Case I

History I

- 70-year old qatari male, December 2007
  - 2 months history of thrombocytopenia, associated with back pain and difficulties in walking

Investigated in Qatar 11/2007:

- Blood film showed a leukoerythroblastic anaemia with 4% blasts and pancytopenia
- Bone marrow aspirate and trephine showed marked fibrosis, infiltration with abnormal cells noted

History II

- CT of chest, abdomen and pelvis:

  Pulmonary emphysema and bilateral adrenal masses

- Bone scan:

  focal uptake in ribs and femora

- Adrenal biopsy: showed possible carcinoma

- Unable to make further diagnosis in Qatar

- Rapid deterioration of the patient

Examination I

- Transfer to London on the 30/11/2007 for further investigation and diagnosis:
  - On arrival:
    - Bedbound, in pain
    - Pale, jaundiced
    - Apyrexial
    - Multiple subcutaneous hard nodules across the anterior chest wall
    - Abdominal examination reveals enlarged liver
    - Neurological exmamination shows a 4/5 weakness of the R hip flexors only

Investigation I

- FBC (there is a discrepancy between the machine and manual differential count)

- Flowcytometry

- Blood film

- Bone marrow aspirate & trephine

  (H&E, DE, SBB, and Immunohistochemistry)

- Skin biopsy

- (H&E and Immunohistochemistry)

- What is the likely diagnosis?

Full Blood Count

	Date of Birth:	01/01/1936		
	Sex:	M		
Laboratory Number: **07H294852**	Specimen Received:	07/12/07	at 12:21	
Ref. Lab. Details:				

Test Name	Results		Units	Reference Range

FULL BLOOD COUNT

Test Name	Results		Units	Reference Range
Hb	**9.4**	L	g/dL	11.5-17.0
WBC	**11.06**	H	10^9/L	3.5-11
Platelets	**27**	L	10^9/L	140-400
RBC	**3.62**	L	10^12/L	3.9-5.6
HCT	**0.299**	L	L/L	0.35-0.47
MCV	82.5		fL	80-98
MCH	**26.1**	L	**pg**	27-33
MCHC	31.6		g/dL	31-37
Neutrophils	4.87		10^9/L	1.7-8.0
Lymphocytes	**4.20**	H	10^9/L	1.0-3.5
Monocytes	**0.00**	L	10^9/L	0.1-1.0
Eosinophils	0.00		10^9/L	0.0-0.46
Basophils	0.00		10^9/L	0.00-0.20
Blast cells	0.44		10^9/L	
Promyelocytes	1.11		10^9/L	
Myelocytes	0.00		10^9/L	
Metamyelocytes	0.44		10^9/L	
Nucleated RBC	28			

Film Report   Manual differential reported. Anisocytosis
Dimorphic population, Polychromasia +++,
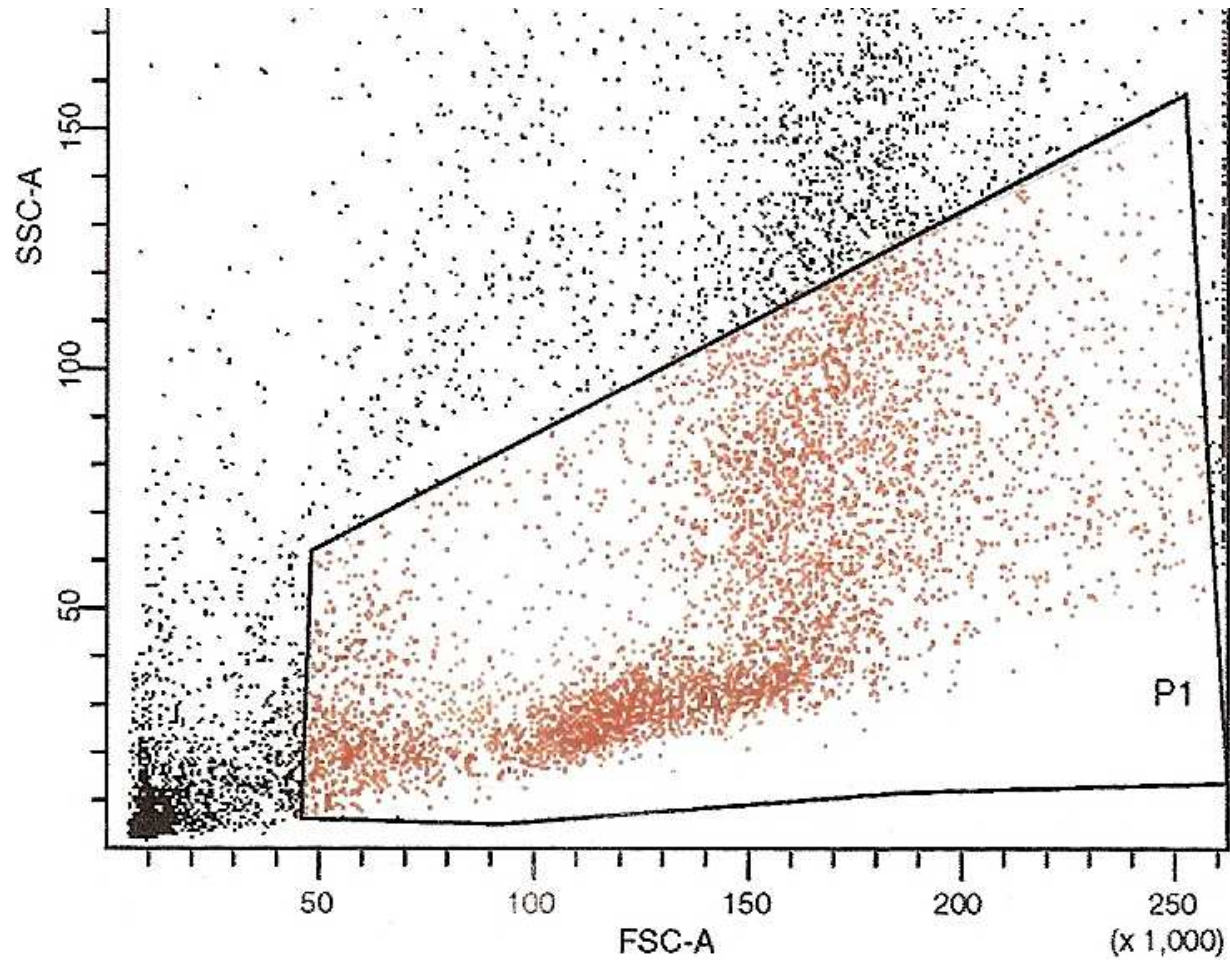Thrombocytopenia confirmed on film.
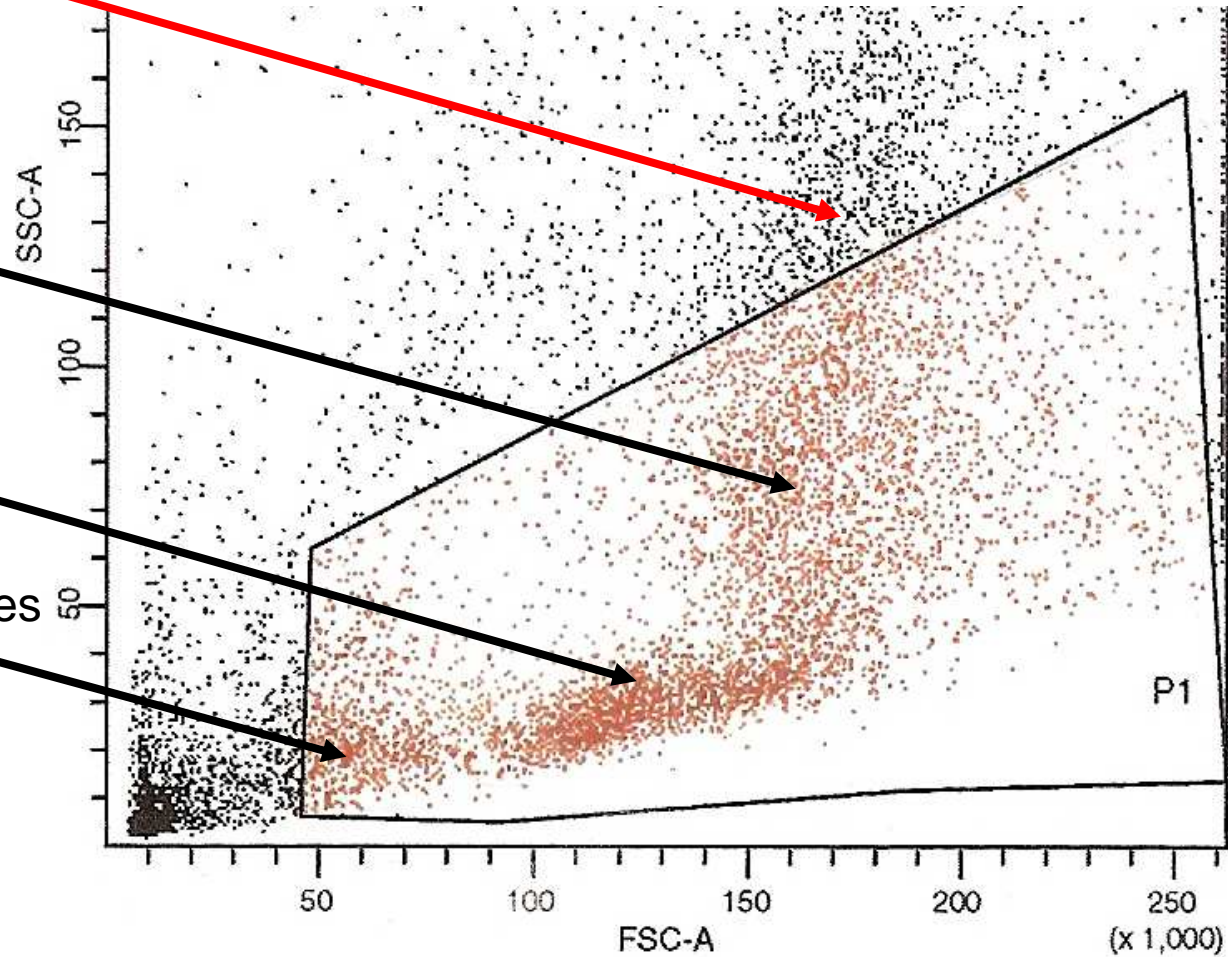
Blood Film I
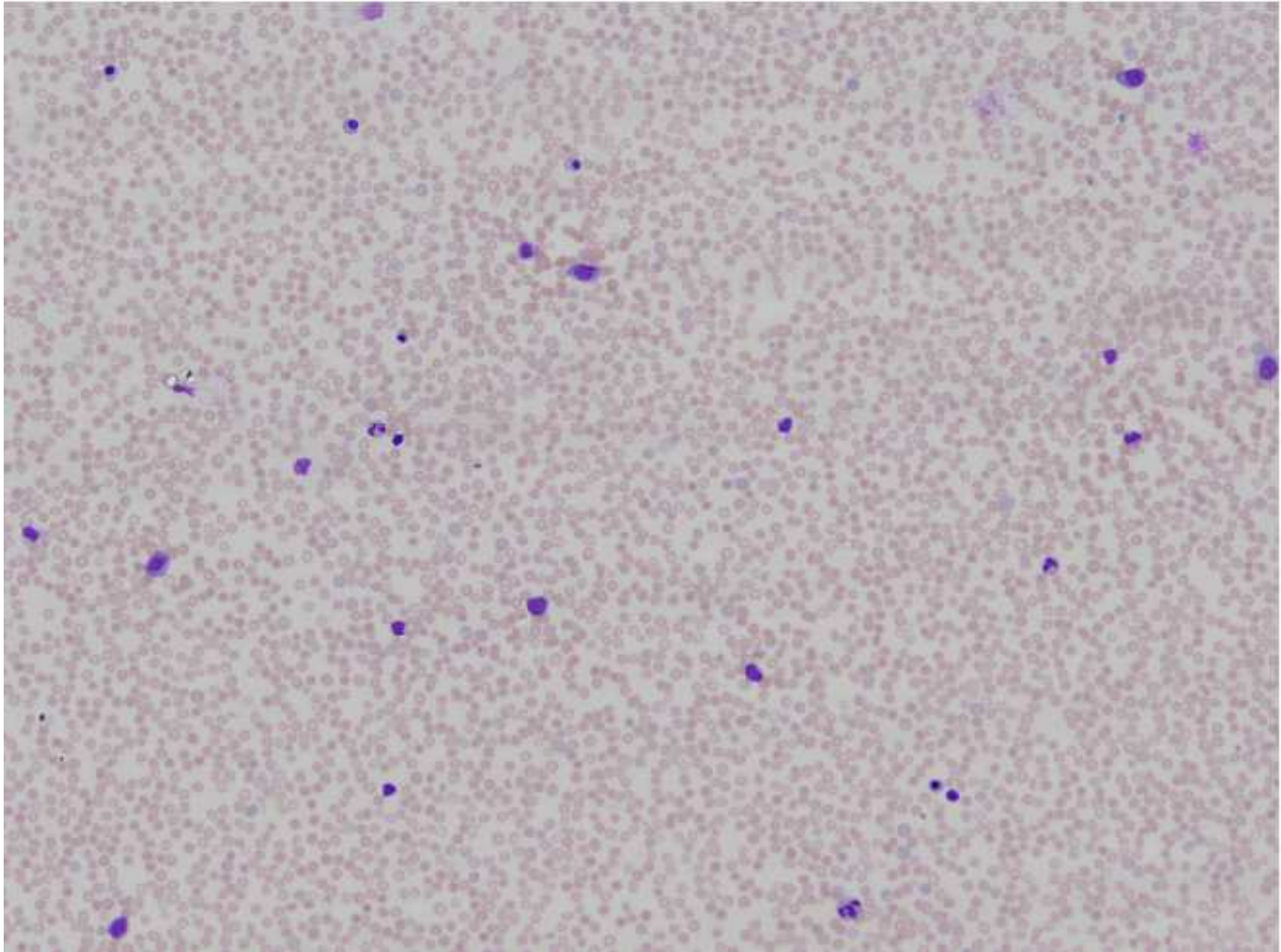
Blood Film III
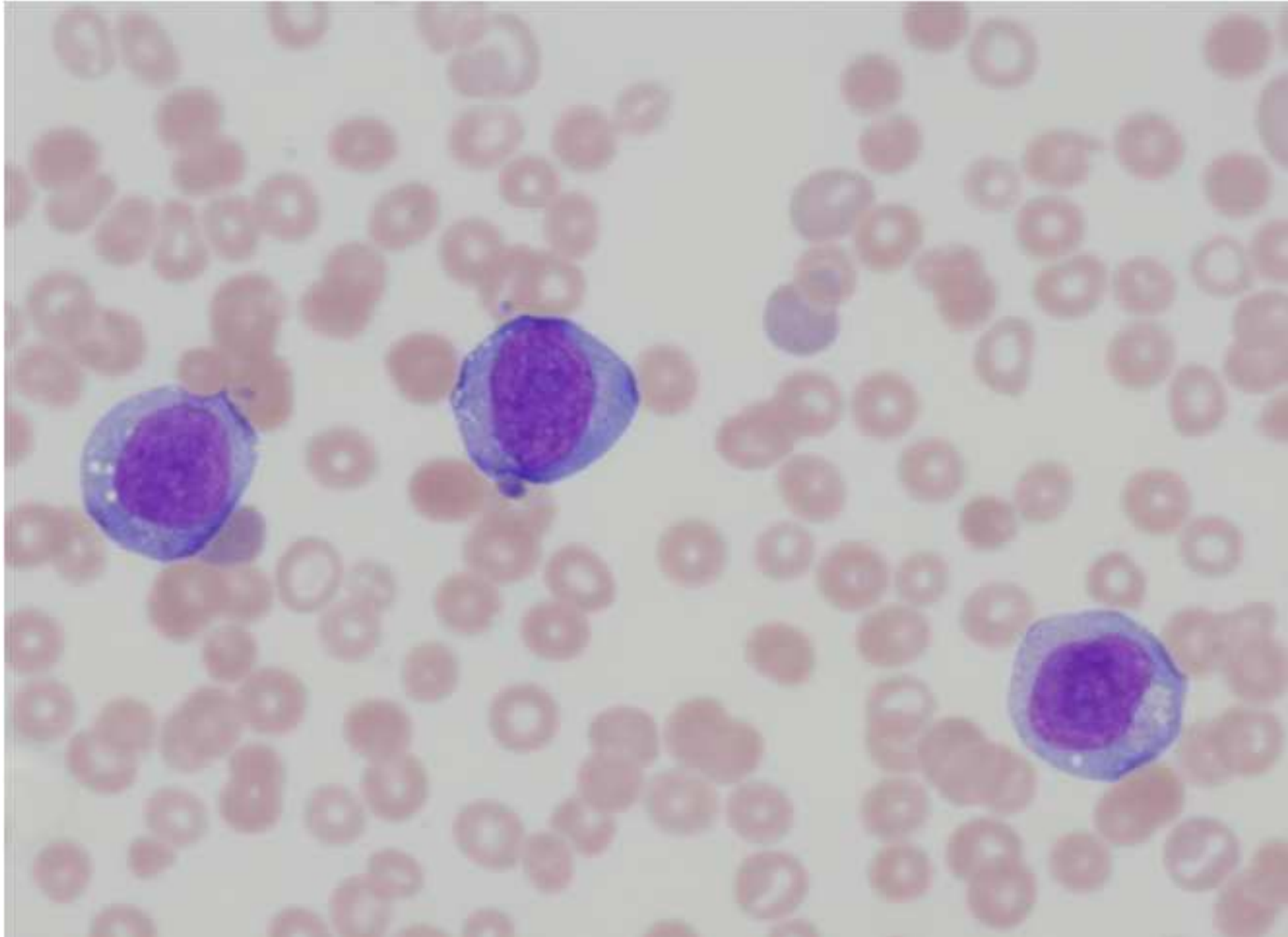
Scattergramm I

