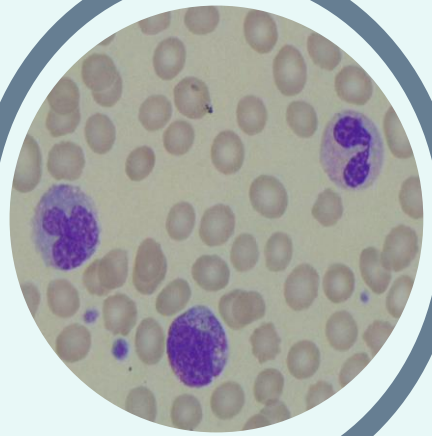
When do we see blasts?



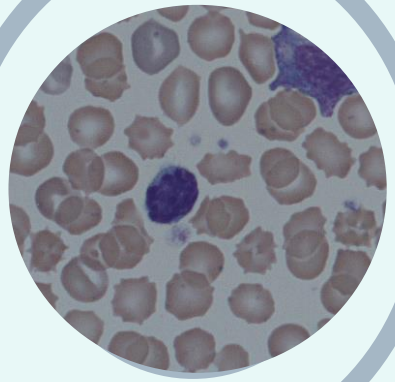
Marrow Infiltration



Bacterial Sepsis



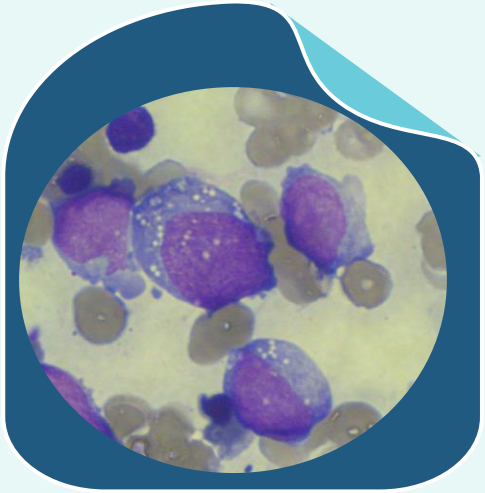
GCSF



Prematurity

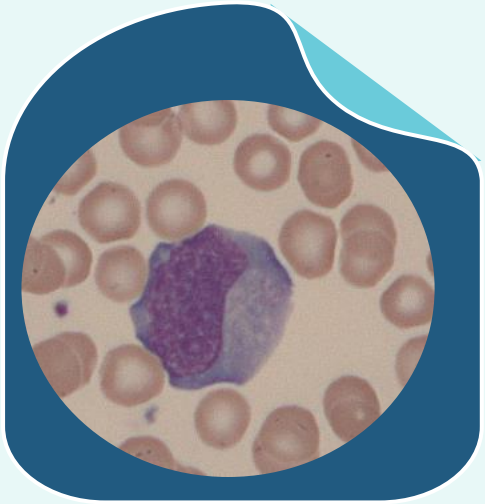
When is a blast not a blast?

When is a blast, not a blast?



High Grade Lymphoma

Large cells with blastic appearance and vacuolation. These are not blasts- but these patients do need urgent treatment!



EBV/CMV Infection

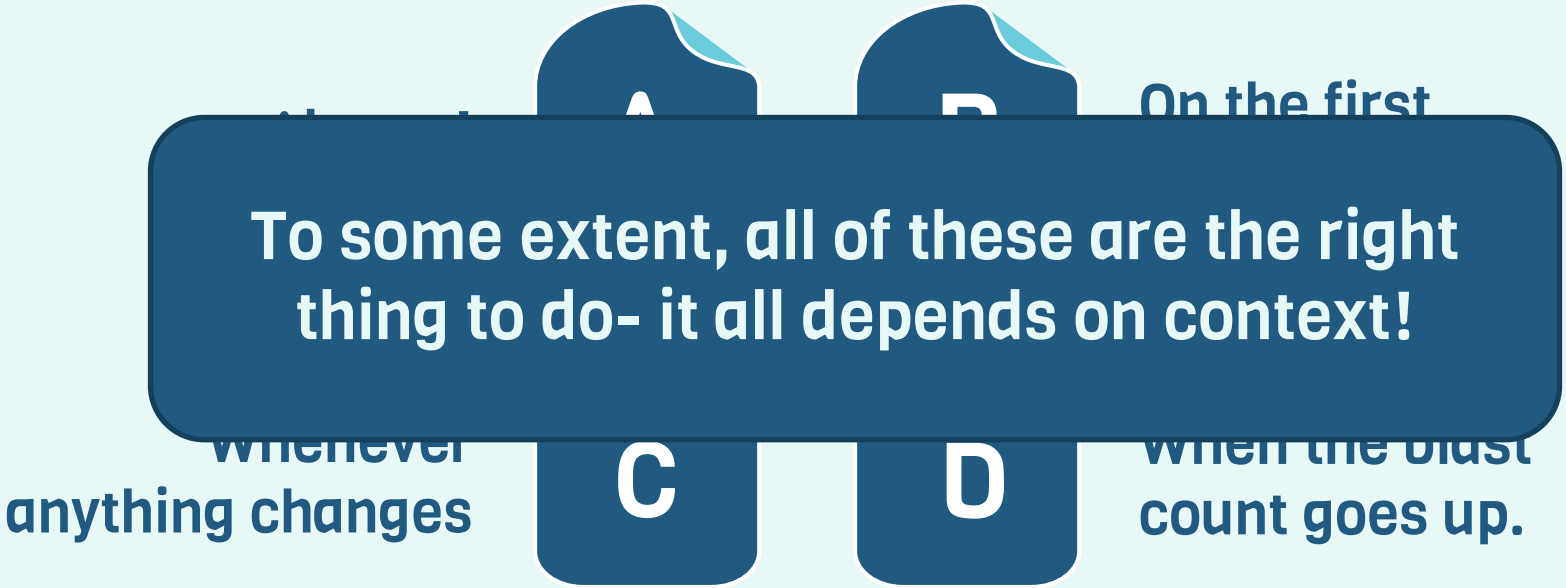
Cytoplam can be becomme expansive and dark and nucleoi present, but chromatin will remain clumped!

