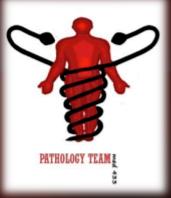


# Hematology practical MED433



5 Questions

# ✤ FIRST; FOR KNOWLEDGE (READ)

Hemoglobin	Distribution
HbD (D-Punjab)	Pakistan – India – sri lanka
HbS	Africa
HbE	Far east (Indonesia – Taiwan – Philippines. etc.
HbC	West Africa
HbO Arab	Arab

## EFFECTS OF HAEMOGLOBIN VARIANTS

Variant	Clinical and hematological abnormalities		
HbS	<ul> <li>Recurrent painful crises (in adults)</li> <li>Chronic haemolytic anaemia;</li> <li>Both related to sickling of red cells on deoxygenation</li> </ul>		Hbc
НЬС	<ul> <li>Chronic haemolytic anaemia due to reduced red cell deformability on deoxygenation, *</li> <li>eoxygenated HbC is less soluble than deoxygenated HbA.</li> </ul>	<ul> <li>α<sub>2</sub>β<sub>2</sub> 6-GLU→ LYS</li> <li>Many thick target RBCs</li> <li>Crystal formation inside RBC's</li> </ul>	10+ 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0

	a) Unstable Haemoglobins	b) Low oxygen affinity haemoglobins	c) Congenital Methaemoglobinaemia	d) Hb ilndianapolis
Genes	1. Hb koln ( $\alpha_2\beta_2$ -98 VAL $\rightarrow$ MET) 2. Hb Hammersmith ( $\alpha_2\beta_2$ 42 PHE $\rightarrow$ SER) 3. Hb Hasharon ( $\alpha_2$ - 47 ASP $\rightarrow$ HIS $\beta_2$ ).	1. Hb kansas ( $\alpha_2\beta_2102 \text{ ASN} \rightarrow$ THR) 2. Hb Aukland ( $\alpha_2\beta_2$ 25 GLY → ASP)	1. Hb M Boston ( $\alpha_2$ 58 HIS $\rightarrow$ TYR - $\beta_2$ ) 2. Hb M Saskatoon ( $\alpha_2$ - $\beta_2$ - $63$ HIS $\rightarrow$ TYR) 3. Hb M Hyde park ( $\alpha_2\beta_2$ 92 HIS $\rightarrow$ TYR) 4. Hb M IWATE ( $\alpha_2$ 87 HIS $\rightarrow$ TYR- $\beta_2$ )	1. α <sub>2</sub> -β <sub>2</sub> 112 CYS – ARG
Manifestations	<ul> <li>✓ haemolysis</li> <li>✓ spherocytic haemolytic anaemia</li> <li>✓ Reticulocytosis</li> </ul>	<ul> <li>✓ Anaemia</li> <li>✓ congenital cyanosis</li> <li>✓ Rare as homozygotes.</li> </ul>	<ul> <li>✓ Cynosis due to methaemoglobinaemia</li> </ul>	<ul> <li>✓ haemolytic anaemia and renal failure in severe cases.</li> <li>✓ Thalassaemia- like syndrome</li> </ul>

# SECOND; CLINICAL

* SECOND; CLINICAL	ККИН
1 (normal – you have to memorize)	Heamatology Unit Hb Electrophoresis
What is this test?	Hospital No.:933376 ID :061773
Hemoglobin electrophoresis	Sample num.: 2 Z14 Z13 Z12 Z11 Z19 Z9 Z8 Z7 Z8 Z8 Z9
The machine does this test:	PREA PREA
New: High-performance liquid chromatography	
(HPLC)	
Old: gel electrophoresis	
Description	
Normal Hemoglobin electrophoresis	
HbA 96.8 - 97.8 %	
HbF Less than or equal to 2.0%	100 F
HbA2 1.5 – 3.5 %	e 29 48 66 60 100 120 140 140 180 200 220 240 280 200
Note: present of HbS → sickle cell	Hb Electrophoresis Fractions % Ref. %
HbA2 if:	Hb A 96.7 96.8 - 97.8 Hb F 0.6 =< 2.0 <
More than 3,5% →beta thalassemia Less than 1.5% → alpha thalassemia	Hb A2 2.8 1.5 - 3.5
2	Heamatology Unit
What is this test?	INSTRUMENT ID   KKUH   24609 Prospilal No. 821107 ID   062761
Hemoglobin electrophoresis	Sample No 54 Date : 09/05/2010
Description	
HbA Absent Absent	
HbF 98.5% Very High	
HbA2 1.5 % Normal	
Findings	HEAR
Absent HbA & High HbF	e de de de de tes tes tes tes de sée sée sée sée sée se Françaisons %, Flat, %,
Diagnosis	Hb F 98.6 Hb A2 1.5
Hereditary persistent fetal Hemoglobin	Comment :
Further investigation	28/3/2010
Genetic study & family study	CBC Hb 98 Hev 73
Genetic study & family study	NROC 34
3	ККИН
-	Heamatology Unit
What is this test?	Hb Electrophoresis INSTRUMENT ID : KKUH : 24509
Hemoglobin electrophoresis	Hospital No.: 233095 ID : 063478
Findings	Sample No 20 Date : 17/04/2010
HbA Absent Absent	
HbF 14.7% High	
Hb S 80.5 Sickle cell disease	'
HbA2 4.8 % High	
Diagnosis	
Sickle cell Anemia with Beta thalassemia,	Ho F Ho A2
and increase HbF	
Further investigation	0 20 40 60 80 100 120 140 140 140 200 220 240 260 200
Genetic study & family study	Fractions % Ref. % Hb F 14.7
e different between sickle cell trait and sickle cell disease	Hb S 80.6 Hb A2 4.8
nemia): ✓ HbS = 45 or less → sickle cell trait	