Scattergramm I

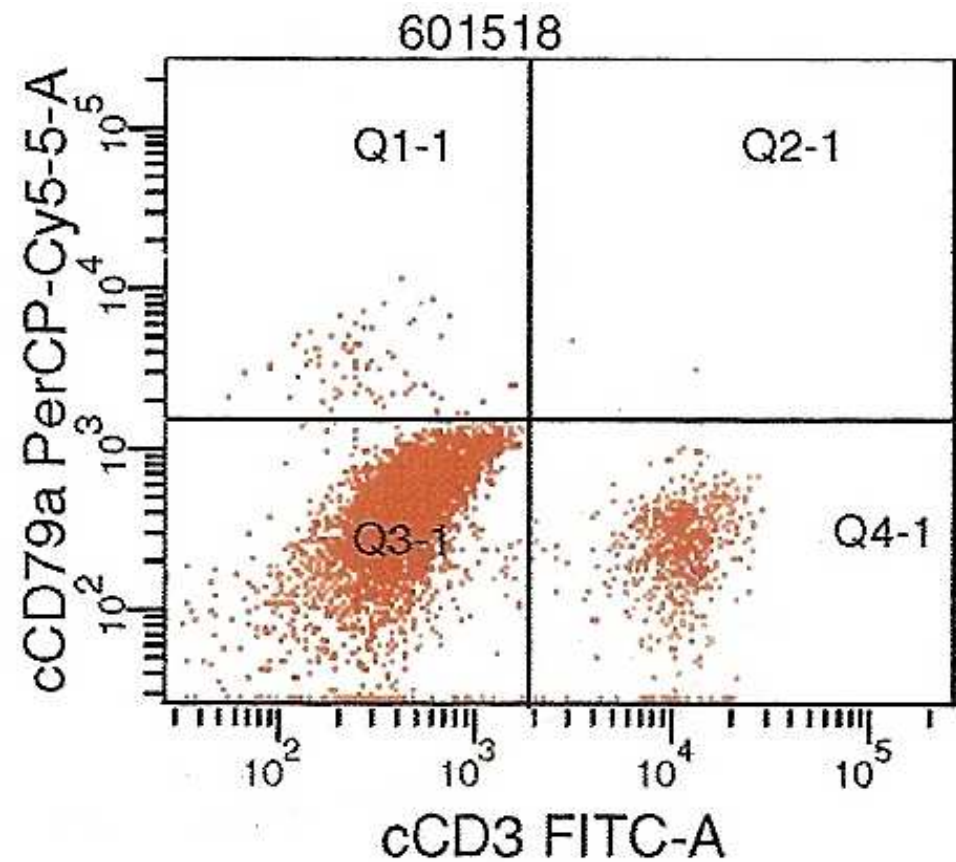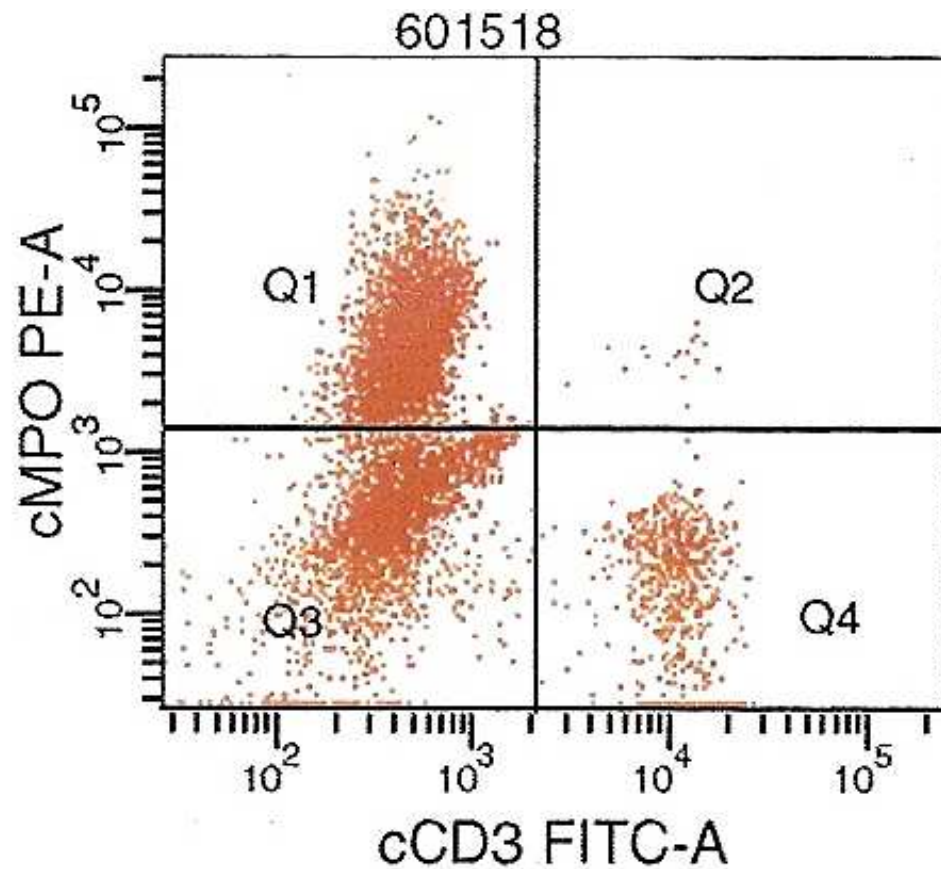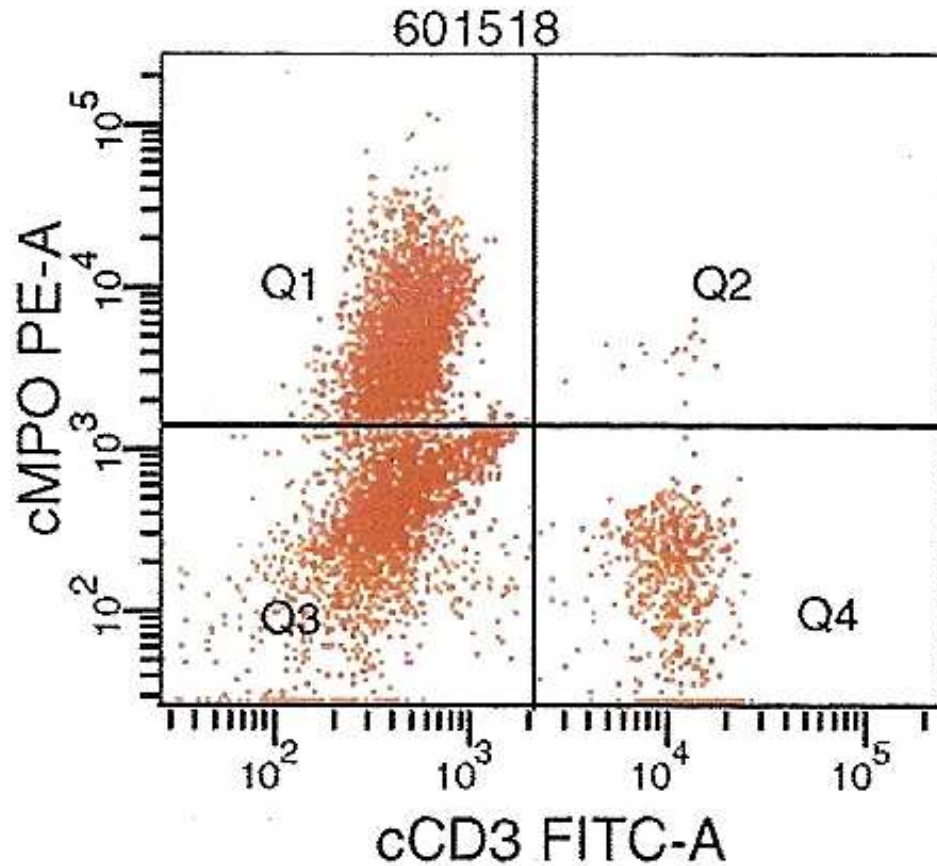# Differentiation myeloid-lymphoid
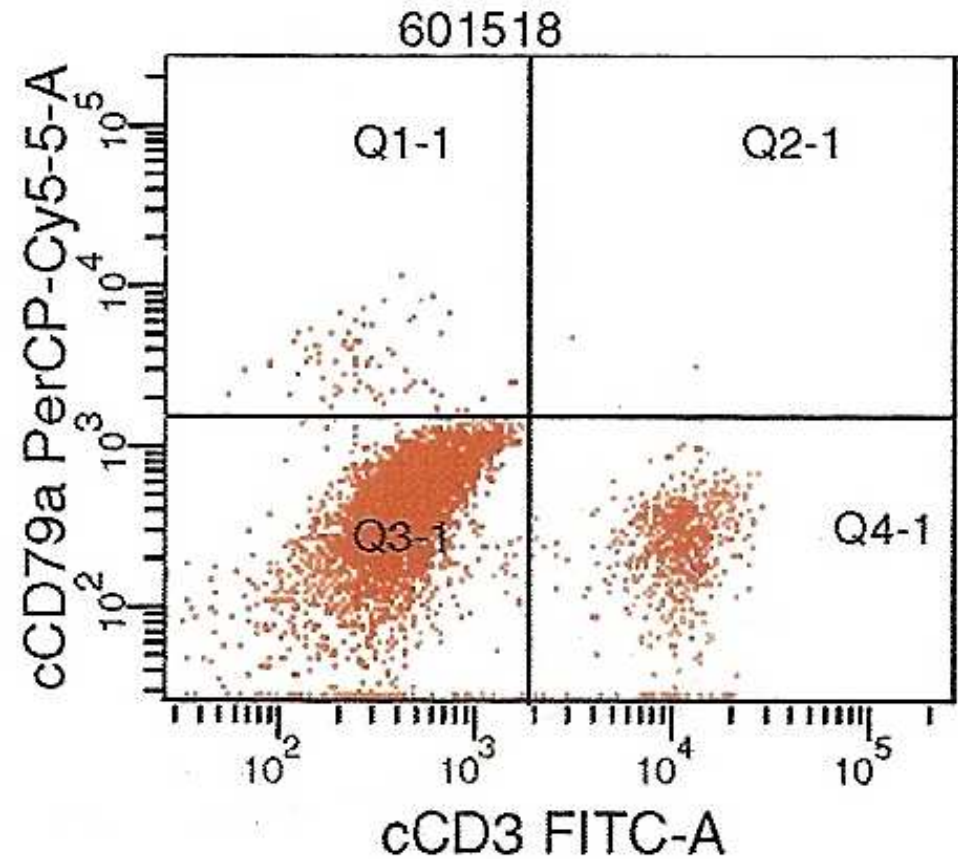# MPO/CD3 – CD79a/CD3

