

# 2012

KING SAUD UNIVERSITY  
COLLEGE OF MEDICINE  
HAEMATOLOGY TEAM  
GIT BLOCK



## Hematology Block Hematology Practical

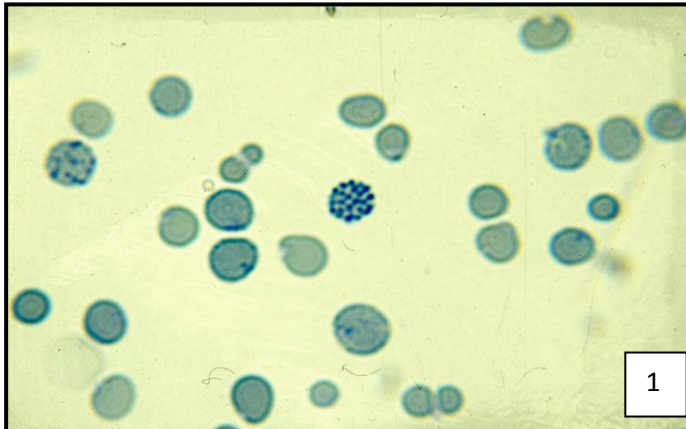
### Haemoglobinopathies & Anemias

Haematology Team

## ❖ Laboratory Diagnosis for Hematological Diseases:

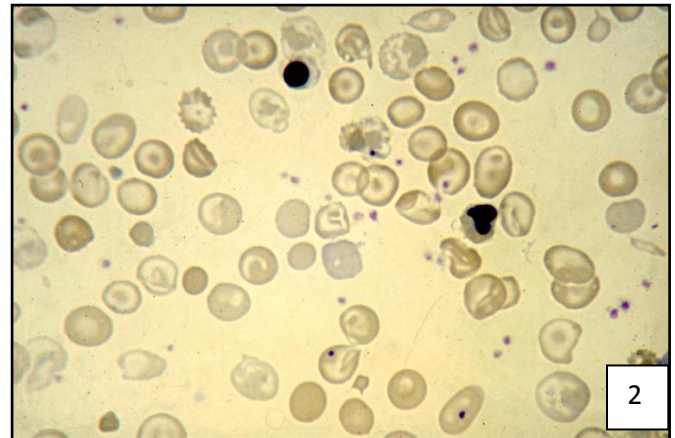
- Blood Film
- Hb Electrophoresis
- Electron Microscope.

## ❖ Blood Film Morphology



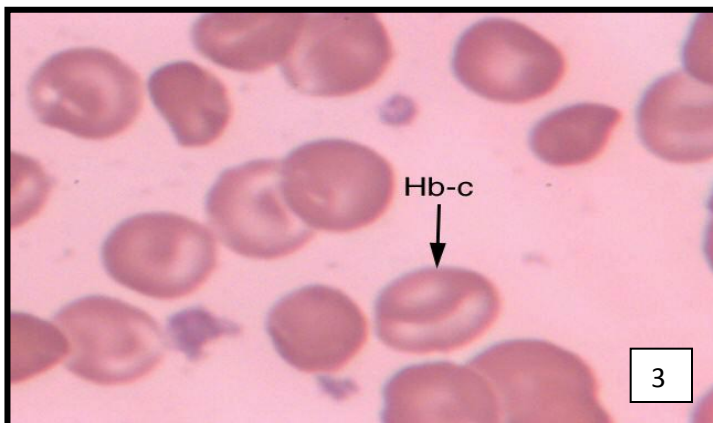
### 1. Hb H Disease:

- Golf Ball Appearance
- Supravital stain



### 2. β Thalassemia Major

- Blood Film Morphology:
  - ✓ Hypochromic microcytic
  - ✓ Target cells
  - ✓ Nucleated RBCs

