HEMOGLOBIN

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- 1. What are the indications of haemoglobin estimation?

- Ans: To determine presence and severity of anaemia
- Screening for polycythemia
- To assess response to specific therapy in anaemia
- Estimation of red cell indices.
- Selection of blood donars

2. What is the structure of hemoglobin?

Ans:

- Hemoglobin is a tetramer containing two pairs of similar polypeptide chains called globin chains.
- To each of the four chains is attached heme, which is complex of iron in ferrous form and protoporphyrin.

3. What are the types of hemoglobin present in embryonic life?

Ans:

- Gower I
- Gower II
- Portland

4. What is the method of collection of blood for the estimation of Hb?

Ans:

- Finger prick (In children & adults)
- From veins (Venous blood)
- Blood collected in EDTA (1.0 to 1.2 mg/ml) or double oxalate (2 mg/1 ml) in appropriate proportion

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5. what is the normal Hb concentration

A: Adults Males-13 to 18g/dl
Adults Females-12 to 16 g/dl
Children-12-14 g/dl
Infants-16 to 22g/

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6. Name the various methods for Hb estimation

calorimetric methods, gasometric methods, specific gravity method, chemical methods

Acid hematin(sahlis method)
Cyanmethemoglobin method (calori metric)
Oxyhemoglobin method (calori metric)
Alkali hematin method (calori metric)
Halden carboxy haemoglobin method (calori metric)
Tallquist method, WHO hemoglobin color scale, spencer
Dares method
Auto analyzers

7. What are visual methods & photoelectric methods?

Ans:

Visual Methods	Photoelectric Methods
Tallquist method	Cyanomethemoglobin method
Sahlis acid hematin method	Oxyhemoglobin method
WHO Hb color scale	Alkaline hematin method

8. Quickest method of Hb estimation?

Ans:

- Automated hematology analyzer

10. Indirect methods of estimation of Hb?

Ans:

- Gasometric method
- Chemical method
- Specific gravity method

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- 9. Which is the best and accurate method for Hb estimation

- Cyanmethemoglobin method

11. In haldane method, what is used to produce hemolysis?

Ans:

- Hypotonic solution (distilled water)

12. Reagent used in Oxyhemoglobin method?

Ans:
0.007 N Ammonium hydroxide

13. Name the quick and easy method done to screen blood donors of possible anemia?

Ans:

- Sepcific gravity method.

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- 14. Which anticoagulant should be used for Hb estimation

- A: Ethylenediamine tetra acetic acid(EDTA)

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- **15. How much quantity of EDTA Should be Used for 1 ml of blood**

- **A.** 1.0- 1.2 mg/ml of blood

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- **16. How N/10 HCL is prepared**

- Ans: Concentrated Hcl-4.5 ml
  Distilled Water-500ml
  To make 500 ml of N/10 HCL

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- **17. What is the principle of sahlis method**

- **A.** Hemoglobin is converted in to acid haematin by dilute Hcl in to brownish coloured solution
- This colour of the soloution is matched with the colour comparator of sahlis haemoglobinometer

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- 18. What are the advantages of sahlis method

- Ans:Simple bed side test
- Reagents and apparatus are cheap
- Easy to perform
- Quick and inexpensive

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- 19. What are the disadvantages of sahlis method

A:Time factor-visual error

- The color of acid hematin fades quickly with passage of time
- Color of the standard comparator fades with passage of time
- Acid hematin solution is not stable

- Color Matching: Variation from person to person in matching the color

Technical errors:

Improper mixing of blood

- Errors in pipette calibration and sample, equipment, tissue fluid containg capillary blood

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- 19. What are the disadvantages of sahlis method
- Types of haemoglobin:
- Not estimate all different types of haemoglobin(carboxy, meth,and supha)
- This method is not suitable for fetal haemoglobin which is also not converted in to acid hematin
- Non hemoglobin substances like protein and lipids in the plasma influence the colour of the blood that is diluted with acid

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- 20. What difference would it make if N/10 HCL is taken above or below the 20% mark?