Differentiation myeloid-lymphoid
MPO/CD3 – CD79a/CD3

Myeloperoxidase
CD3 stains normal T-Lymphocytes

Distinct MPO negative population
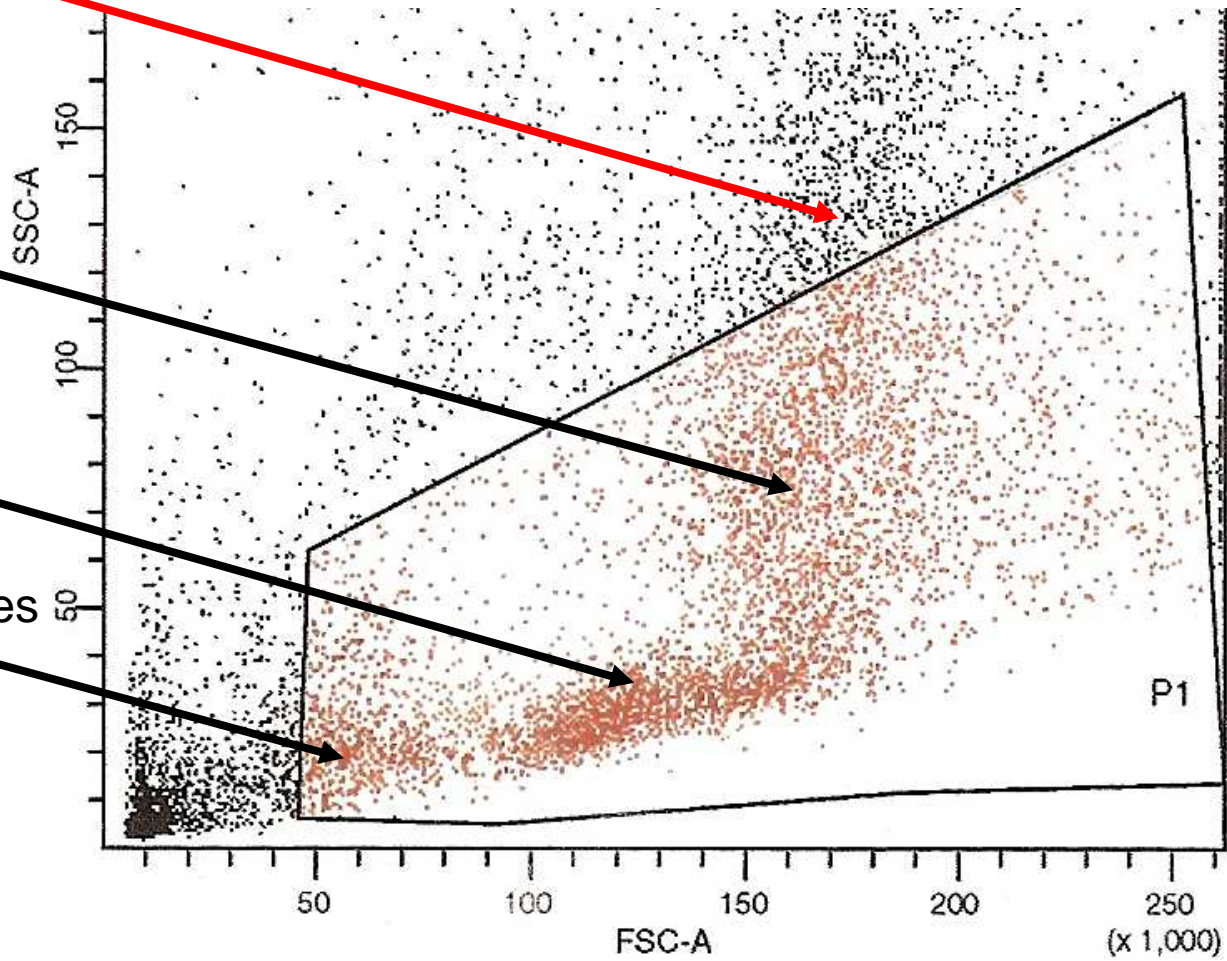
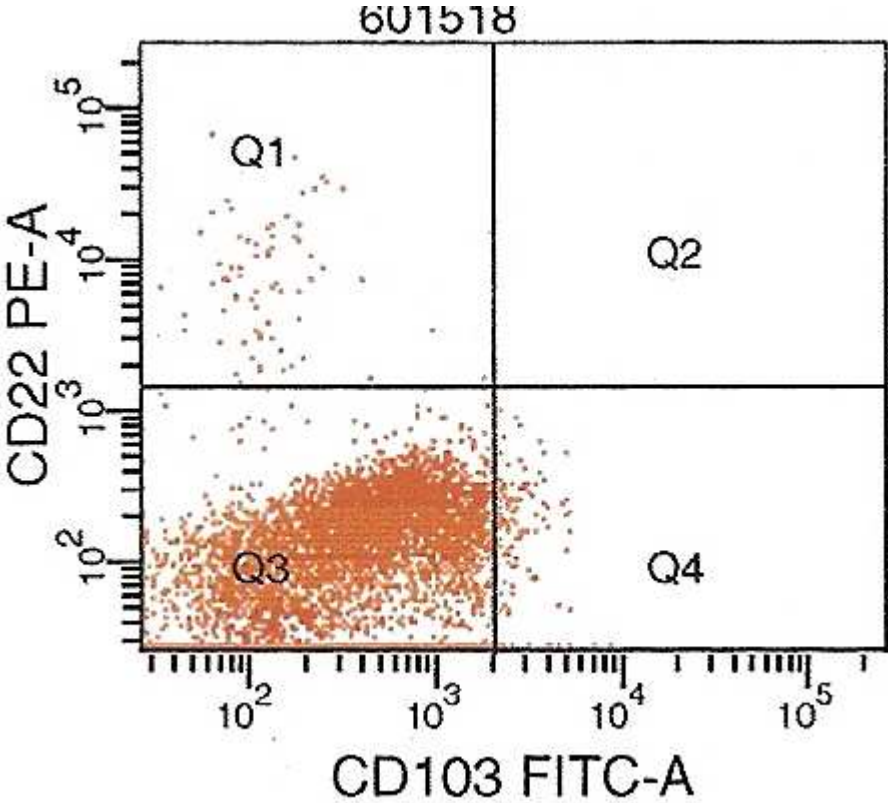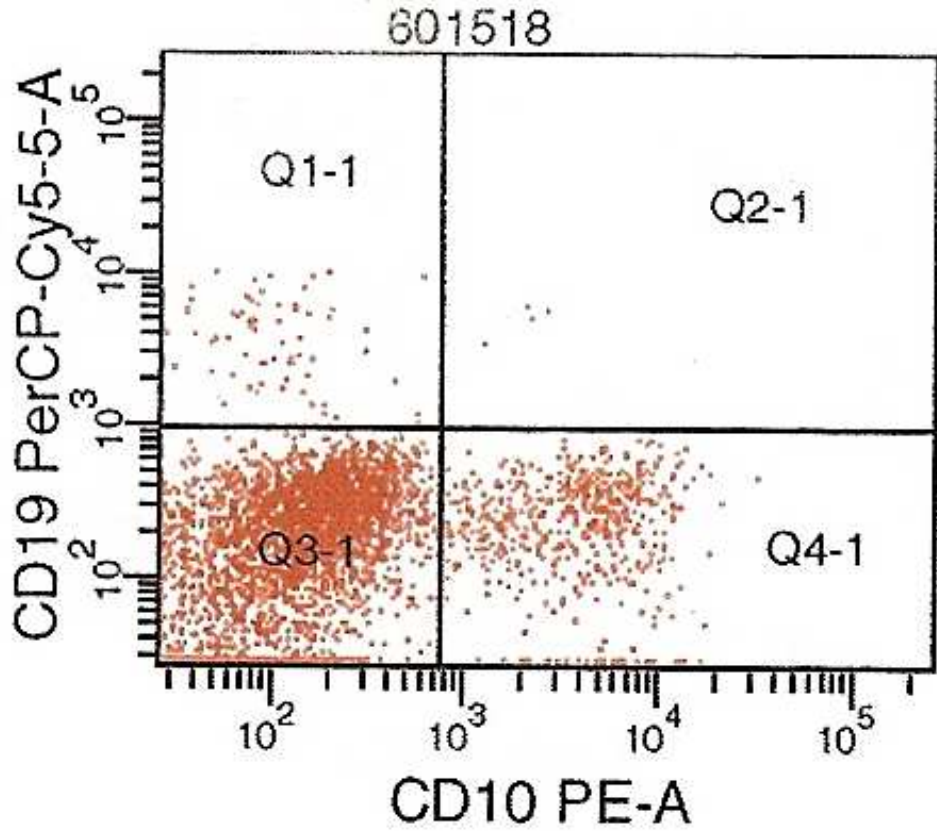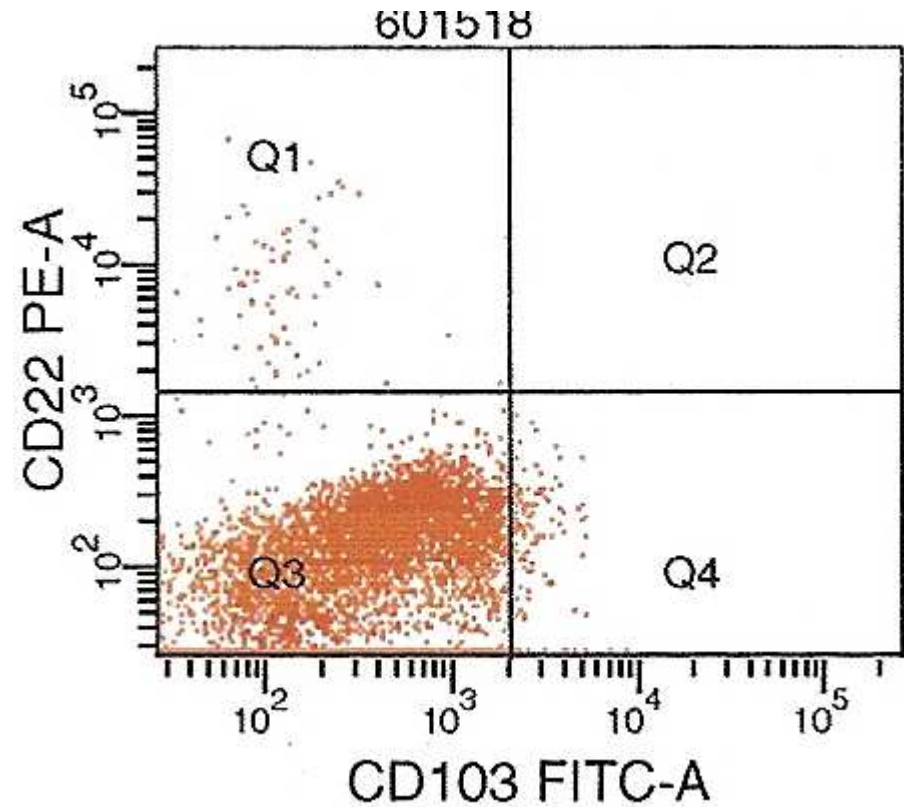