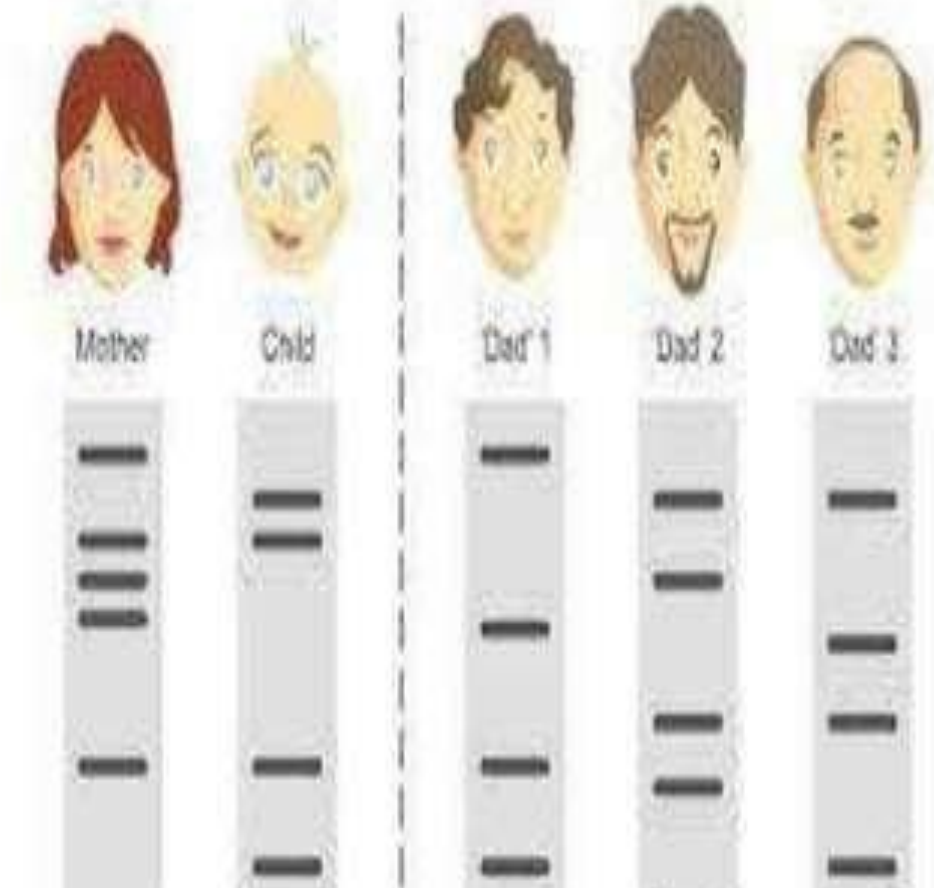
Disputed Paternity

Round 2

Who is father ??



Definitions

- *Paternity* : Is defined as the fatherhood.
- *Paternity testing :* The technique of determining the relationship between people, most commonly alleged parents.
- *Established (proved) paternity:* When a paternity testing demonstrate that an alleged father is the biological father .
- *Disproved paternity:* When the testing methods demonstrate that an alleged father is not the biological father .

Clinical case

A man denied the paternity of a child. Blood groups were determined for the man, mother and the child, and were found to be (A, Rh +ve , N) , (B, Rh +ve , MN) and (O, Rh –ve, M) respectively.

- Was the man honest or not ?

Answer

We determine the blood groups (ABO, Rh& MN system) for the man, mother and the child : see the following table

Blood group system	Man	Mother	Possible child	The present child
ABO	A	B	A, B, AB, O	O
RH	+ve	-ve	+ve or -ve	-ve
MN	N	MN	MN or N	M

The questions of disputed paternity arises in the following cases

”

1. In case of sorting baby claimed by two sets of parents

2. Accidental interchange of infant in a maternity hospital.

3. Am I the father ?!!!!

A father may deny paternity of a child in case of :

