

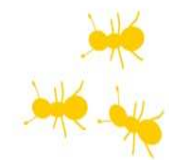
# Haemolytic disease of the newborn

09.06.2016

**Burak Salgin**



# THE ROSIE HOSPITAL



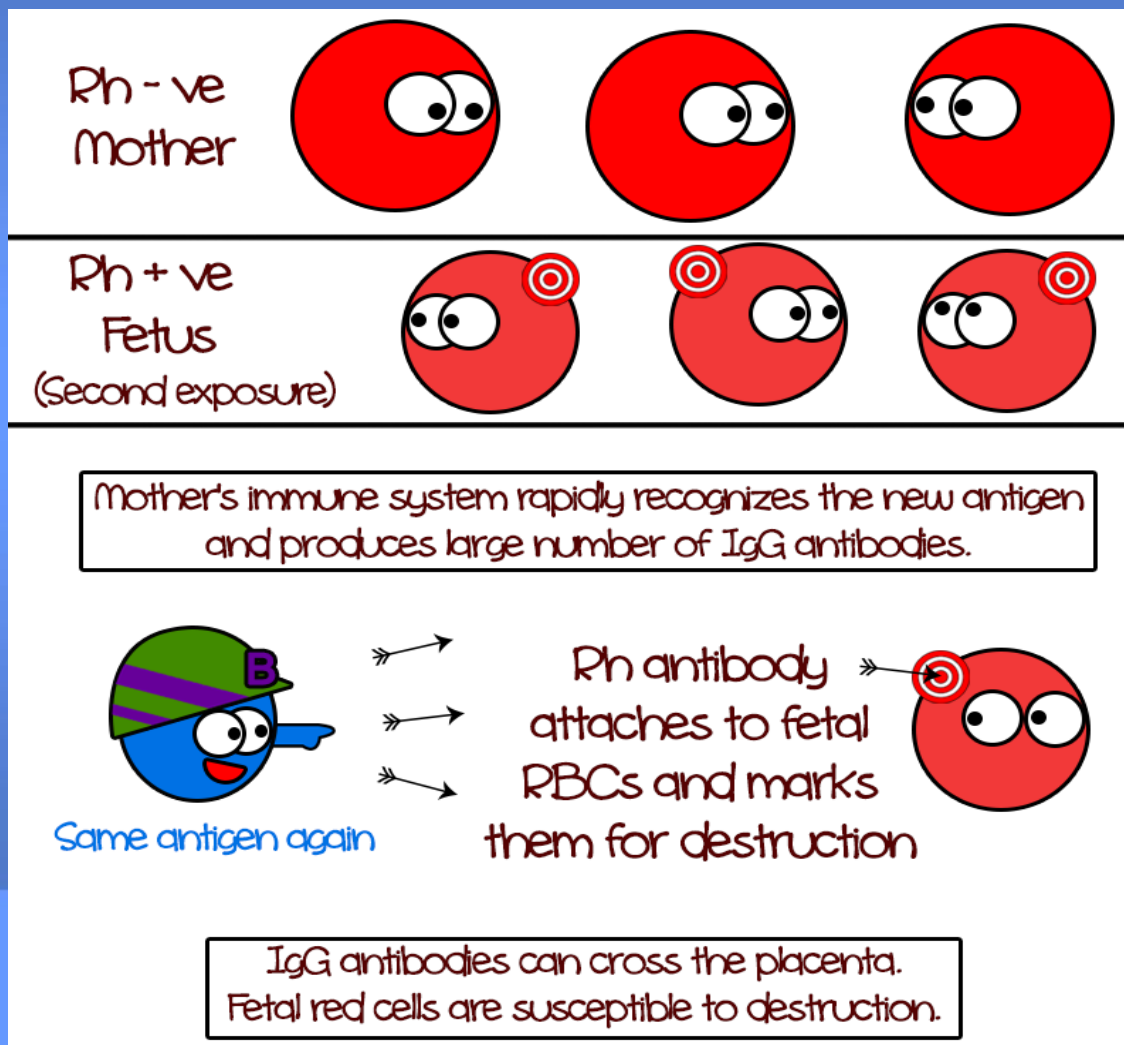