Prolymphocytes

Prolymphocytes can be seen in LPDs e.g. CLL- but >55% indicates PLL! These cells have nucelli, but an otherwise mature appearance!

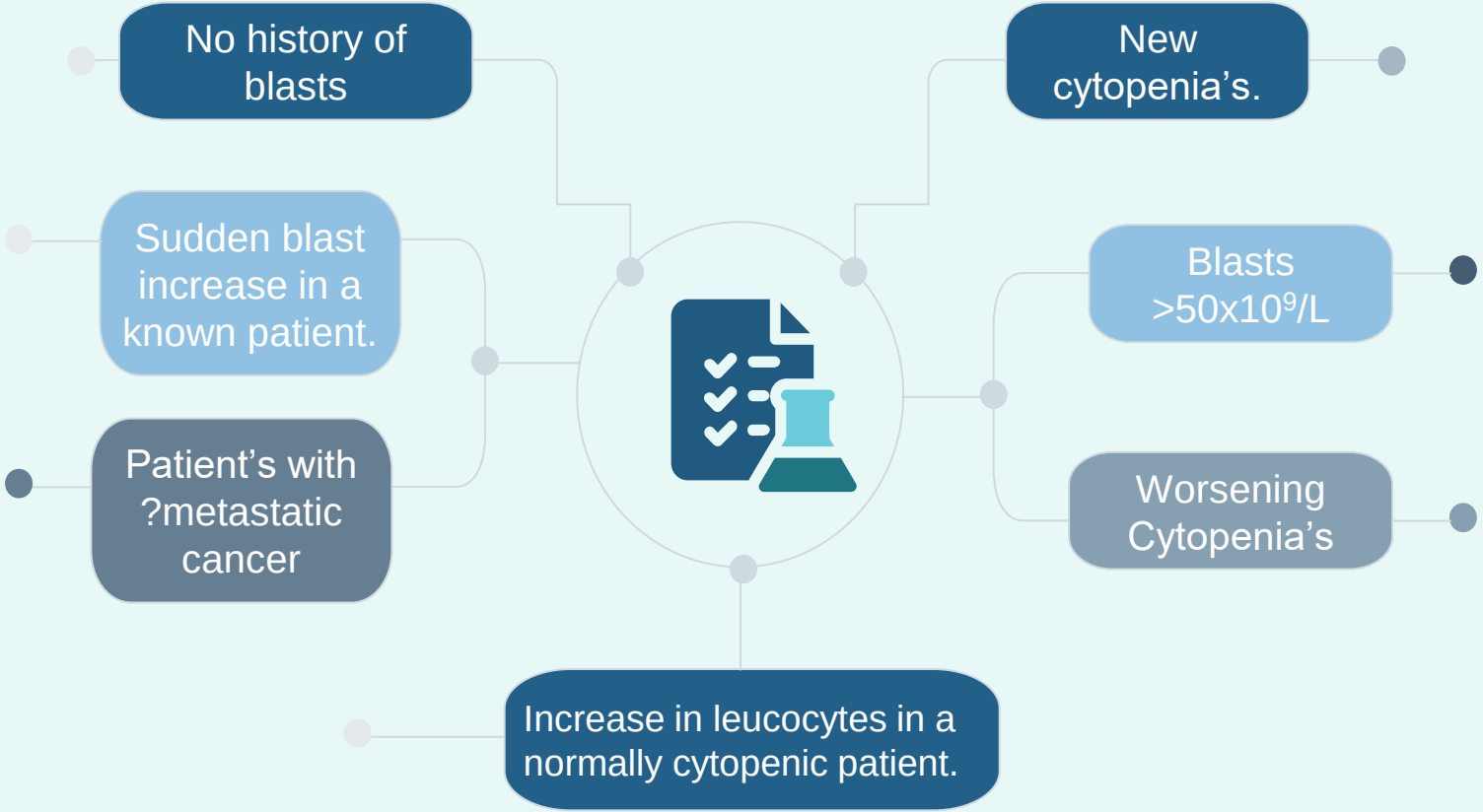
When are blasts important?

When should results be passed to clinicians?



When should films be passed to HQ?

When are blasts important?



When is it urgent?

When are blasts important?

APML is always a medical emergency- phone straight through a medic OOH!

Patients with WBCC >50x10^9/L need to phoned through urgently OOH.

Low blast counts can often wait if OOH, however, if in doubt- always let a medic know!

This could indicate AML transformation- clinicians may be expecting this, but it doesn't hurt to let them know!

Fragments can indicate disseminated intravascular coagulation (DIC) – these should be phoned urgently!

Blast Check List!

When are blasts important?

Blast Features

Granularity?

Vacuolation?

Size?

Maturation signs?

How Many Blasts?

Are they the majority?

Is this the same as previous?

Other Cells

Are there any other cells?

How mature are the other cells?

Are they dysplastic?

What's the history?

Previous blasts?

Previous cancer?

Previous haematology diagnosis?

Any known comorbidities?

What should I do?

Phone to the requester.

Put the film on HQ

Contact a Haematologist.

Authorise.

Thanks!

Do you have any questions?

Jennifer.mills@porthosp.nhs.uk
023 92 28 5774