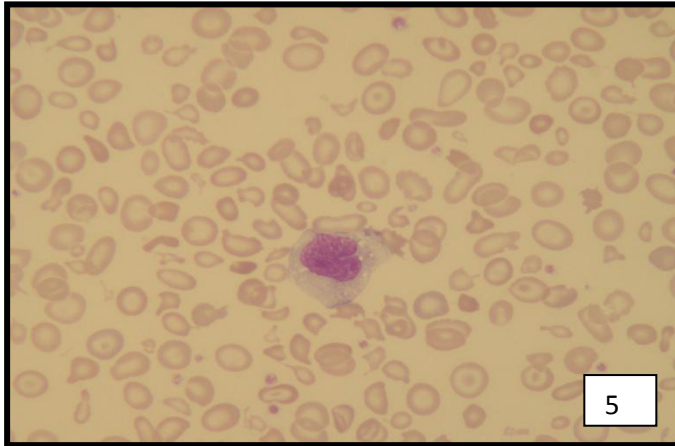
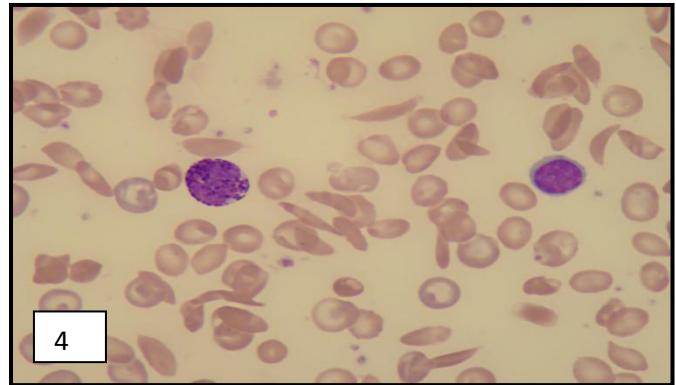


### 3. Hb C Disease:

- Blood film Morphology:
  - ✓ Hemoglobin C Crystals inside the RBCs

#### 4. Sickle cell (SS) Anemia

- Blood film Morphology:
  - ✓ Sickle shaped RBCs (Tapered Ends).
  - ✓ Hypochromic.
  - ✓ Target cells



#### 5. Alpha Thalassemia:

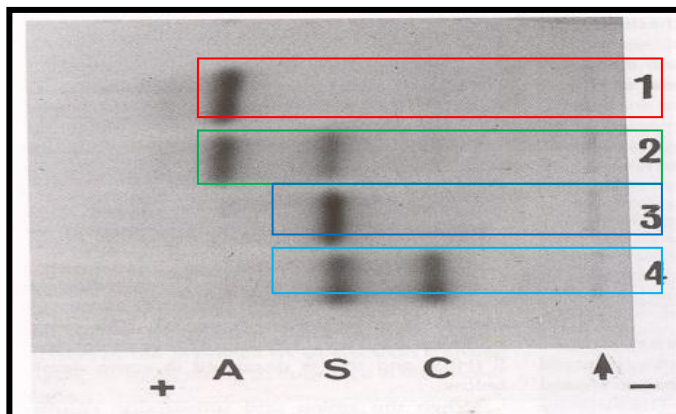
- Blood film Morphology:
  - ✓ Hypochromic.
  - ✓ Target cells

### ❖ Hemoglobin Electrophoresis:

There are 2 types of electrophoresis:

1. Gel Electrophoresis
2. HPLC electrophoresis

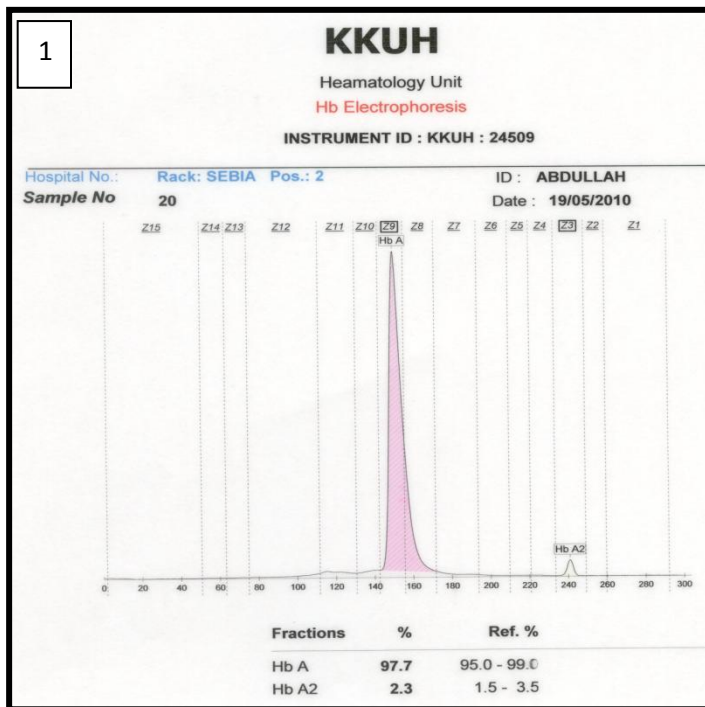
#### 1. Gel Electrophoresis:



#### Gel Electrophoresis:

- 1= Normal (A)
- 2= Carrier (AS)
- 3= Sickle cell anemia (S)
- 4= Diseases (SC)

## 2. HPLC Electrophoresis:



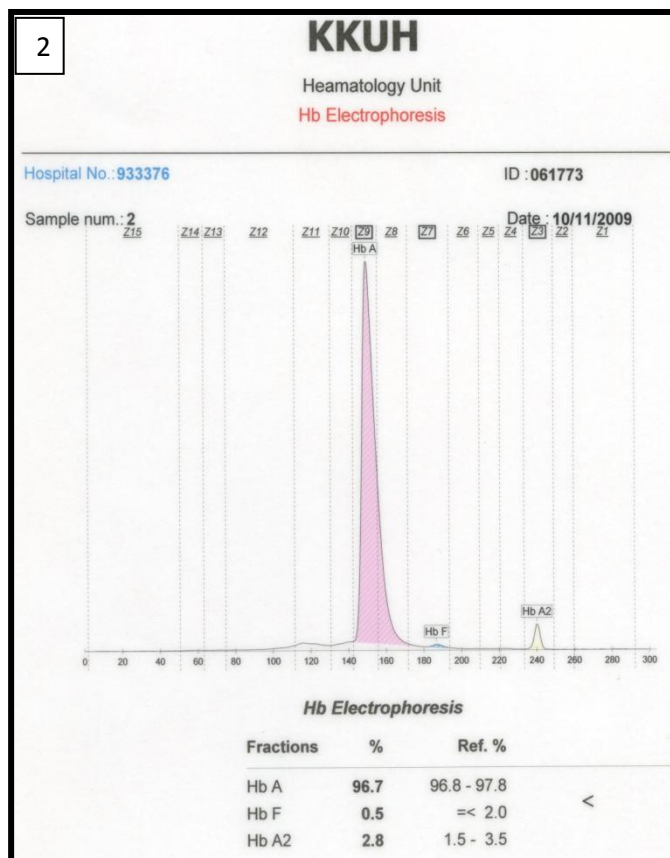
1.

### Readings:

- ✓ Hb A = 97.7% (Normal)
- ✓ Hb A2 = 2.3% (Normal).
- ✓ HbF is absent

### Result:

**Normal blood Hemoglobin Electrophoresis pattern**



2.

### Readings:

- ✓ Hb A = 96.7% (Normal)
- ✓ Hb F = 0.5 % (Normal)
- ✓ Hb A2 = 2.8% (Normal)

### Result:

**Normal blood Hemoglobin Electrophoresis pattern**

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**KKUH**

Heamatology Unit

Hb Electrophoresis

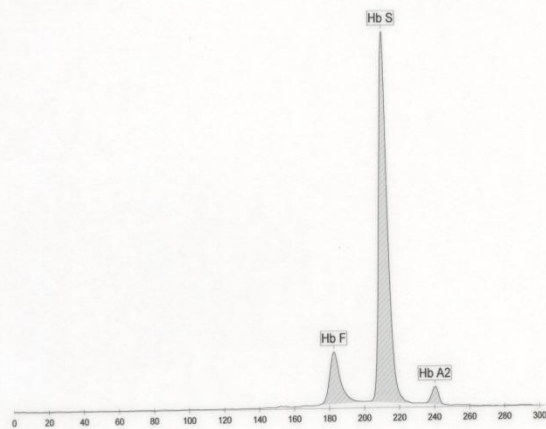
INSTRUMENT ID : KKUH : 24509

Hospital No.: 873506

ID : 064230

Sample No 53

Date : 29/06/2010



Fractions	%	Ref. %
Hb F	14.5	
Hb S	82.2	
Hb A2	3.3	

3.Readings:

- ✓ Hb A = Absent
- ✓ Hb F = 14.5%
- ✓ Hb S = 82.2 (High)
- ✓ Hb A2 = 3.3% (Normal)