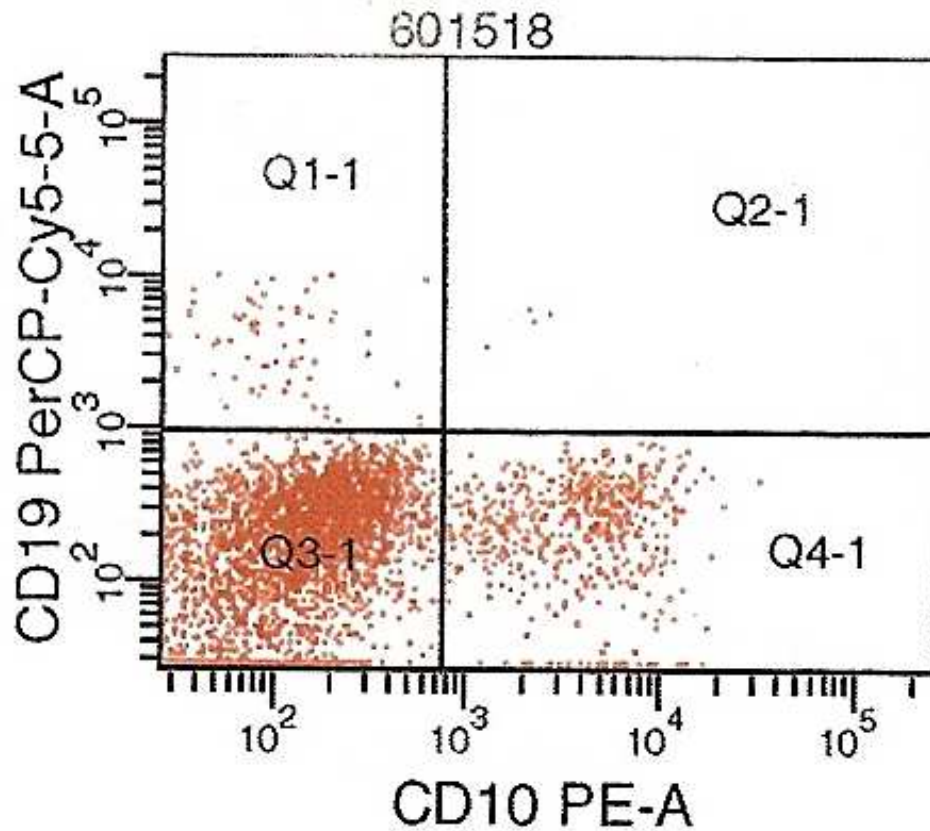Negative for lymphoid markers
CD79a and CD3
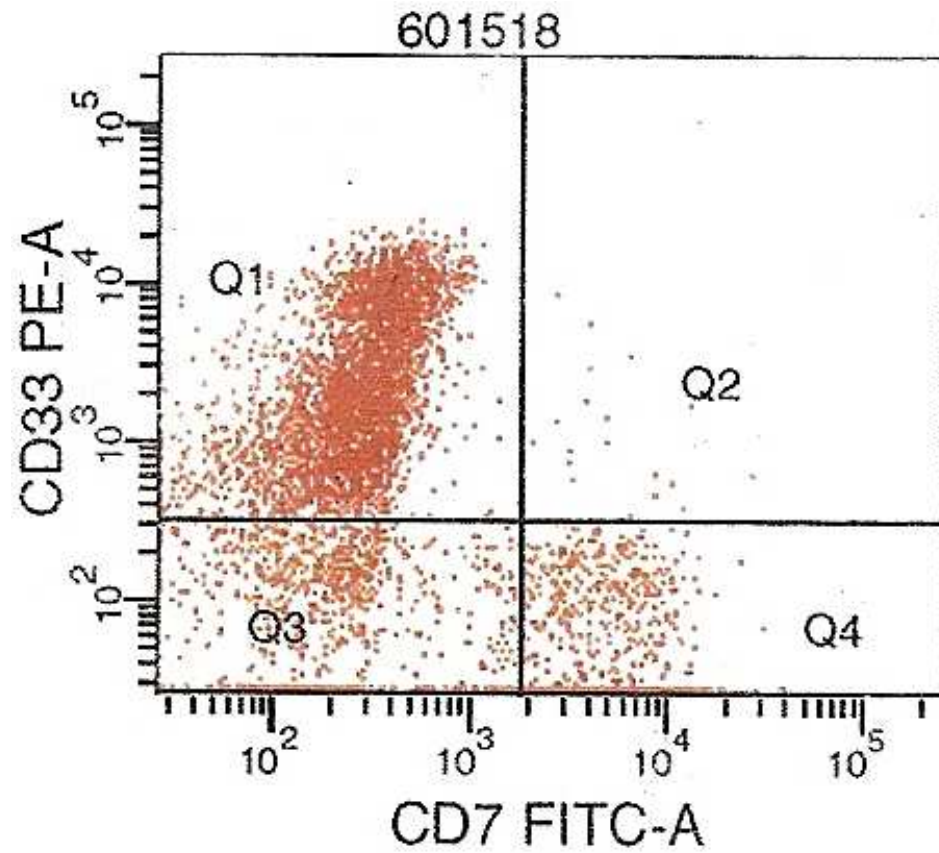
Scattergramm I

CD19/CD10 – CD22/CD103

CD19/CD10 – CD22/CD103

B-lymphoid markers

CD103 – Hairy Cell marker
(HCL causes monocytopenia)
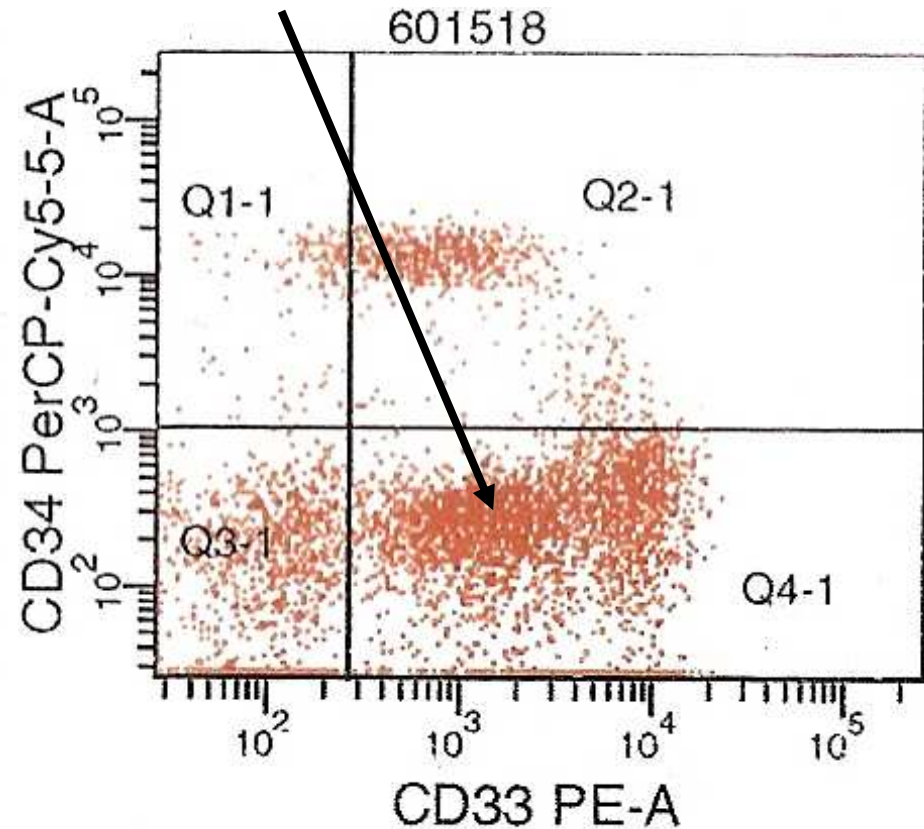