- The wife living apart from her husband
- Raped
- Adultery

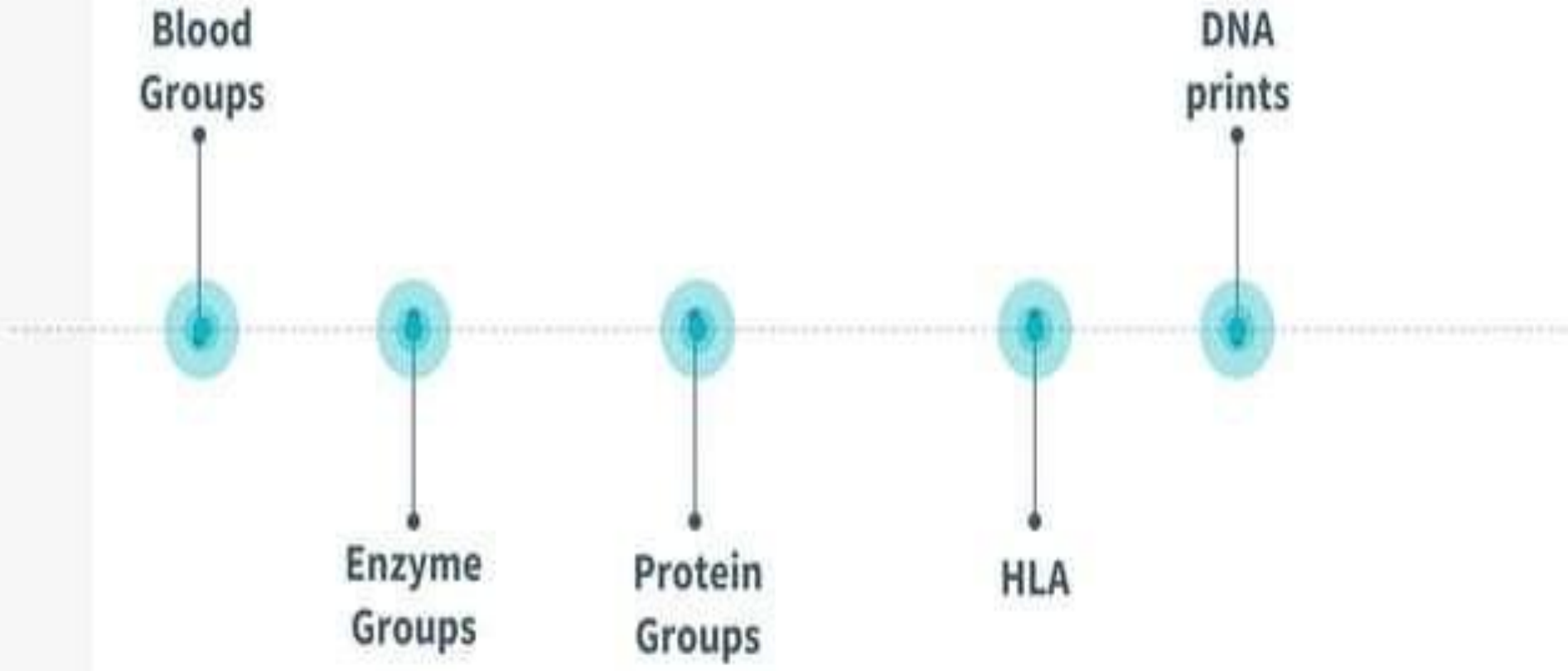
4. When lost child is recovered after years, it is required to determine whether he belongs to a given set of parents.

5. Mass disasters

How to manage a case of disputed paternity ?