Result:**Sickle cell - (SS) Anemia with raised Hb F**

(Hb S does not appear in normal blood)

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**KKUH**

Heamatology Unit

Hb Electrophoresis

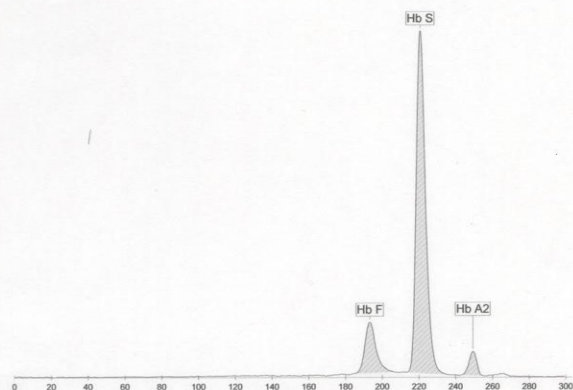
INSTRUMENT ID : KKUH : 24509

Hospital No.: 233095

ID : 063478

Sample No 20

Date : 17/04/2010



Fractions	%	Ref. %
Hb F	14.7	
Hb S	80.5	
Hb A2	4.8	

4.Readings:

- ✓ Hb A = Absent (abnormal)
- ✓ Hb F = 14.7%
- ✓ Hb S = 80.5 (High)
- ✓ Hb A2 = 4.8% (High)

Result:**Sickle cell (S-Beta) Thalassemia**

In the presence of Hb S, A2 must be above 3.5%

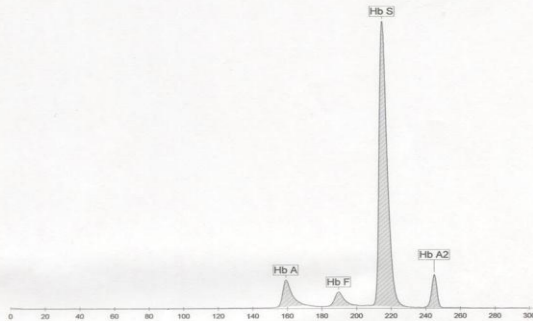


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## KKUH

Hematology Unit  
Hb Electrophoresis

INSTRUMENT ID : KKHU : 24509

Hospital No.: 913628  
Sample No 34ID : 063511  
Date : 19/04/2010

Fractions	%	Ref. %
Hb A	8.7	
Hb F	4.9	
Hb S	80.1	
Hb A2	6.3	

Comment :

5.

Readings:

- ✓ Hb A = 8.7% (present)
- ✓ Hb F = 4.9%
- ✓ Hb S = 80.1 (Abnormal)
- ✓ Hb A2 = 6.3% (High)

Result:**Sickle cell  $\beta$  Thalassemia with blood transfusion**

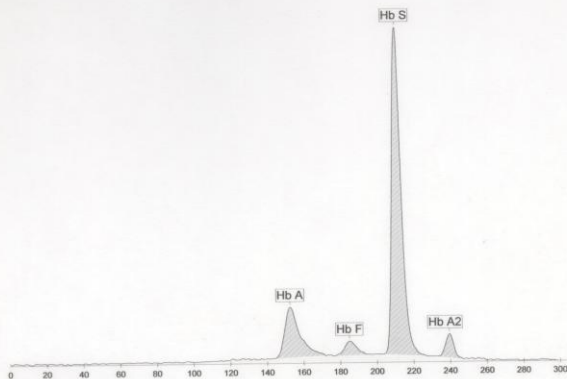
- In this case, the presence of Hb A is due to **blood transfusion** received **more than one month ago**.

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## KKUH

Hematology Unit  
Hb Electrophoresis

INSTRUMENT ID : KKHU : 24509

Hospital No.: 010755  
Sample No 19ID : 064209  
Date : 28/06/2010

Fractions	%	Ref. %
Hb A	18.0	
Hb F	4.0	
Hb S	73.3	
Hb A2	4.7	

6.

