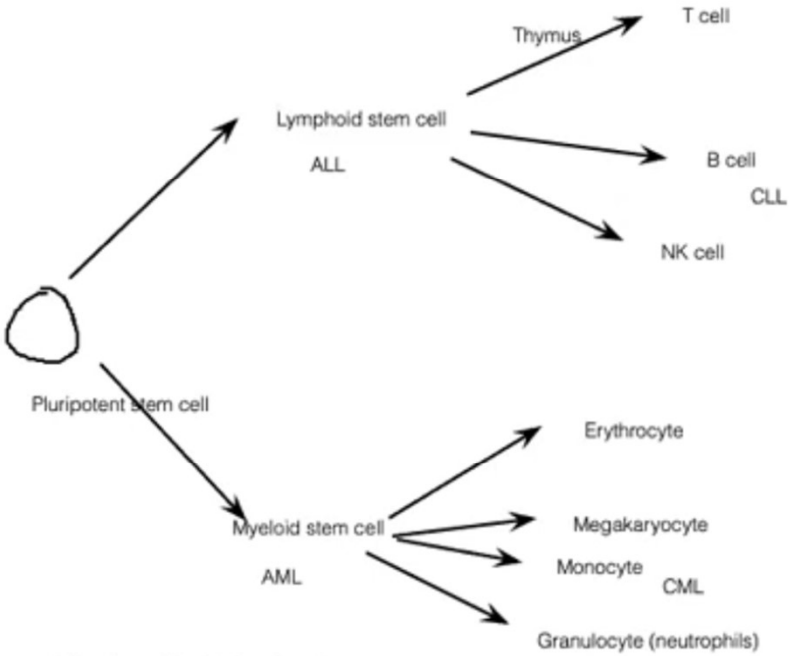
CSM

THE CANCER SOCIETY OF MELBOURNE
UNIVERSITY (CSM) PRESENTS

LEUKAEMIA & LYMPHOMA MASTERCLASS

THURSDAY 3RD SEPTEMBER
6 PM - 7:30 PM

Leukaemia = Cancer in the bloodstream
Lymphoma = Cancer in the LNs



AML = Acute Myeloid Leukaemia
ALL = Acute Lymphoblastic Leukaemia
CML = Chronic Myeloid Leukaemia
CLL - Chronic Lymphoblastic Leukaemia —> Treat like a lymphoma

Acute = develops over days-weeks
Chronic = over months - years

Acute Leukaemia Presentation (Both AML and ALL)
1) Quick (days-weeks)
2) BM failure
- Low RBCs —> Anaemia (Fatigue, Pale, SOB, Dizzy)
- Low WBC —> Infection
- Low Platelets —> Bleeding
3) B symptoms = high cell turnover
- Fever > 38
- Drenching night sweats
- LOW 10% over 6 months
Constitutional Symptoms

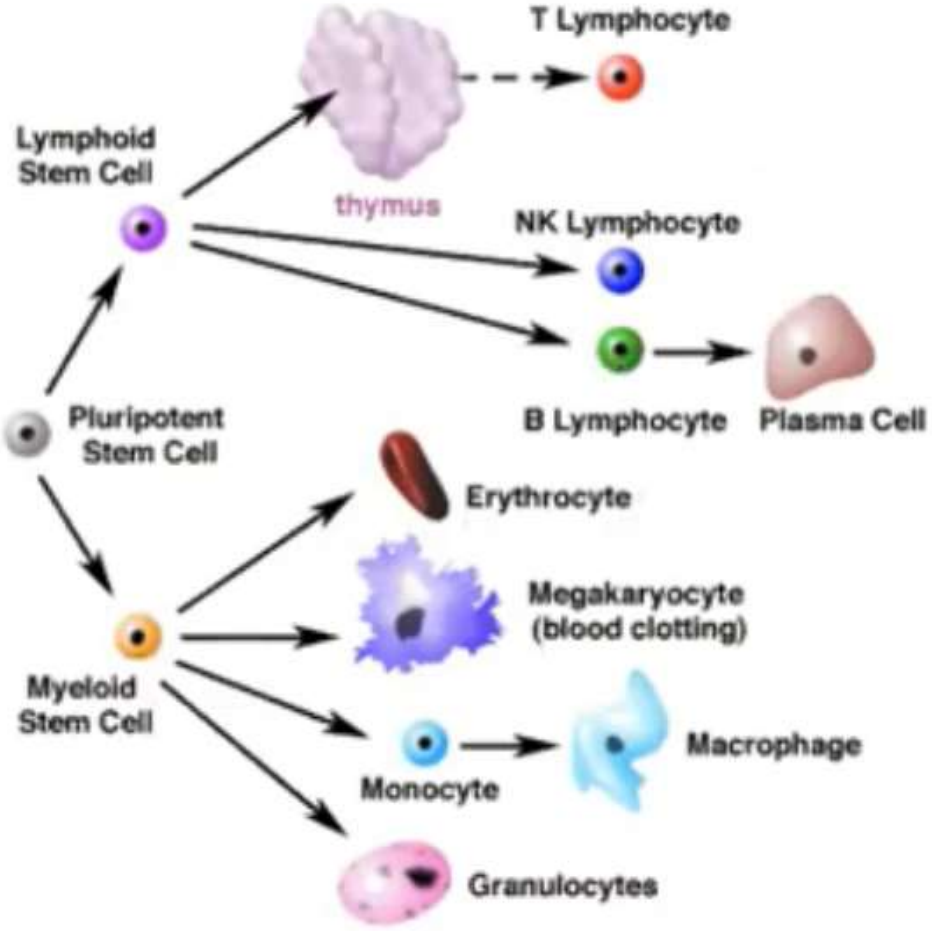
ALL: Spleen, Liver, Thymic mass
V. difficult to tell AML Vs ALL clinically