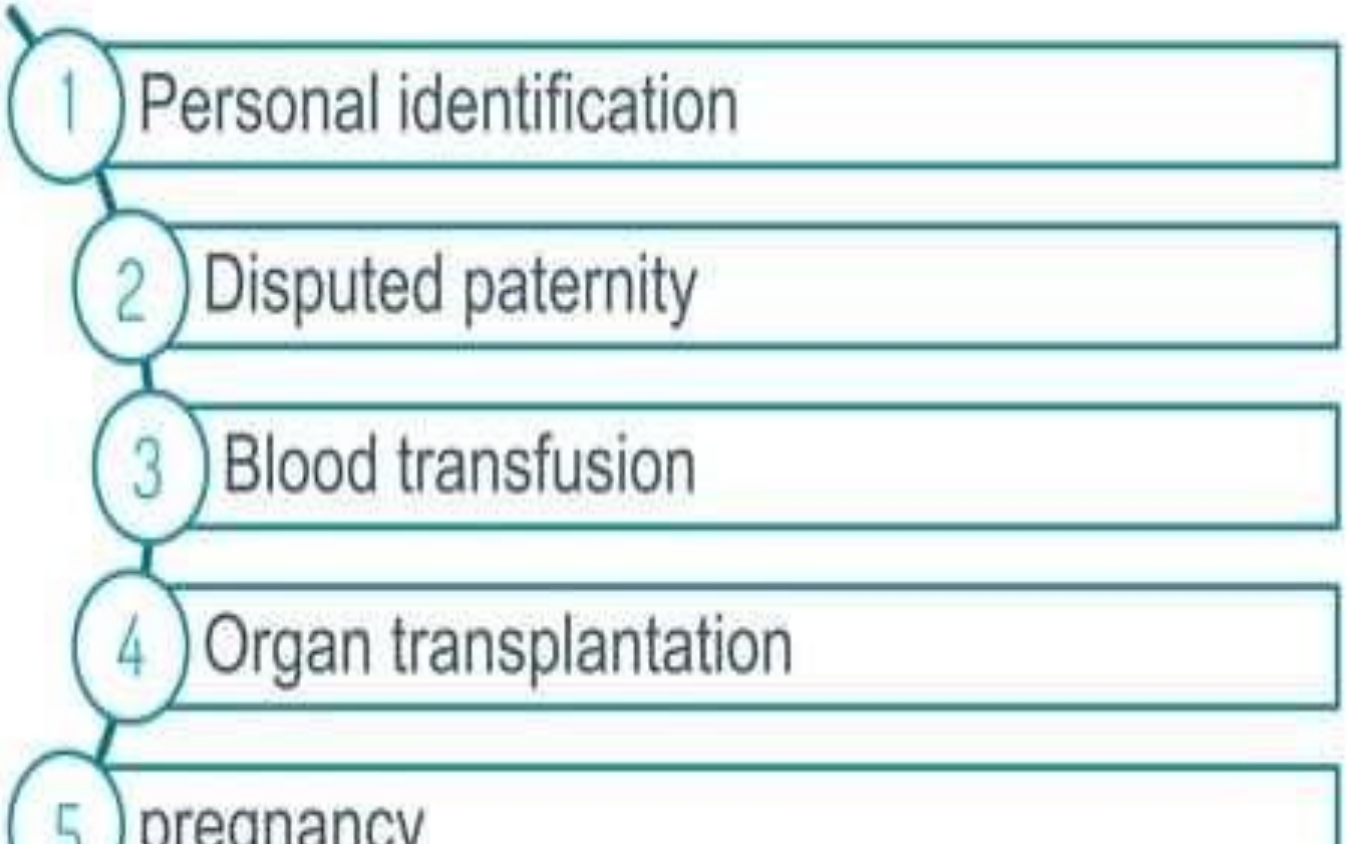
”

Human Genetically Controlled Markers System (HGCMS)