## ANTS

Acute Neonatal Transfer Service  
East of England NHS



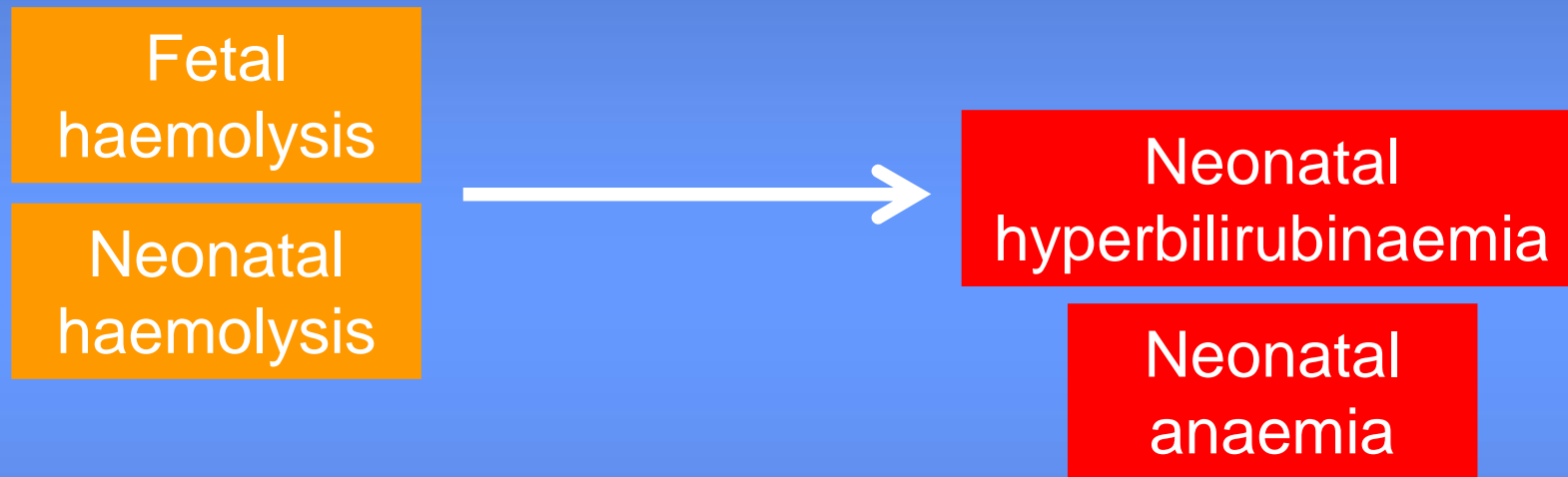
# Haemolytic disease of the newborn...