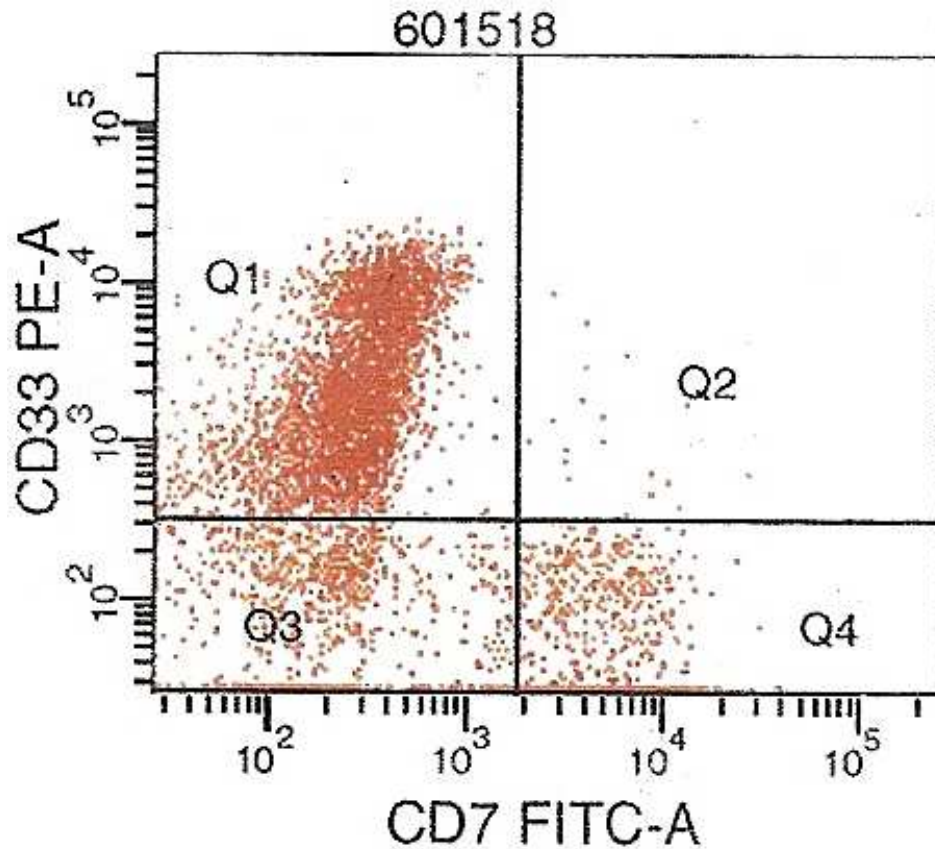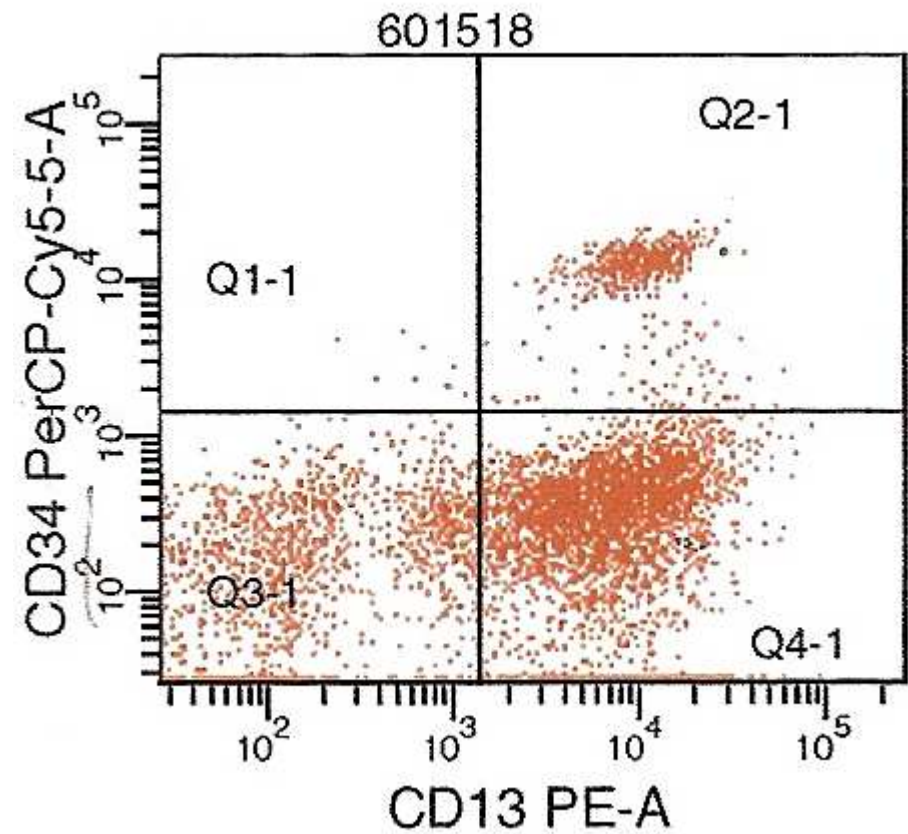Early B-lymphoid and HC markers negative
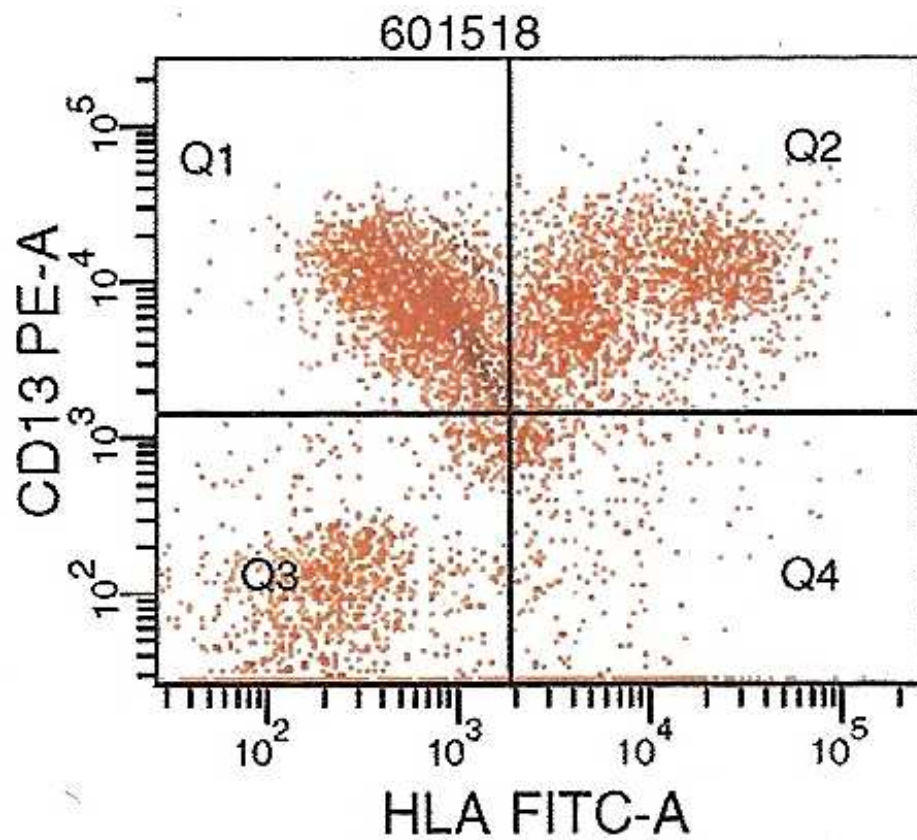
CD33/CD7 – CD34/CD33
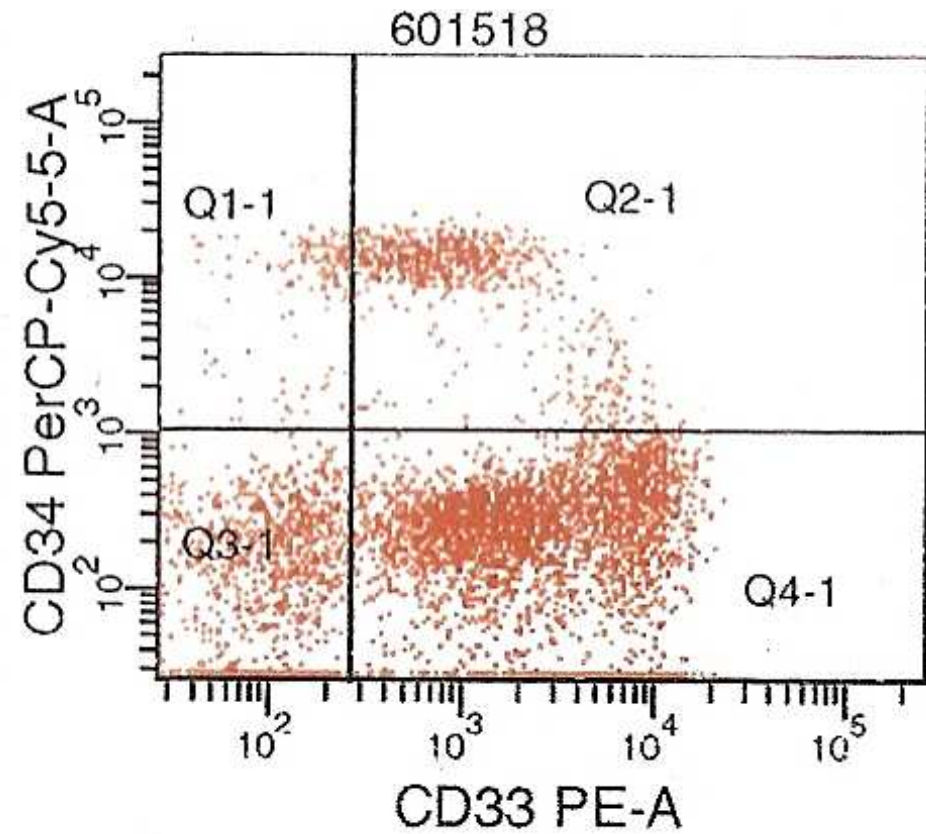
CD33/CD7 – CD34/CD33

CD34 – immature cells CD33 – myeloid marker Leukaemic blasts or maturing myelocytes?