Diagnosis = BMAT
1) Morphology
2) Flow cytometry
3) Cytogenetics
4) Molecular studies

BMAT: At least 20% blasts

	Old AML	Kids ALL
Morphology	Cytoplasmic granules Auer rods	High nuclear:cytoplasmic ratio
Flow	CD34 = blast MPO = Myeloid	CD34 = blast TdT = Lymphoid
Cytogenetics		
Molecular studies		

Induction: Chemo
Consolidatio: Chemo OR BMT


T Lymphocyte
Lymphoid
Stem Cell
thymus
NK Lymphocyte
B Lymphocyte
Plasma Cell
Pluripotent
Stem Cell
Erythrocyte
Megakaryocyte
(blood clotting)
Myeloid
Stem Cell
Monocyte
Macrophage
Granulocytes

Medical Emergencies Acute Leukaemia
1) Febrile neutropenia N<1 and T>38.3 (T>38 1 hour apart)
- Dr ABC
- 2x large bore cannulas (green 18G)
- BC x 2 sets (if they central line, take from there too)
- Empirical antibiotics
—> Gram-ves b/c they kill you = IV Tazocin 4.5g QID
—> MRSA = IV Vancomycin
- Find the source: Hx, Ex, Ix
—> Cough, Hamaeturia, Diarrhoea, Lines
—> Sputum, Urine, Stools, CXR
—> CT Brain

2) Hyperviscosity from hyperleukocytosis (Blast Crisis)
- Acute leukaemia (cell turnover is fast)
- WCC > 100
- Sx (headache, blurry vision, tortuous retinal veins, hypoxia (white of lungs), stroke)
- Treat
—> IV fluids
—> Must NOT give PRBCs (unless they're dying of AMI)
—> Plasmapharesis (wash out blood)

3) DIC
- Clotting factors are consumed
- BLEEDING
- Triggers: Cancer, Sepsis, Surgery, Trauma, APML
- Coags
—> Fibrinogen LOW
—> INR HIGH
—> APTT HIGH
—> Plts LOW
—> D-Dimer HIGH
- Treat
—> Fix the cause
—> Replace their fibrinogen (Cryoprecipitate, FFP)

4) Tumour lysis Syndrome (TLS)
- High K, High Phosphate, High Urate, High LDH
LOW Calcium
- IV fluids
- Prevent: Allopurinol
- Last resort: Rasbirucase

Chonic Myeloid Leukaemia (CML)
- Grows over months to years
- Constitutional symptoms but not B symptoms