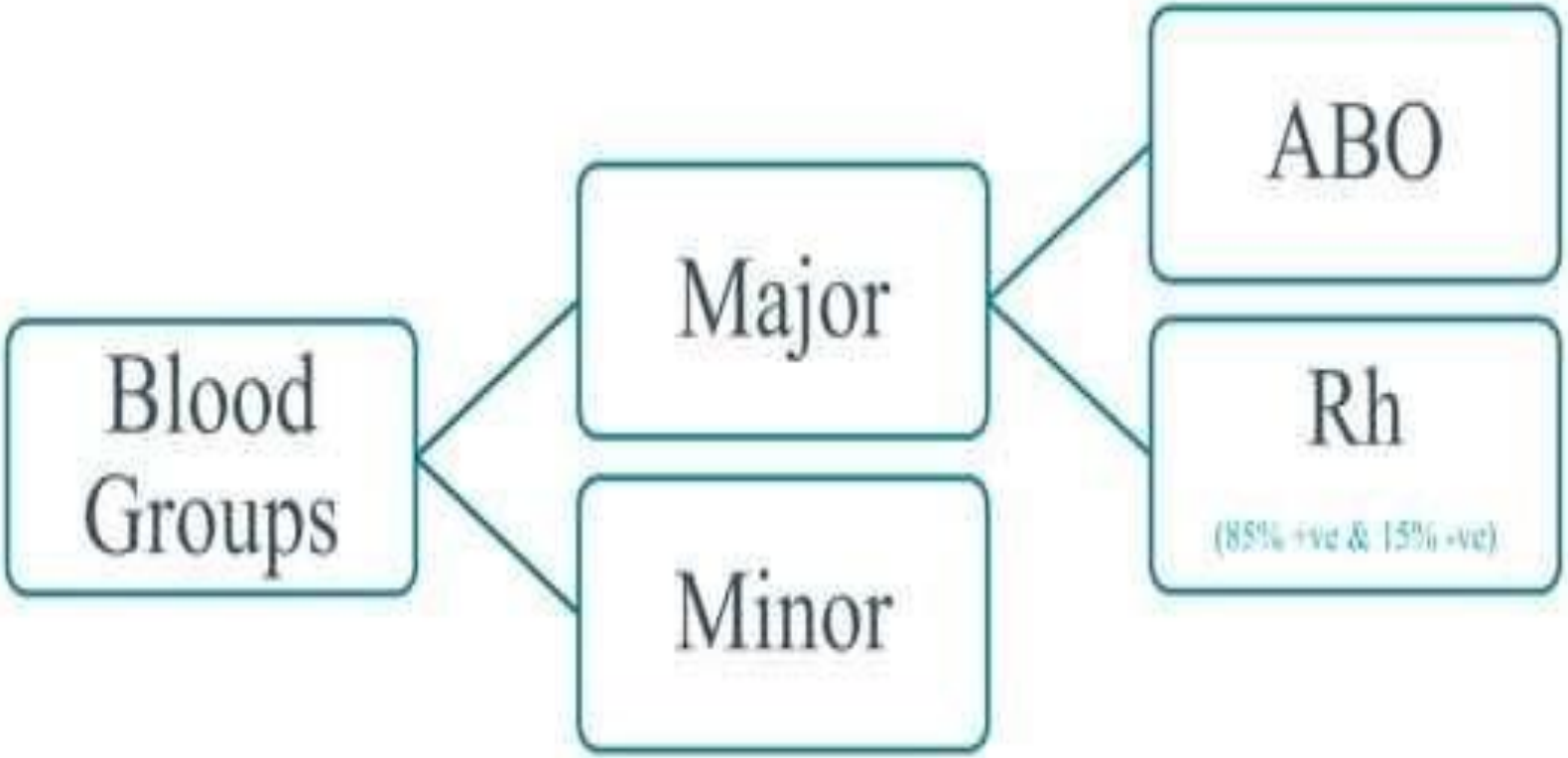


Blood Groups

Medico-legal importance of blood groups



Blood Groups

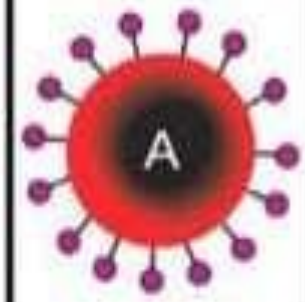
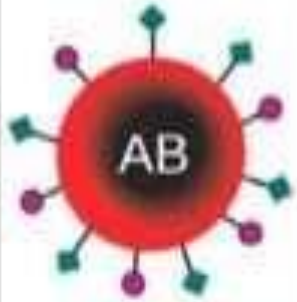


Blood Groups

- More than 30 major blood group systems including ABO and Rh systems. (WHO)
- In addition to the ABO antigens and Rhesus antigens, many other antigens are expressed on the red blood cell surface membrane named minor blood groups .
- Minor blood groups include:
  MNS, P, Lutheran, Kell, Lewis, Duffy, Diego .....
- Inheritance of blood groups according to Mendel's law of inheritance (Bernestein theory)

i. The child inherits the parents blood group (A, B, O). A and B are dominant and O is recessive.
ii. Every infant will take two of these 3 factors, one from his father and one from his mother.