CD34 pos and CD33 pos cells are immature myeloid cells
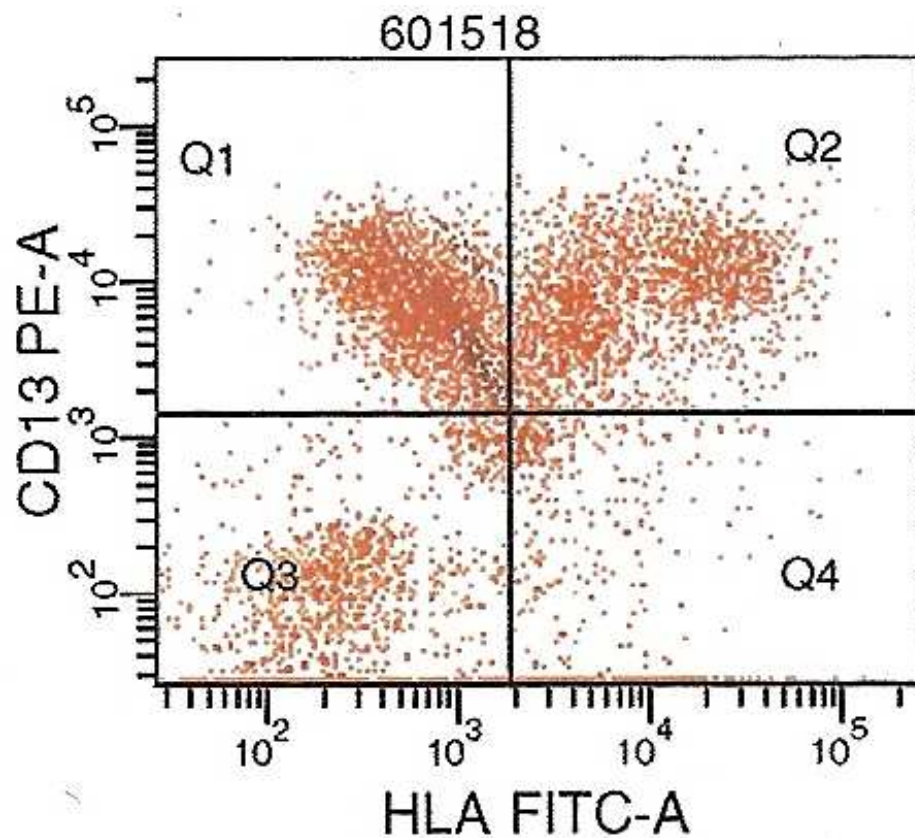Are the CD34 neg, but CD34 pos cells leukaemic blasts?
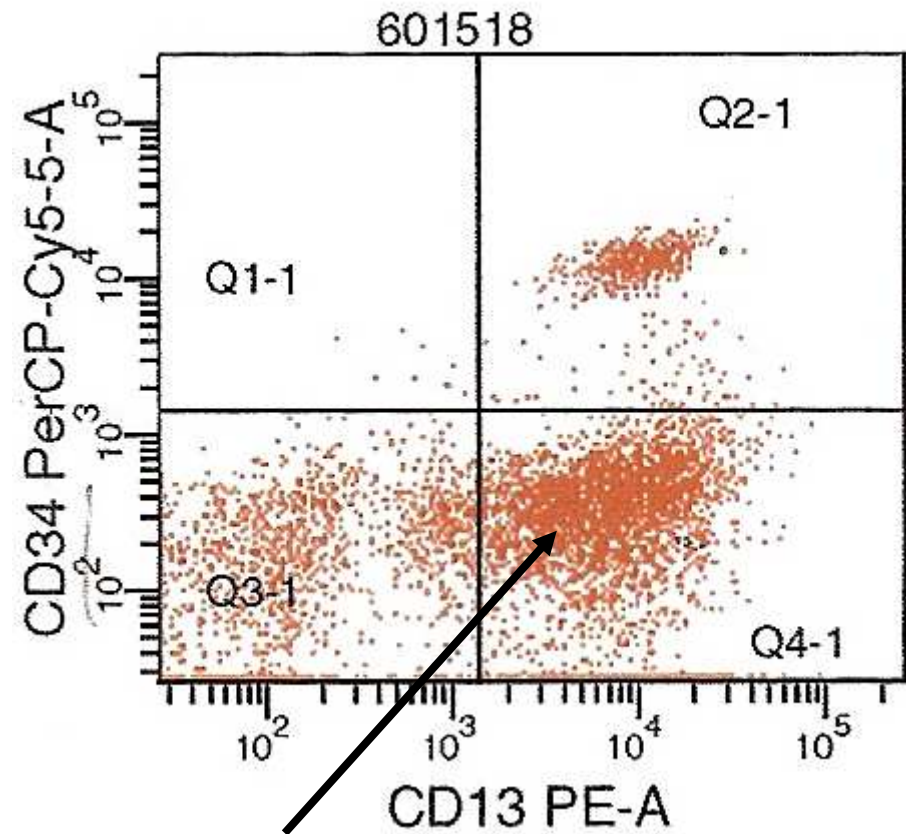
CD13/HLA-DR – CD34/CD13

CD13/HLA-DR – CD34/CD13

HLA – marker for immature cells
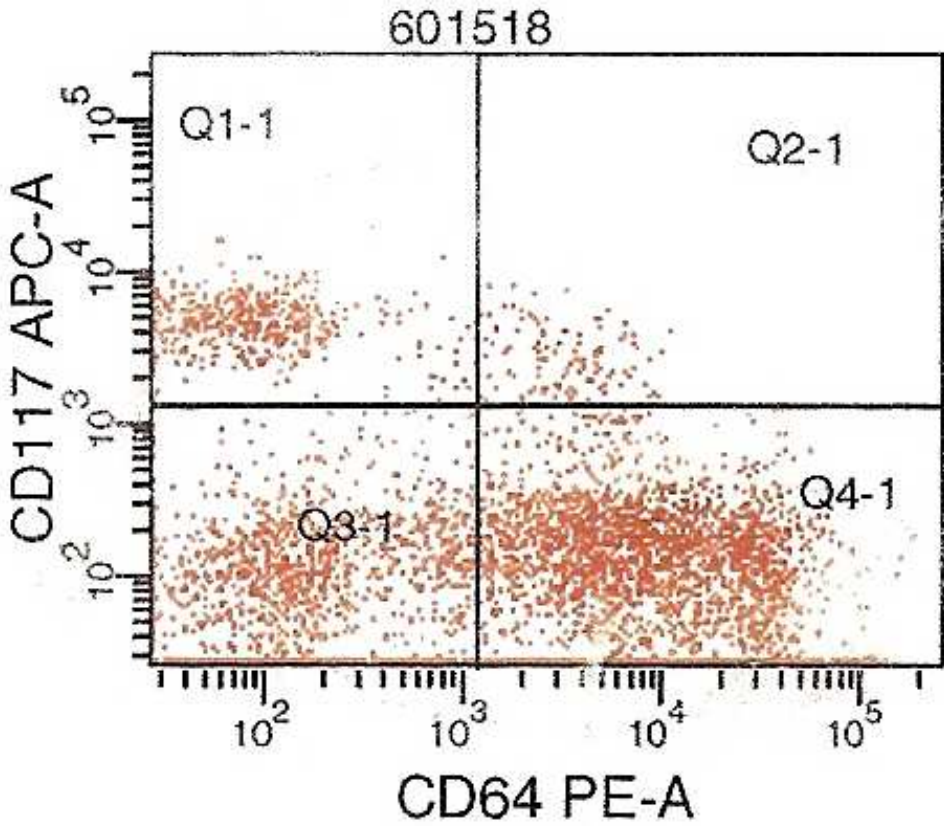
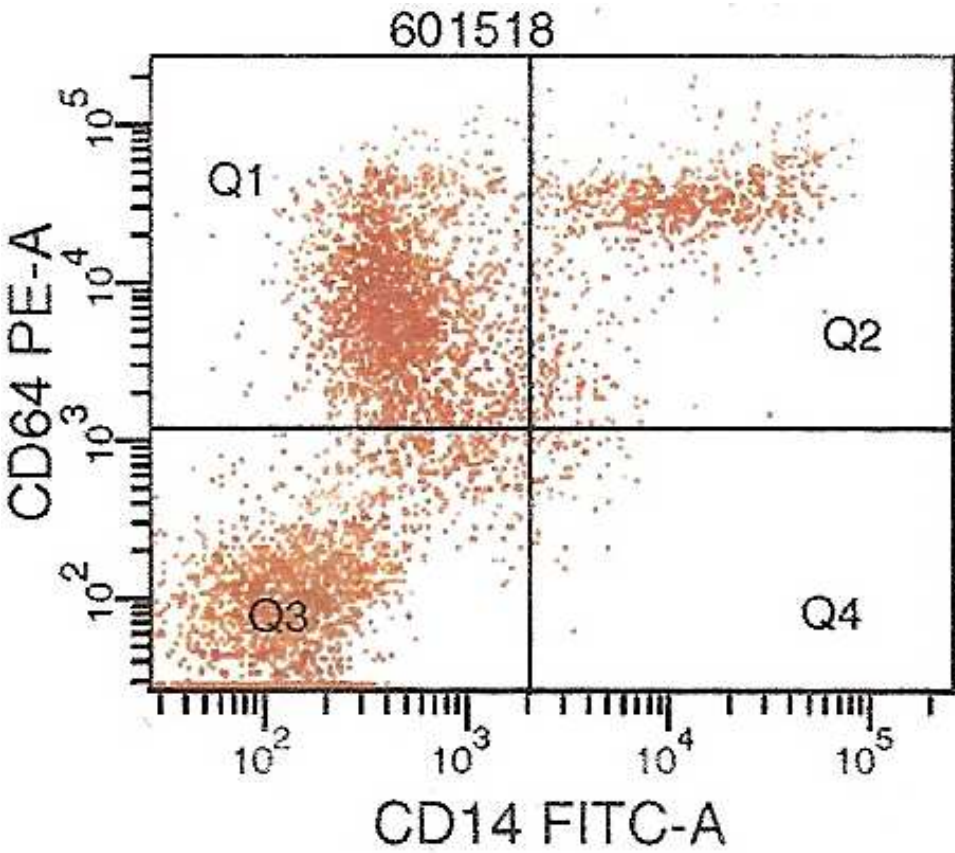CD13 – myeloid marker of maturing cells

CD13 positive cells
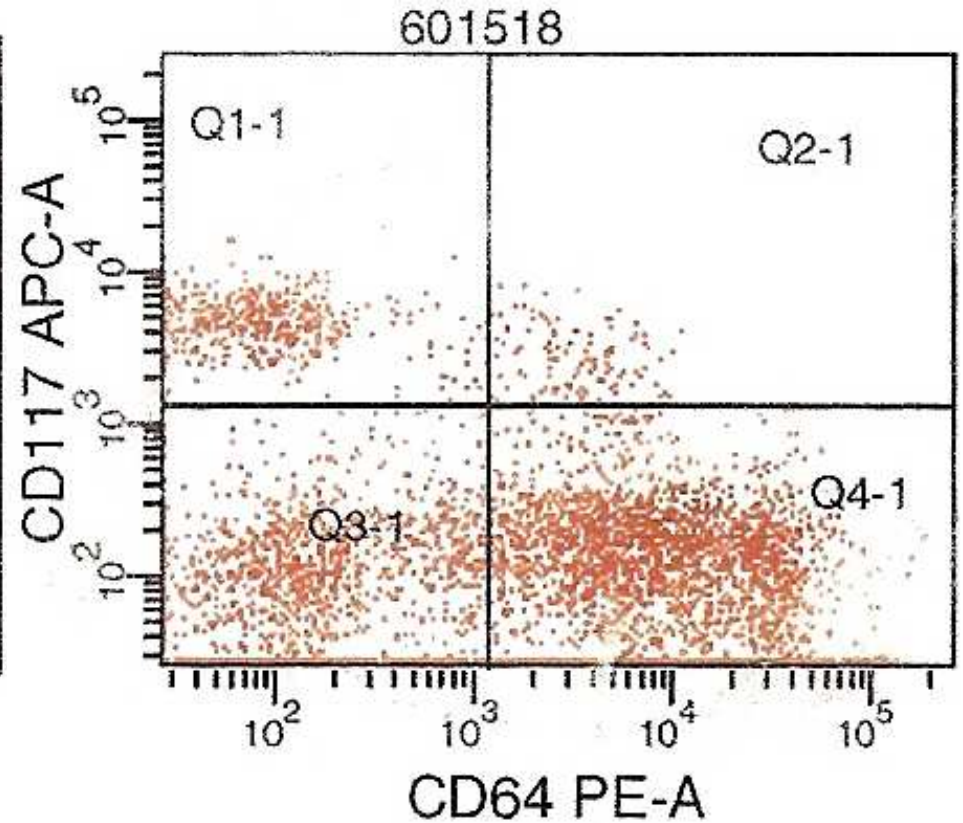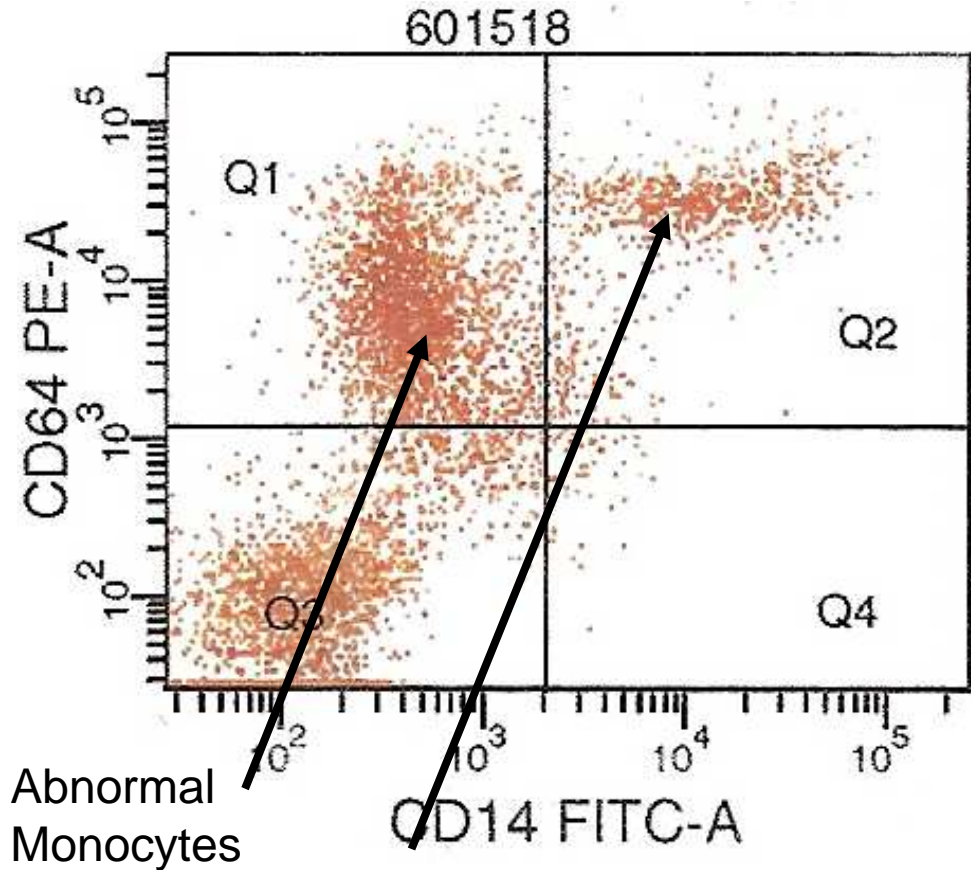
Leukaemic blasts or maturing myelocytes?