...used to be synonymous with Rhesus D allo-immunisation



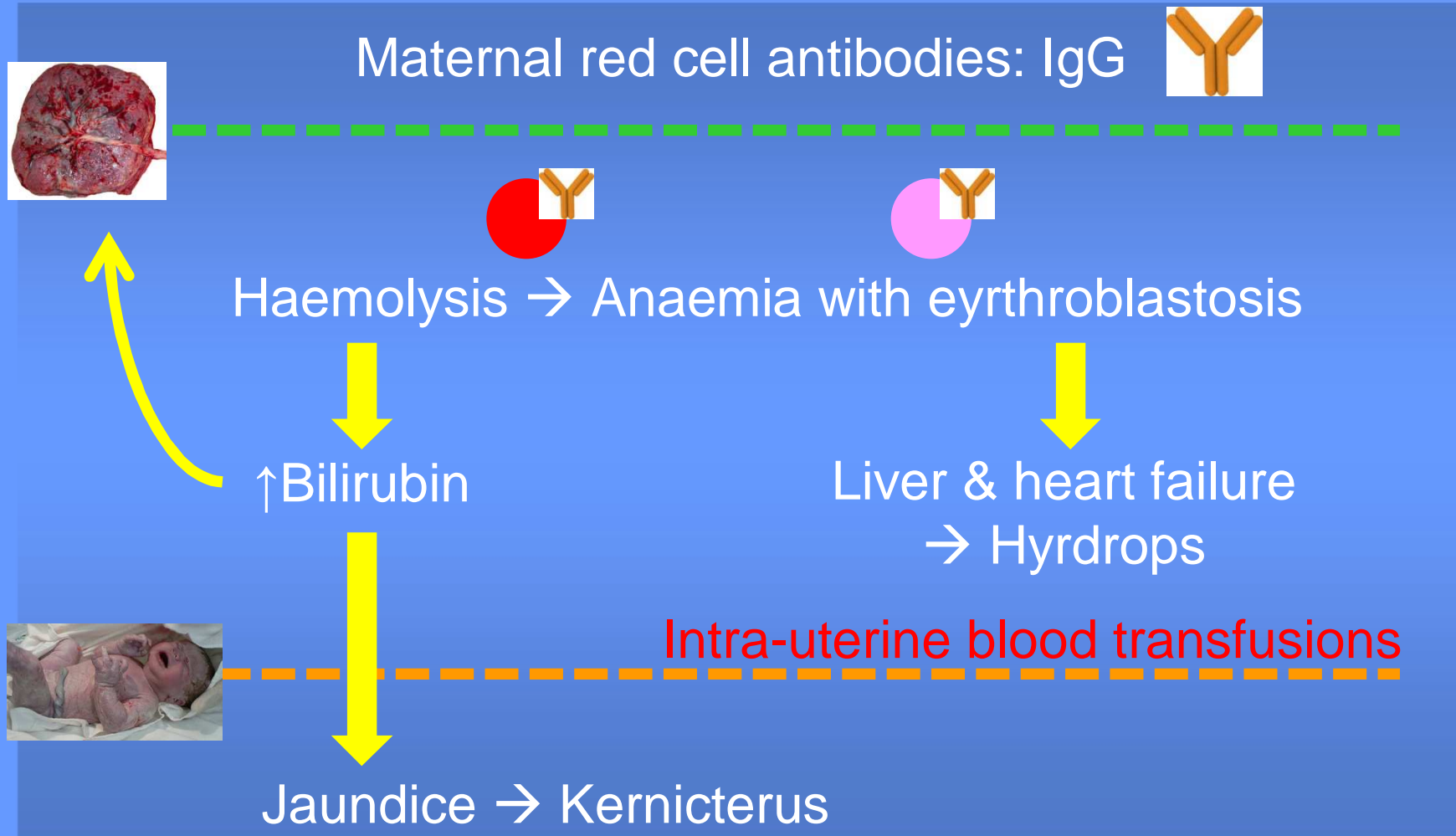
# Haemolytic disease of the newborn...

...used to and still can be an emergency



# Pathophysiology

Incompatible blood transfusion  
or feto-maternal 'haemorrhage'



Postnatal management

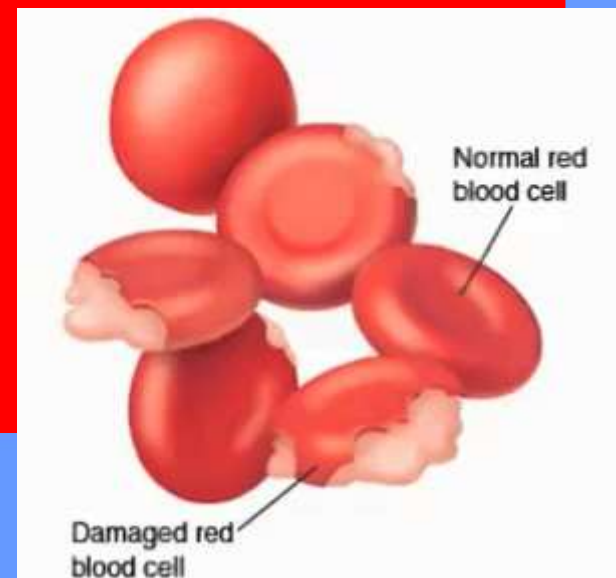


# In contemporary neonatal clinical practice...



When you say...

# Haemolytic Disease of the Newborn



...we think \*\*\* **High-risk Neonates** \*\*\*



JAUNDICE





## Consider haemolytic disease if $\geq 1$ of...

- Positive maternal antenatal antibody screening and/or anaemic/hydronic fetus
- Rapidly developing or significant hyperbilirubinaemia not predicted by maternal antenatal antibody screening
- Prolonged postnatal hyperbilirubinaemia
- Haemolysis on postnatal blood film
- Positive postnatal direct anti-globulin test (DAT)



How common is “significant” jaundice?