Blood Groups

	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in Plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in Red Blood Cell	A antigen	B antigen	 A and B	None

Blood Groups

- If the infant inherits the two different dominant factors so his blood group is AB .
- If both inherited factors are recessive this indicates blood group O .
- If the two inherited factors are one dominant (A or B) and other recessive (O) this indicates the blood group (A or B) .
- If the two inherited factors are dominant and similar (AA) or (BB) This indicates the blood group (A or B)

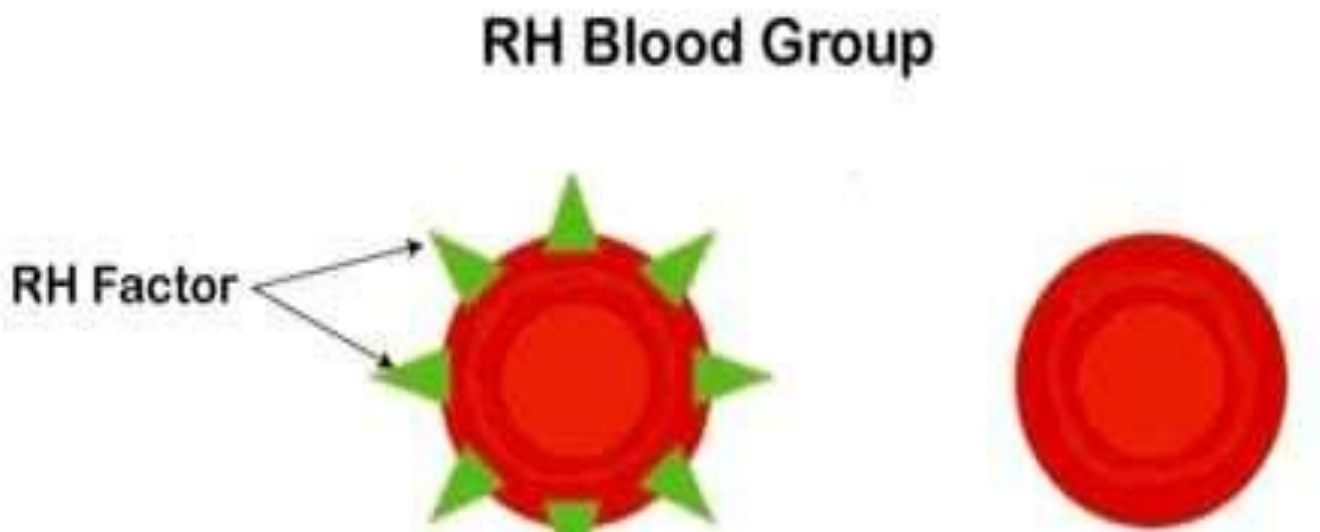
Blood Groups

Parents	Possible child	Impossible child
O & O	O	A, B, & AB
O & A	O or A	B & AB
O & B	O or B	A & AB
O & AB	A or B	O & AB
A & A	O or A	B & AB
A & B	O, A, B, or AB	None
A & AB	A, B, or AB	O
B & B	O or B	A & AB

Rh Blood Group System

Rh Blood Group System

- System for classifying blood groups according to the presence or absence of the Rh antigen on the cell membranes of the red blood cells.



Rh +ve : if he has D antigen on RBCs. His genotype may be DD or Dd

Rh –ve : if he has not D antigen on RBCs . His genotype is dd

Parents	Possible child	Impossible child
(Rh +ve) & (Rh +ve)	(Rh +ve) or (Rh –ve)	----------
(Rh +ve) & (Rh –ve)	(Rh +ve) or (Rh –ve)	----------
(Rh –ve) & (Rh –ve)	(Rh –ve)	(Rh +ve)

MNS

MNS

Inheritance of MN blood groups: by two codominant genes : M &N .