✓ HbS = 45 or less  $\rightarrow$  sickle cell trait

✓ HbS ABOVE 45 → sickle cell disease

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4	ККИН	
What is this test?	Heamatology Unit Hb Electrophoresis	
Hemoglobin electrophoresis	INSTRUMENT ID   KKUH   24509 Hospital No.: 913628 ID   063611	
Findings	Sample No 34 Date : 19/04/2010	
HbA 8.7 Present & Low		
HbF 4.9 High		
HbS 80.1 Sickle cell anemia		
(above 45)		
HbA2 6.3 Very High	10.AZ	
Diagnosis	Han and and a set of	
Sickle cell Anemia with Beta thalassemia, increase HbF, with HbA <sup>(1)</sup>	Fractions % Ref. %	
Further investigation	HD F 4.9 HD 5 80.1 HD A2 6.3	
Genetic study & family study	Comment :	
	Home 300 mes cickle cell that	
(1) Note that normally in sickle cell anemia	Hanna 2011.	
• HbA is absent, but its present due to blood transfusion		
• HbF (5-15%) raised	ККИН	
5	Heamatology Unit Hb Electrophoresis	
What is this test?	INSTRUMENT ID : KKUH : 24509	
Hemoglobin electrophoresis	Hospital No.:         010755         ID:         064209           Sample No         19         Date:         28/06/2010	
Findings	HD 51	
HbA 18.0 Present & Low		
HbF 4.0 High		
HbS 73.3 Sickle cell anemia		
(above 45)		
HbA2 4.7 High		
Diagnosis	HD A HD F HD A2	
Sickle cell Anemia with Beta thalassemia,	9 20 40 40 10 100 100 100 100 100 200 200 200 500 500	
increase HbF, with HbA <sup>(1)</sup>	Fractions % Ref. %	
Further investigation	Hb A 18.0 Hb F 4.0	
Genetic study & family study	Hb S 73.3 Hb A2 4.7	
	ККИН	
6	Heamatology Unit Hb Electrophoresis	
What is this test?	INSTRUMENT ID : KKUH : 24509	
Hemoglobin electrophoresis	Hospital No.: 594729 ID: 064199 Sample No 37 Date : 27/06/2010	
Findings	1955 Edite - 27/06/2010	
HbA Absent Absent		
HbF 6.5 High		
HbS 89.9 Sickle cell anemia		
(above 45)		
HbA2 3.6 Normal (3.5 -3.7%)		
Diagnosis		
Sickle cell Anemia	HD E HD A2	
Further investigation	a po do do do tão tão táo são são po pao pao pão pão são	
Genetic study & family study	Fractions % Ref. %	
4 HEMATOLOGY PRACTICAL	Hb S 89.9 Hb A2 3.6	
	10 Az 3.0	