CD64/CD14 – CD117/CD64

CD64/CD14 – CD117/CD64

CD14 – unspecific myeloid marker
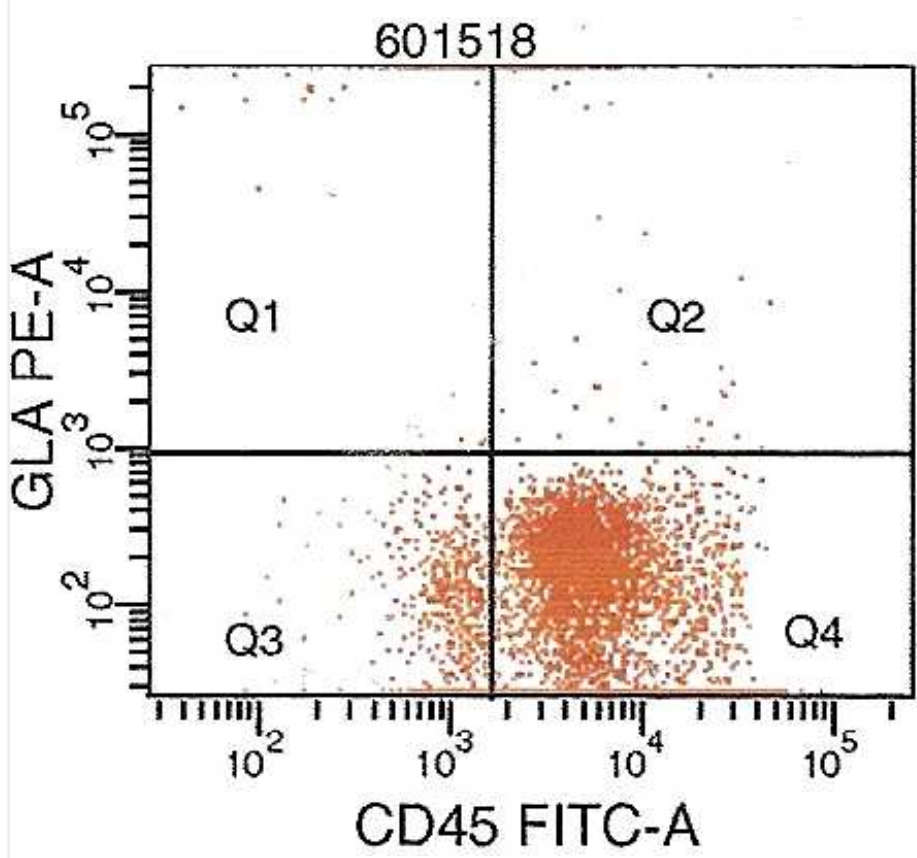CD64 – monocytoid differentiation

CD117 – immature cells

Abnormal
Monocytes
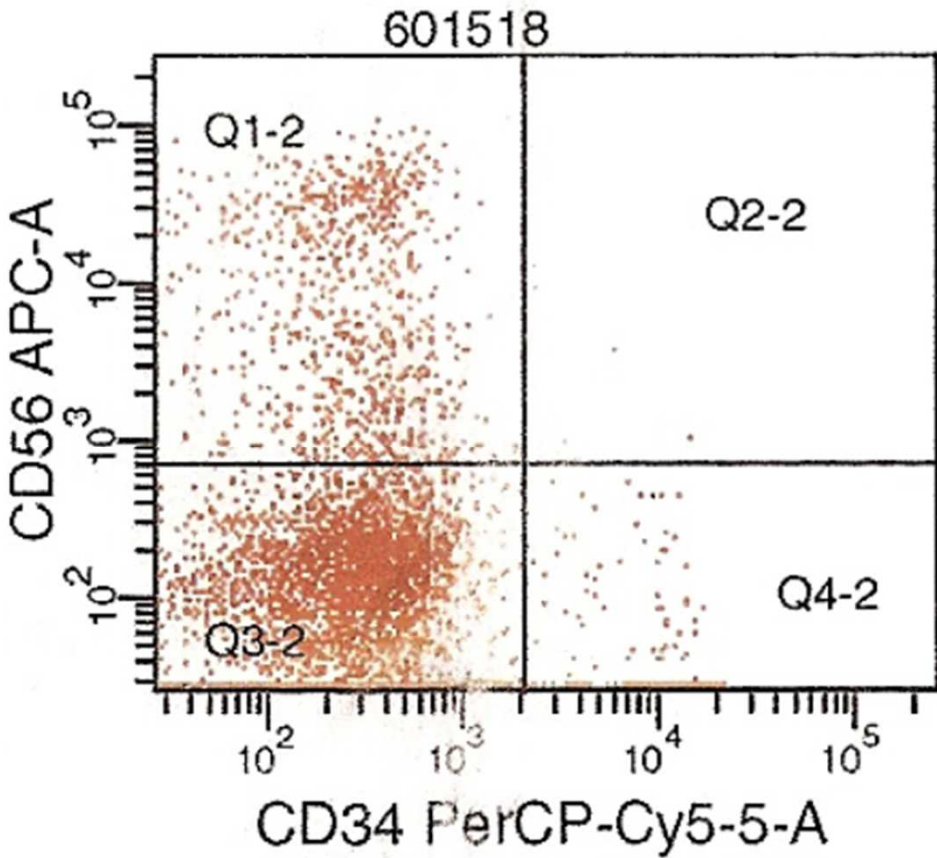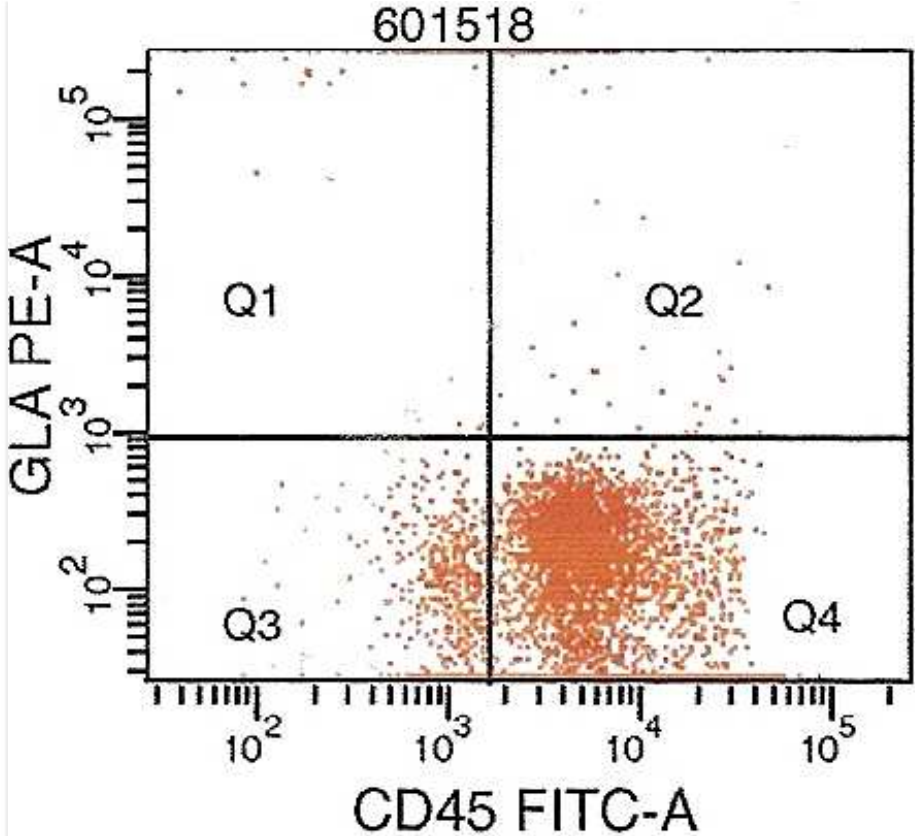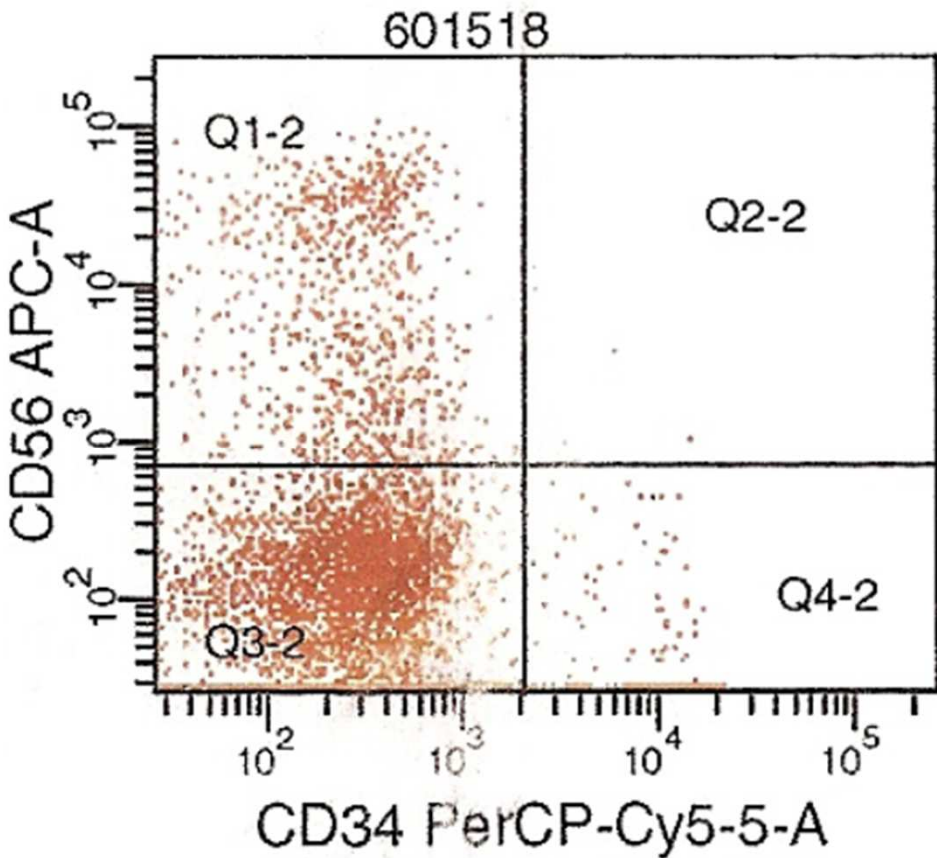
CD64/CD14 positive cells are normal
monocytes