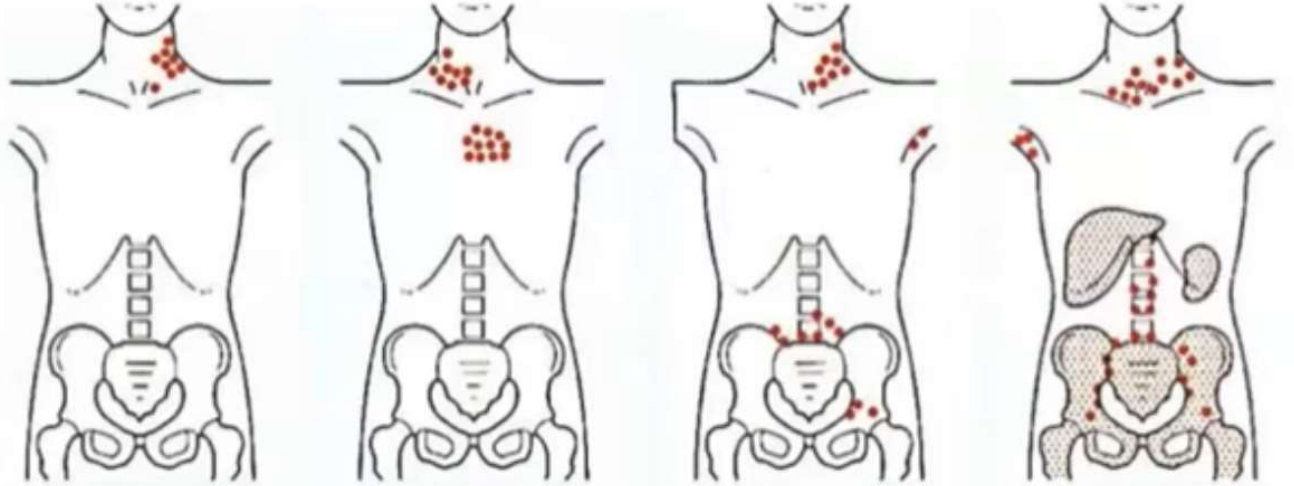
Feature = Philadelphia Chromosome t (9,22)
Bcr-Abl = Constitutive tyrosine kinase active —> intracellular cascade for replication

Presentation
- Long time
- BM failure
- Consitutional Sx
- Splenomegaly
- Rarely get DIC or Hyperviscoscity b/c turnover is not fast enough

3 phases
1) Chronic phase
2) Accelerated phase (10-20% blasts in BM)
3) Blast crisis (>20% blasts in BM) = Transitioned into an acute leukaemia —> V. poor prognosis

Treatment
1) Tyrosine Kinase Inhibitors = Imatinib
2) If blast crisis: Go straigt to a bone marrow transplant

Ann Arbor staging



Stage I: involvement of single lymph node region or single extralymphatic site (I_E)

Stage II: involvement of two or more lymph node regions on same side of diaphragm; may include localized extralymphatic

Stage III: involvement of lymph node regions on both sides of the diaphragm; may include spleen (III_S) or localized

Stage IV: diffuse extralymphatic disease (e.g. in liver, bone marrow, lung, skin)

Non-Hodgkin's Lymphoma

Low grade
- Slow dividing (months-years)
- Not curable —> No treatment unless disease-complications

Indications for Rx
1. Obstruction (LNs that are compromising organ function)
2. B symptoms (fever, sweats, LOW)
3. Cytopenia

2 exceptions
1. Stage 1 or 2 Follicular lymphoma —> RTx
2. CLL: WCC doubles in 6 months

They're not a problem until they are

B cell
- CLL
- Mantle cell lymhoma
- Follicular lymphoma
- Marginal zone lymphoma

T cell

High grade
- Fast growing (weeks-months)
- Potentially curable

Always treat
- Stage 1 or 2: Chemo x 3 + RTx
- Stage 3 or 4: Chemo x 6

DLBCL
1. Morphology: Large/Diffuse
2. Flow: CD45/CD19/CD20
3. Cytogenetics: nil
4. Molecular: Bcl2 +/-Myc
(double-hit —> poor prognosis)

DLTCL

Very high grade
- Die if you dont treat
- Tumour lysis b/c cell turnover is so high
- The stage doesn't matter, so give FULL dose chemo

Treat: Combo high dose chemo

Burkitt's lymphoma
- Morphology: V. large/Starry sky
- Flow: CD45/CD19/CD20, 100% proliferation
- Cytogenetics: t(8,14)
- Molecular: IgH -Myc