- ✓ The genotype of blood group M is MM
- ✓ The genotype of blood group N is NN
- ✓ The genotype of blood group MN is MN

Parents	Possible child	Impossible child
M & M	M	MN & N
M &N	MN	M & N
M &MN	M or MN	N
N & N	N	M & MN

Enzyme Groups & Protein Groups

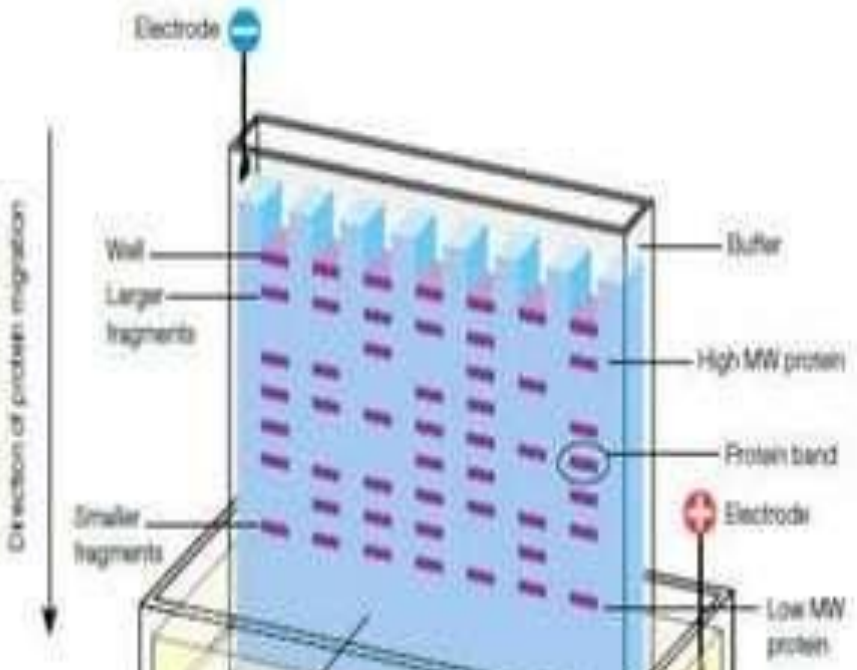
Enzyme Groups

Examples of polymorphic enzymes (in RBCs) :

- Lactate dehydrogenase enzymes
- Phosphatase enzymes

These enzymes are detected by :

Electrophoresis



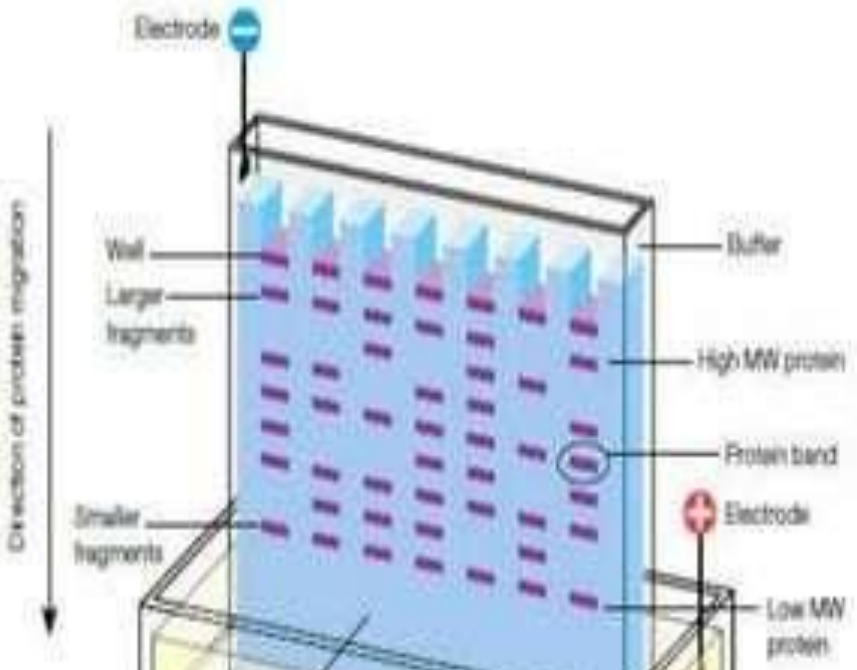
Protein Groups

Examples of blood proteins (in the plasma) :

- Haptoglobins
- Gc and Gm
- Immunoglobulins

These proteins are detected by :