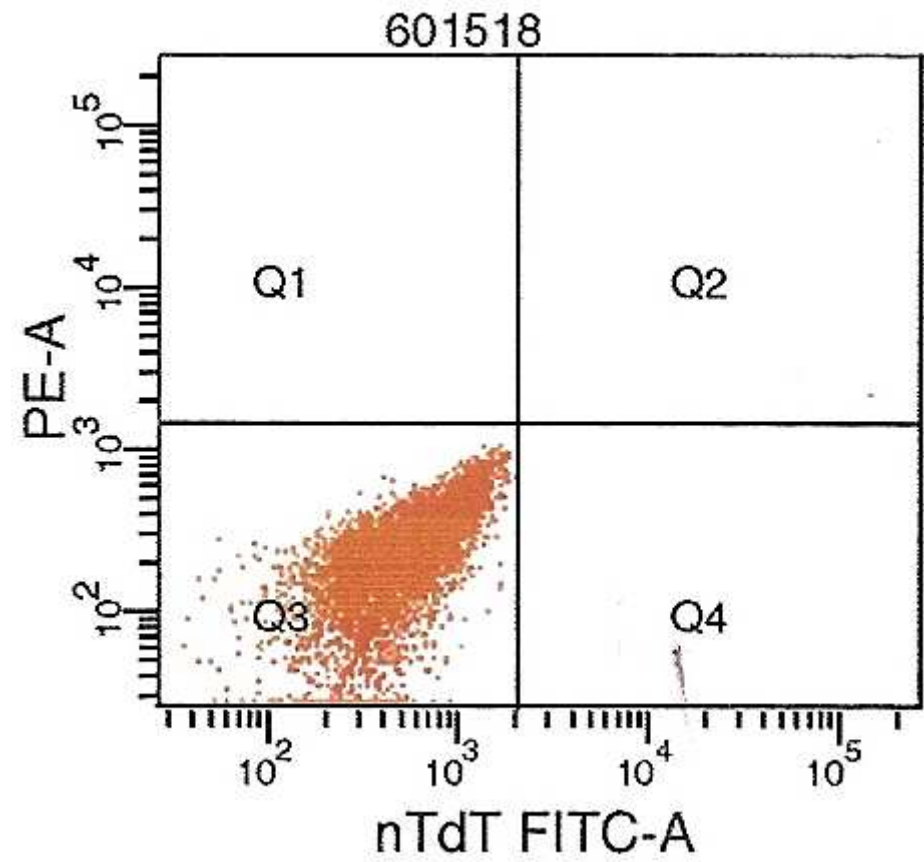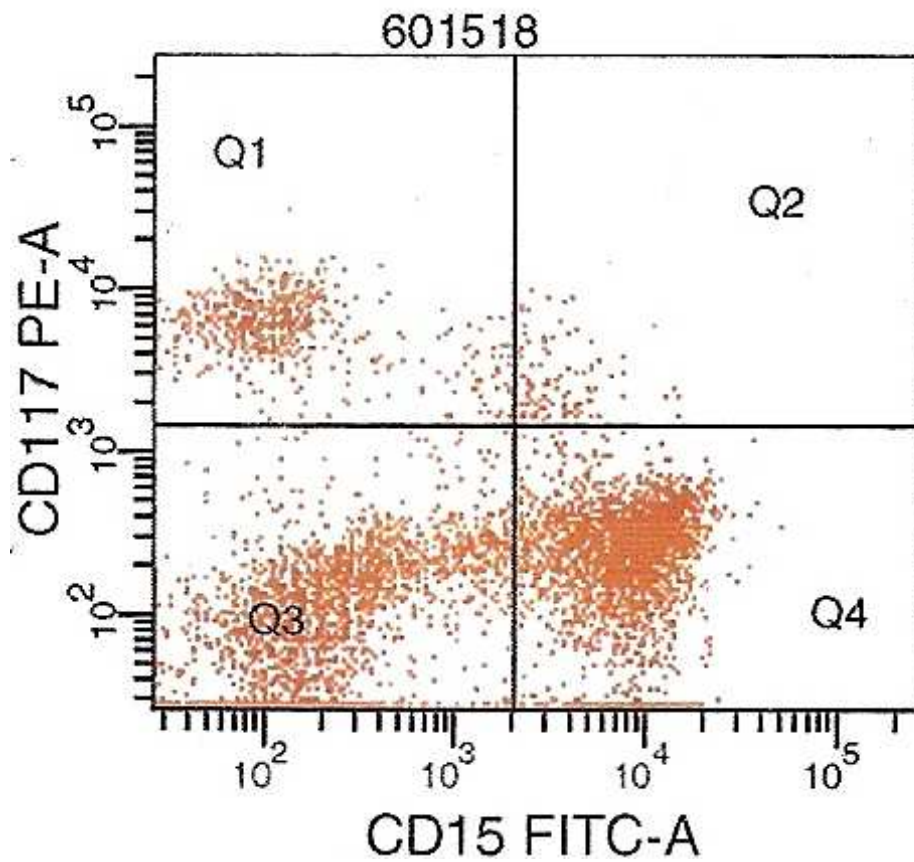CD64 positive /CD117 negative cells

CD34/CD56 – GL-A/CD45

CD34/CD56 – GL-A/CD45

Cells carry CD56

Cells are all CD45 positive and Glycophorin A negative – rules out a non haematopoietic tumour
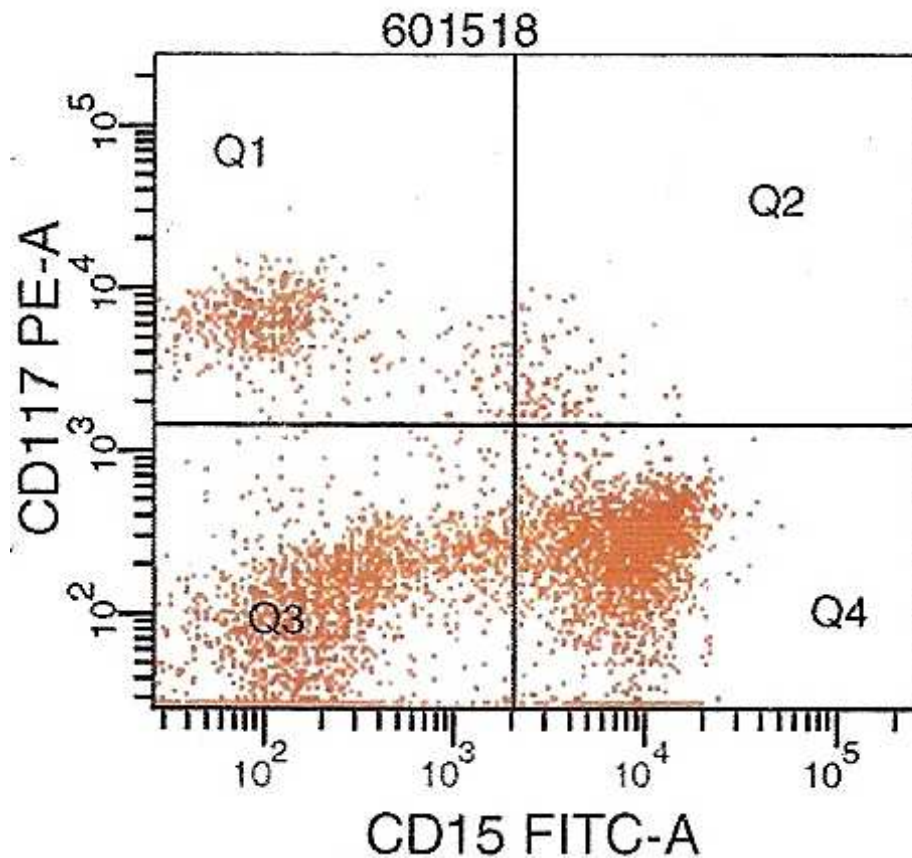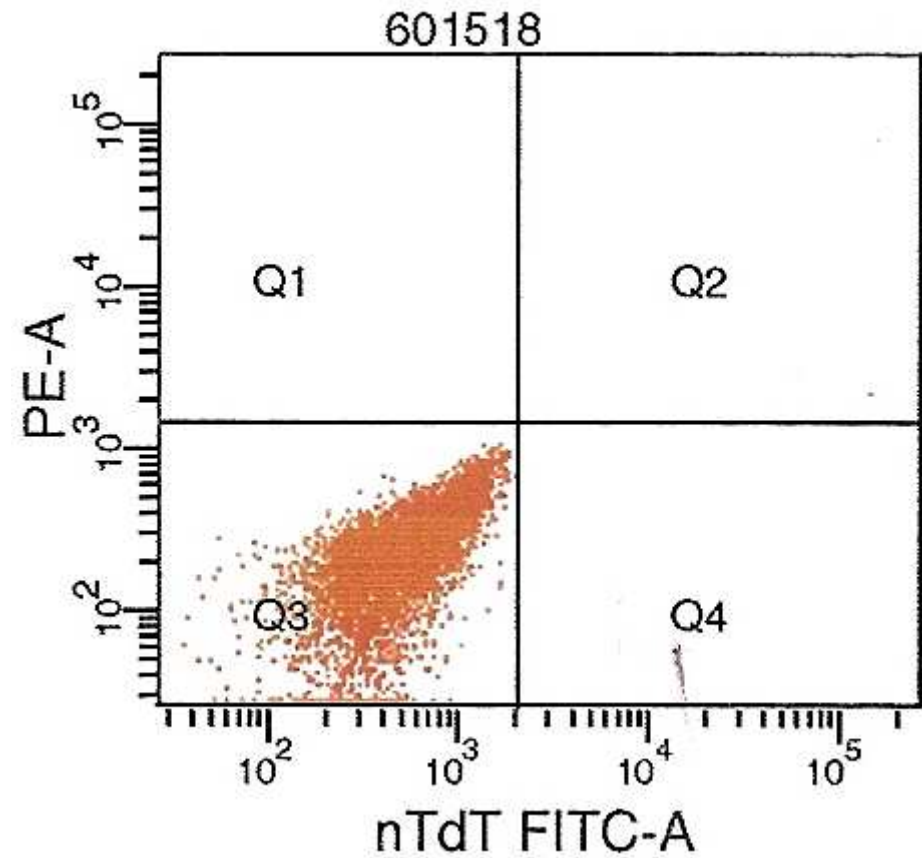
CD117/CD15 - TdT

CD117/CD15 - TdT

CD15 – mature monocytoid marker

Asynchronous expression of monocytoid marker

Cells are TdT neagtive

Flowcytometry

T-LYMPHOID MARKERS

Cell Marker - CD2	30	%
Cell Marker - cCD3	10	%
Cell Marker - CD5	32	%
Cell Marker - CD7	13	%

B-LYMPHOID MARKERS

Cell Marker - CD10	<1	%
Cell Marker - CD19	2	%
Cell Marker - CD20	2	%
Cell Marker - CD22	1	%
Cell Marker - cCD79a	1	%
Cell Marker - sIgM	2	%

IMMATURE STEM CELL MARKERS

Cell Marker - CD117	14	%
Cell Marker - nTdT	NEG	
Cell Marker - CD34	14	%

DOUBLE CELL MARKERS

Cell Marker - CD7:CD33	<1	%

OTHERS

Cell Marker - CD45	86	%
Cell Marker - HLA-DR	41	%

MYELOID MARKERS

Cell Marker - CD13	69
Cell Marker - CD14	14
Cell Marker - CD15	50
Cell Marker - CD33	72
Cell Marker - cMPO	52
Cell Marker - CD64	55
Cell Marker - Glycophorin A	5
Cell Marker - CD41A	7

Conclusion

- Poorly differentiated acute myeloid leukaemia with monocytoid features:
    - CD34 negative
    - expresses CD15, CD56 and lysozyme
    - aberrant expression of CD14 and CD64
    - with skin and organ infiltration