Lymphoblastic Lymphoma

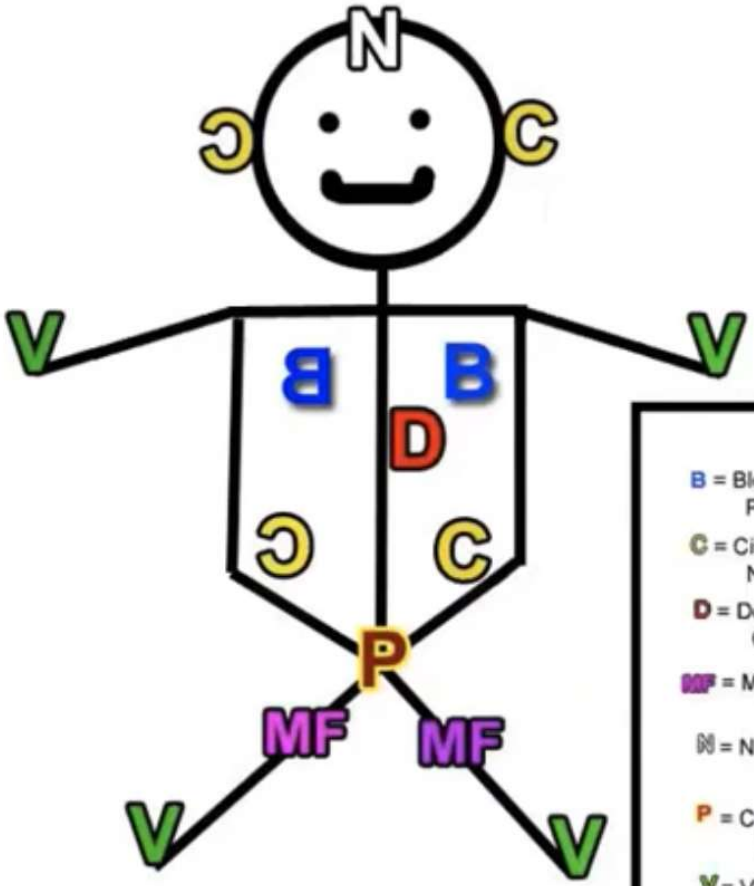
	CLL	Mantle cell Lymphoma	Follicular lymphoma	Marginal zone Lymphoma
Morphology	Small Smear/Sludge	Small	Small Follicles	Small
Flow cytometry	CD45 = lymphocyte CD19/20 = B cell CD5+CD23+	CD45 CD19/20 CD5+CD23-	CD45 CD19/20 CD5-10+	CD45 CD19/20 CD5-CD10-
Cytogenetics		t(11,14)	t(14,18)	
Molecular		IgH-Cyclin D1	IgH-Bcl2	

Hodgkin's lymphoma
1) Reed-Sternberg cells are the cancer cells
2) Very curable —> Chemo ABVD
3) Symptoms are of high cell turnour

Workup of Lymphoma

- CT: Structural abnormalities of LNs
- PET: Metabolic uptake of disease, essential for monitoring of response
- Gated blood pool scan: prior to Anthracycline therapy eg. Doxorubicin
- BMAT
- RFT: Prior to Bleomycin
- Bloods
  - FBE, UEC/CMP, LFTs, LDH, Urate, B2M, Coags
  - HepB, HepC, HIV, EBV, Quantiferon Gold

Chemo Man



Key

B = Bleomycin, Busulfan
Pulmonary Fibrosis

C = Cisplatin, carboplatin
Nephro/ototoxic

D = Doxorubicin
Cardiotoxic

MF = Methotrexate and 5-Fluorouracil
Myelosuppresion

N = Nitrosureas (lomustine, carmustine)
Neurotoxic (xBBB)