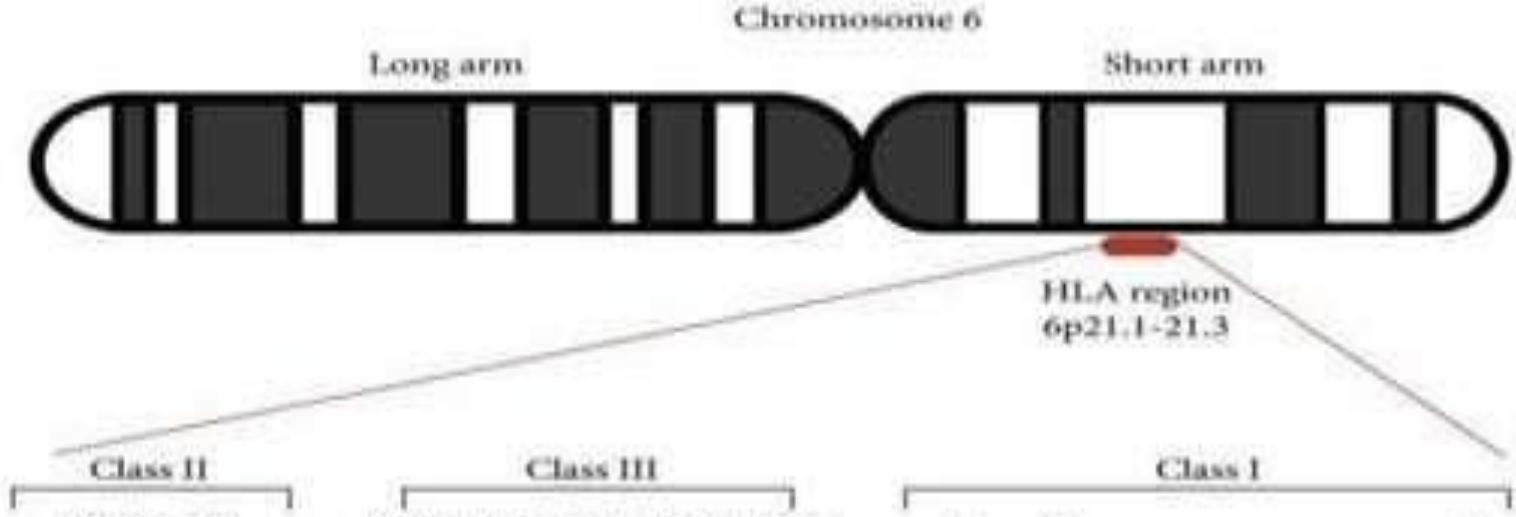
Electrophoresis



HLA

HLA : Human leukocytosis Antigen Loci

- Protein substance on the surface of a wide variety of tissues
- Detected by major histocompatibility complex (MHC), situated on the short arm of chromosome 6.



Medico-legal importance of HLA

Aid much in the field of

1. Organ transplantation
2. Disease association
3. Disputed paternity

DNA

- DNA fingerprints (old name)
- DNA prints (recent name)
- DNA is determined by PCR

Protocol for investigating disputed paternity cases

Protocol for investigation

1. Determination of blood groups:
   - Easy and rapid technique .
   - Cheap .
   - It gives 100% exclusion results .
   - It gives 75% probability results .

Protocol for investigation

2. Determination of enzymes or proteins patterns:
   - Rapid technique .
   - Non expensive .
   - Disadvantage: alone it is non-conclusive .

Protocol for investigation

3. Determination of HLA typing:
   - Difficult technique .
   - Expensive .
   - Alone it gives 98% probability of paternity.

Protocol for investigation

4. Determination of enzymes or proteins patterns:
   - Difficult technique .
   - Expensive .
   - Alone it gives 100% probability of paternity .

It is the only test which can by itself solve the problem of the disputed paternity

Any questions?


Hesham Shaban


Mohamed Mustafa


Alaa Hassan


Khaled Shawky


Ahmed Ragab


Mohamed Ghozal


Moamen Fayed


Hager Salah


Hadeer Mohamed


Hadeer Nabhan


Reem Abdelhakeem

TEAM PRESENTATION


Hager Sobhy