Readings:

- ✓ Hb A = 18.0% (present)
- ✓ Hb F = 4.0%
- ✓ Hb S = 73.3 (Abnormal)
- ✓ Hb A2 = 4.7% (High)

Result:**Sickle cell  $\beta$  Thalassemia with blood transfusion**

In this case, the presence of Hb A indicate a **recent blood transfusion** because Hb A here is higher than the case above

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KKUH

Heamatology Unit

Hb Electrophoresis

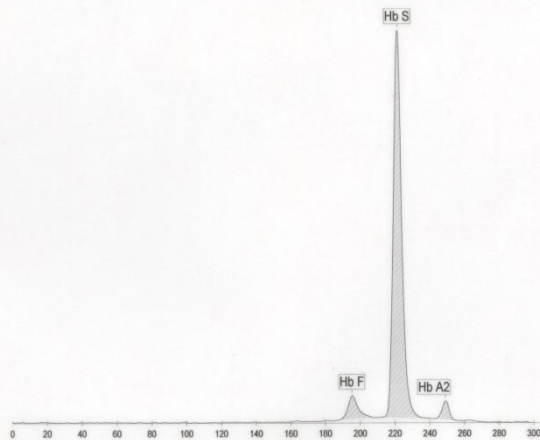
INSTRUMENT ID : KKHU : 24509

Hospital No.: 594729

ID : 064199

Sample No 37

Date : 27/06/2010



Fractions	%	Ref. %
Hb F	6.5	
Hb S	89.9	
Hb A2	3.6	

7.

Readings:

- ✓ Hb A = Absent (abnormal)
- ✓ Hb F = 6.5%
- ✓ Hb S = 89.9 (High)
- ✓ Hb A2 = 3.6% (High)

Result:**Sickle cell - (SS) Anemia**

Because of the combination of S and A2, we consider 3.7% the cut point for determining S- $\beta$ Thalassemia (we raise the reference number of A2 to 3.7 and above)

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KKUH

Heamatology Unit

Hb Electrophoresis

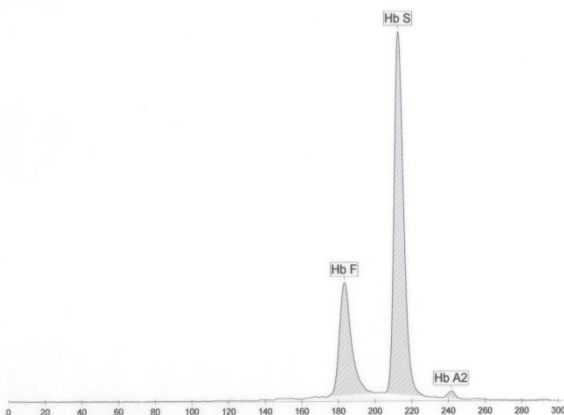
INSTRUMENT ID : KKHU : 24509

Hospital No.: 610043

ID : 064229

Sample No 52

Date : 29/06/2010



Fractions	%	Ref. %
Hb F	28.1	
Hb S	70.8	
Hb A2	1.1	

8.

Readings:

- ✓ Hb A = Absent (abnormal)
- ✓ Hb F = 28.1% (High)
- ✓ Hb S = 70.8 (High)
- ✓ Hb A2 = 1.1% (Low)

Result:**Sickle cell - (SS) Anemia with raised Hb F**

The presence of Hb F helps in decreasing the severity of the disease.

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**KKUH**Hematology Unit  
Hb Electrophoresis

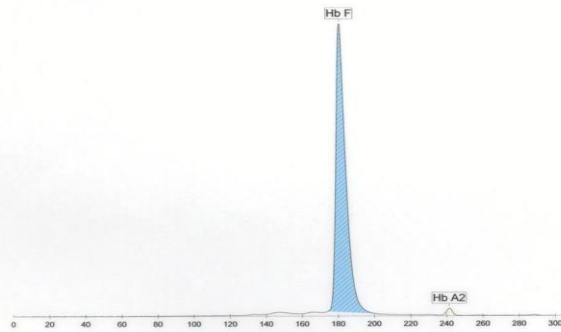
INSTRUMENT ID : KKHU : 24509

Hospital No.: 921107

ID : 063761

Sample No 54

Date : 09/05/2010



Fractions	%	Ref. %
Hb F	98.5	
Hb A2	1.5	

Comment :

9.Readings:

- ✓ Hb F = 98.5% (High)
- ✓ Hb A2 = 1.5% (Normal)

Result:**Hereditary persistence of fetal hemoglobin**