P = CycloPhosphamide
Hemorragic Cystitis

V = Vinca Alkaloid (Vincristine, Vinblastine)
Peripheral Neuropathy

DHP

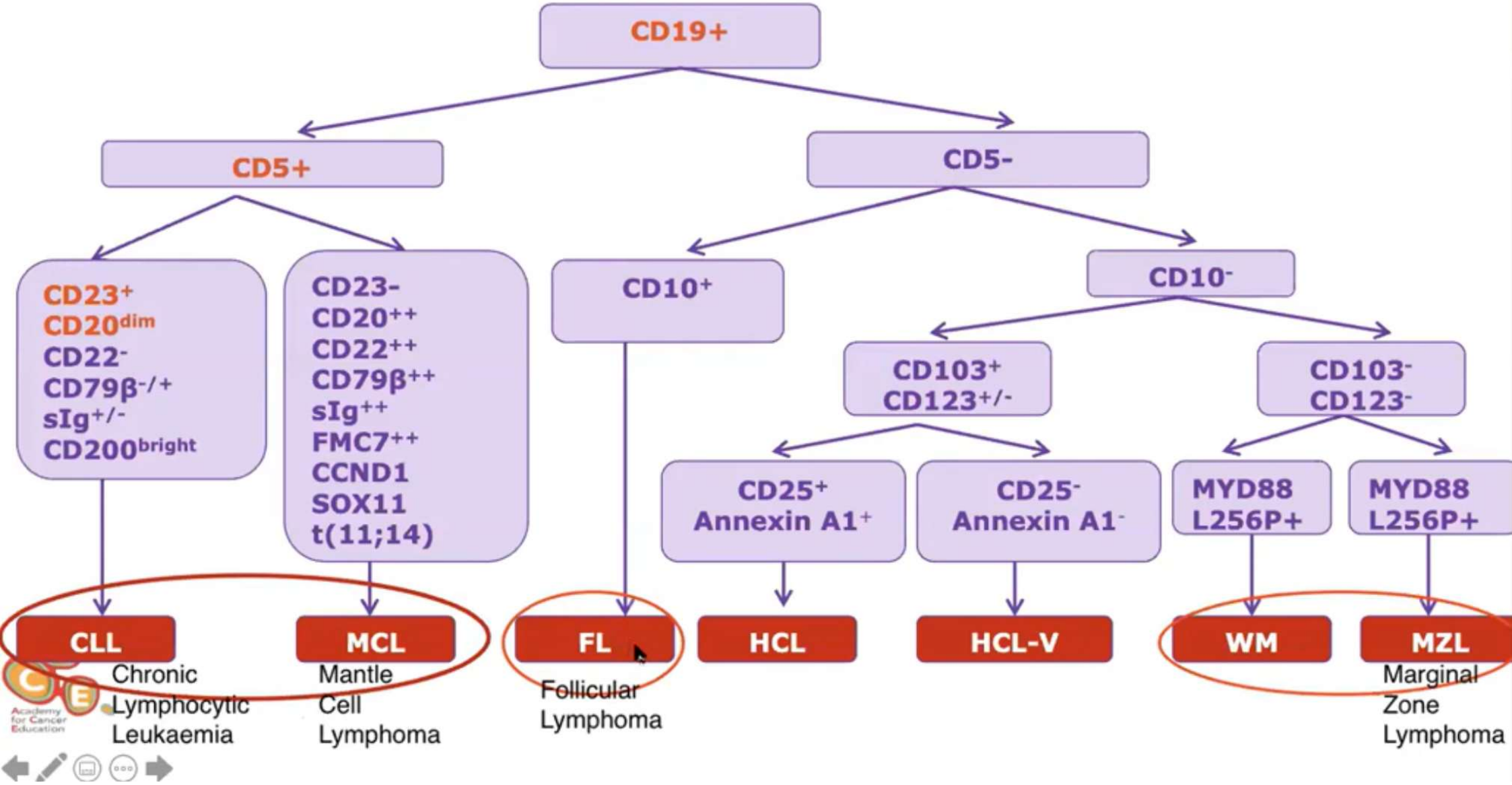
A 65 year old man presents with fatigue and generalised lymphadenopathy.

The blood film shows a lymphocytosis with smudge cells. Results of a full blood count are given in the table below:

Result Normal range
Haemoglobin 100 g/L 135175 g/L
White cells 73 x 10^9/L 4.511.0 x 10^9/L
Neutrophils 2.5 x 10^9/L 2.08.0 x 10^9/L
Lymphocytes 70.0 x 10^9/L 1.23.6 x 10^9/L
Platelets 73 x 10^9/L 150400 x 10^9/L

The presence on the lymphocytes of which of the following cluster of differentiation (CD) markers would be consistent with a diagnosis of Bcell chronic lymphocytic leukaemia in this patient?

A. CD3 and CD4
B. CD4 and CD19
C. CD5 and CD19
D. CD8 and CD19
E. CD3 and CD5


CD19+
CD5+
CD5-
CD23+
CD20dim
CD22-
CD79β-/+
sIg+/-
CD200bright
CD23-
CD20++
CD22++
CD79β++
sIg++
FMC7++
CCND1
SOX11
t(11;14)
CD10+
CD10-
CD103+
CD123+/-
CD103-
CD123-
CD25+
Annexin A1+
CD25-
Annexin A1-
MYD88
L256P+
MYD88
L256P+
CLL
MCL
FL
HCL
HCL-V
WM
MZL
Chronic
Lymphocytic
Leukaemia
Mantle
Cell
Lymphoma
Follicular
Lymphoma
Marginal
Zone
Lymphoma

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C. CD5 and CD19

D. CD8 and CD19

E. CD3 and CD5

Match the toxicity with the drug below

a. Doxorubicin
b. Vincristine
c. Prednisolone
d. Cyclophosphamide
e. Bleomycin

1. Weight gain
2. Pulmonary fibrosis
3. Haemorrhagic cystitis
4. Cardiomyopathy
5. Peripheral neuropathy

Match the toxicity with the drug below

Doxorubicin → Cardiomyopathy

Vincristine → Peripheral neuropathy

Prednisolone → Weight gain

Cyclophosphamide → Haemorrhagic cystitis

Bleomycin → Pulmonary fibrosis