- Ans: If N/10 HCL more – The colour of undiluted solution may be lighter than standard.
- If N/10 HCL less –All haemoglobin will not get converted.

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- 21. Which precaution should be taken while taking final reading?

- Ans: Hemoglobinometer should be hold at the eye level against good light and lower meniscus of the Hemoglobinometer tube solution should be considered.

22. Which precaution should be taken while taking final reading?

Ans:

- The lower meniscus should be taken as result which expressed Hb as grams.

23. Why the result expressed in grams rather than %?

Ans:

- No single Hb value can be considered as 100% since it varies with age and sex of individual and altitude.
- Hb meters of different manufacturers have different values as 100%. So, the same sample of blood will yield different results on different instruments.

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24. How much blood is used in cyanmet Hb estimation method

A:20 miroliter

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- **25. Which reagent is used in cyanmet Hb method?**

- **A.** Drabkin solution

26. Drabkin solution composition?

Ans: Drabkin's solution PH-7.0-7.4

- potassium cyanide 50mg,
- potassium ferricyanide200mg,
- potassium dihydrogen phosphate 200mg,
- Distilled water 1L, Non ionic detergent 1ml.

- The final solution should be clear and pale yellow in colour.

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- 27. What is the principle of cyanmet Hb method
- A:First Hb is converted to methemoglobin by potassium ferricyanide and then KCN converts it to cyanmethemoglobin

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- 28.Advantages of cyanmethemoglobin

- All forms of Hb except sulphemoglobin are converted hemiglobincyanide/cyanmethemoglobin (HiCN)

- Visual error is not there as no colour matching is required.

- Cyanmethaemoglobin solution is stable and its colour does not fade with time so readings may not be taken immediately.

- A reliable and reference standard is available from world health organisation for direct comparison.

29. How do we store Drabkin solution?

Ans:

It is stored in Brown borosilicate bottles as it is unstable if exposed to sunlight.

30. In cyanomethemoglobin method, at what wavelength absorbance is noted.?

Ans:

At 540 nm

- 31. Hb Less than 10 gm%

- Ans:Anemia, Auto immune diseases, water retention(pregnancy, edema), Blood loss(menses,bleeding,internal hemorrhage),
- parasitic infection, drugs, lead poisoing,
- Dietary deficiency(iron,cu,vitamins),malabsorption of nutrients
- chronic disease

- 32.Hb more than 18 gm%

- Ans:High altitude, severe vomiting or diarrhoea(hemoconcentration) ,infants smoking,
- obstructive lung disease, congestive heart disease, splenic hypo function

33. Conditions where there is false anemia?

Ans:

- Pregnancy (due to increase in plasma volume)
- Hypervolemia (due to disproportionate increase in plasma volume & RBC volume)

34. Conditions where there is false rise in Hb?

Ans:

- Burns
- Severe dehydration
- Immediately after acute hemorrhage
- Blood taken during the intravenous infusion of iron containing drugs

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- 35. Define anemia

A:It is a Pathological condition characterized by decreased in oxygen carrying capacity of blood manifested by decreased Hb concentration, Reduced RBC count and packed cell volume

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- **36. How will you classify anemia**

On the basis of morphology

Normocytic normochromic,microcytic hypochromic and macrocytic

According to underlying mechanism

Anemia due to blood loss

Anemias due to increased rate of destruction

Anemias due to impaired red cell production

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- **37. What are the abnormal haemoglobins**

- **A.** Hb S,Hb C,Hb D. Hb E

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- 38. What are conditions that come under hemoglobinopathies

- A: Sickle cell anemia,Thalaseemia

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- 39. What are important investigations in diagnosing anemia

A:Hemoglobin estimation, RBC count, Packed cell volume,Red cell indices and peripheral smear examination