7	
What is this test?	Heamatology Unit
	Hb Electrophoresis
Hemoglobin electrophoresis	INSTRUMENT ID : KKUH : 24509 Hospital No.: 610043 ID : 064229
Findings	Sample No 52 Date : 29/06/2010
HbA Absent Absent	P40-51
HbF 28.1 High	
HbS 70.8 Sickle cell anemia	
(above 45)	
HbA2 1.1 Low	
Diagnosis	Hito P
Sickle cell Anemia with alpha thalassemia,	
increase HbF	HEAZ
Further investigation	0 20 40 50 10 100 100 140 140 160 260 220 240 260 260 260 260
Genetic study & family study	Fractions % Ref. %
	Hb F 28.1 Hb S 70.8
	Hb A2 1.1
8	ккин
	Heamatology Unit
What is this test?	Hb Electrophoresis INSTRUMENT ID : KKUH : 24509
Hemoglobin electrophoresis	Hospital No.: Rack: SEBIA Pos.: 2 ID : ABDULLAH
Findings	Sample No         20         Date : 19/05/2010           Z15         Z14 Z12         Z12         Z11 Z19         Z19         Z2         Z1         Z12         Z1
HbA 97.7 Normal	256.0
HbF Absent Absent (< 2 is normal)	
HbA2 2.3 Normal	
Diagnosis	
Normal Hemoglobin electrophoresis	
Further investigation	
Genetic study & family study	900 A21
```````````	0 20 40 60 40 100 100 100 100 100 200 200 200 200 20
	Fractions % Ref. % Hb.A. 97.7 95.0 - 99.0
	Hb A2 2.3 1.5 - 3.5
	ККИН
6	Heamatology Unit
What is this test?	INSTRUMENT ID : KKUH : 24509
Hemoglobin electrophoresis	Hospital No.: 873506 ID: 064230 Sample No 53 Date : 29/06/2010
Findings	Sample No 53 Date : 29/06/2010
HbA Absent Absent	
HbF 14.5 High	
Sickle coll anomia	
HbS 82.2 (above 45)	
HbA2 3.3 Normal	
Diagnosis	
Sickle cell Anemia	Ho FI Ho AZ
Further investigation	0 20 40 00 00 100 120 140 160 160 200 240 260 260 260 260
Genetic study & family study	Fractions % Ref. %
	HbF 14.5 HbS 82.2
	Hb A2 3.3

5



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# What is this test?

# Blood film

- Findings (Abnormalities)
  - ✓ Sickle cells RBC's
  - ✓ Target cells

#### Normally

- ✓ Lymphocytes
- ✓ Basophils

#### Diagnosis

Sickle cell anemia

#### **Further investigation**

Hemoglobin electrophoresis  $\rightarrow$  (case 3) Genetic study & family study

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What is this test?

Blood film

Findings (Abnormalities)

- Nucleated (immature) RBC's
- ✓ Target cells
- ✓ Hypochromic, microcytic cells
- ✓ Anisocytosis
- ✓ Poikilocytosis

#### Normally

- ✓ Lymphocytes
- ✓ Eosinophil's

#### Diagnosis

Beta Thalassaemia Major

Further investigation

- Hemoglobin electrophoresis
- Genetic study & family study

#### 12

What is this test?

Blood film

- **Findings (Abnormalities)** 
  - ✓ Target cells
  - ✓ Hypochromic, microcytic cells
  - ✓ Anisocytosis
  - ✓ Poikilocytosis

#### Diagnosis

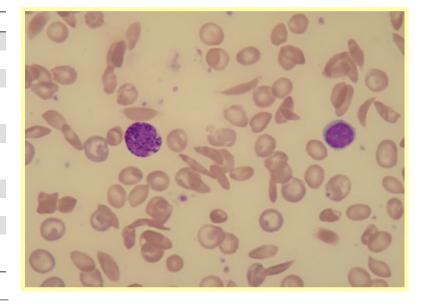
Alpha Thalassaemia

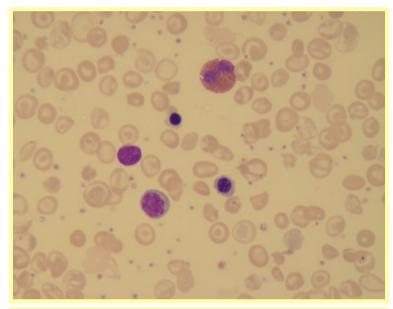
### Further investigation

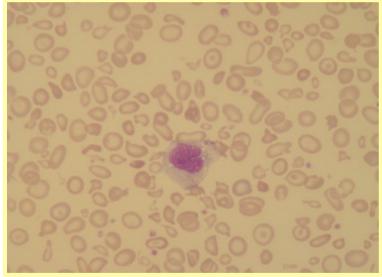
Hemoglobin electrophoresis

Genetic study & family study









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What is this test?

Blood film with supra vital stain (supra vital brilliant crystal blue)

## Findings (Abnormalities)

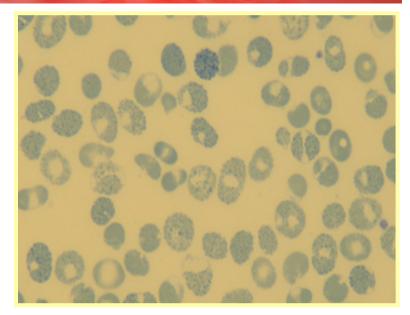
✓ Golf ball appearance

#### Diagnosis

Haemoglobin H Disease (alpha thalassemia - 3 α thalassemia chin deletion)

## Further investigation

Hemoglobin electrophoresis Genetic study & family study





NAME THIS TEST? GEL ELECTROPHORESIS TEST

\* Not important