**Jaundice is always significant**



## How common is jaundice?

- 6 in 10 babies develop jaundice
- 8 in 10 premature babies develop jaundice
- 1 in 20 babies need treatment
- <1 in 100,000 develop kernicterus (England 2013-14)



# When is it significant jaundice?

## Bilirubin thresholds for phototherapy and exchange transfusion in babies with hyperbilirubinaemia

Baby's name \_\_\_\_\_

Date of birth \_\_\_\_\_

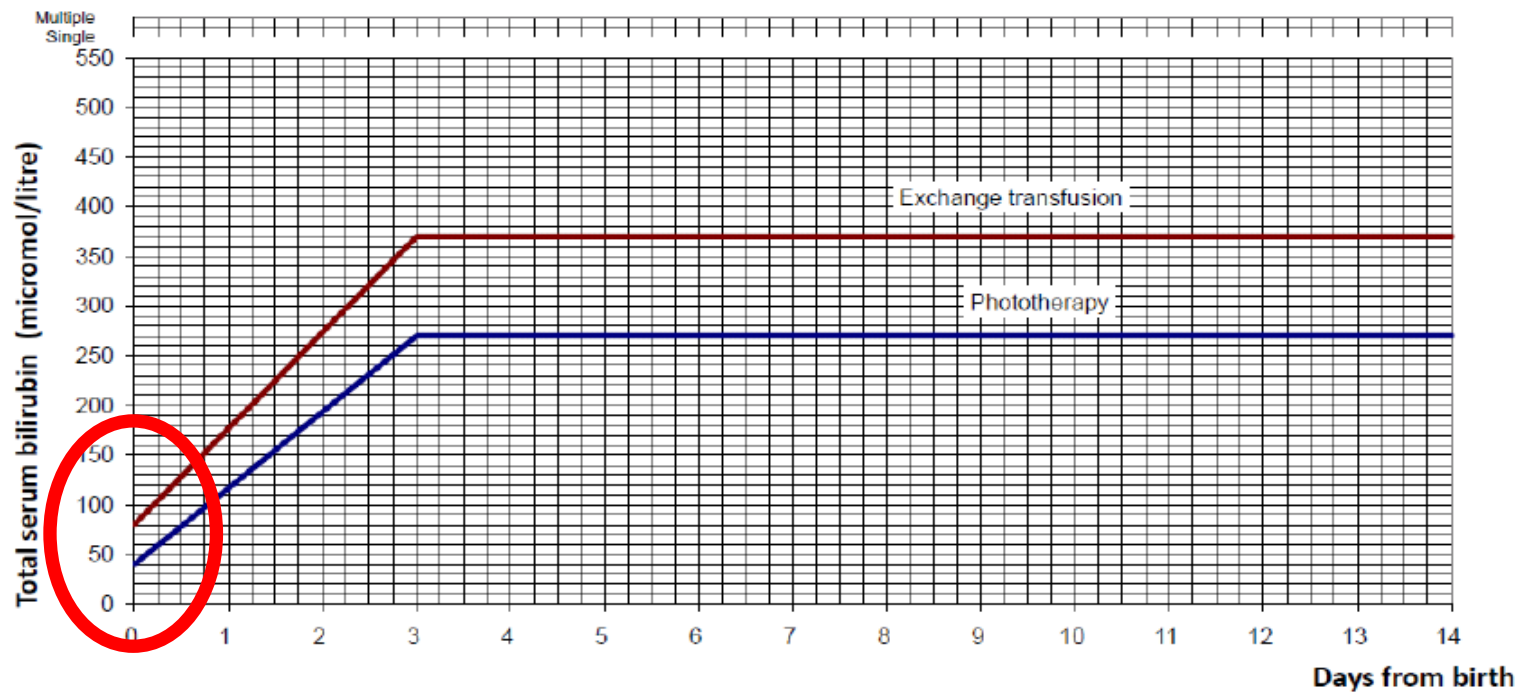
Hospital number \_\_\_\_\_

Time of birth \_\_\_\_\_

Direct Antiglobulin Test \_\_\_\_\_

**37** weeks gestation

Shade for phototherapy



Baby's blood group \_\_\_\_\_

Mother's blood group \_\_\_\_\_

# When is it significant jaundice at 38+ weeks?

## Bilirubin thresholds for phototherapy and exchange transfusion in babies with hyperbilirubinaemia

Baby's name \_\_\_\_\_

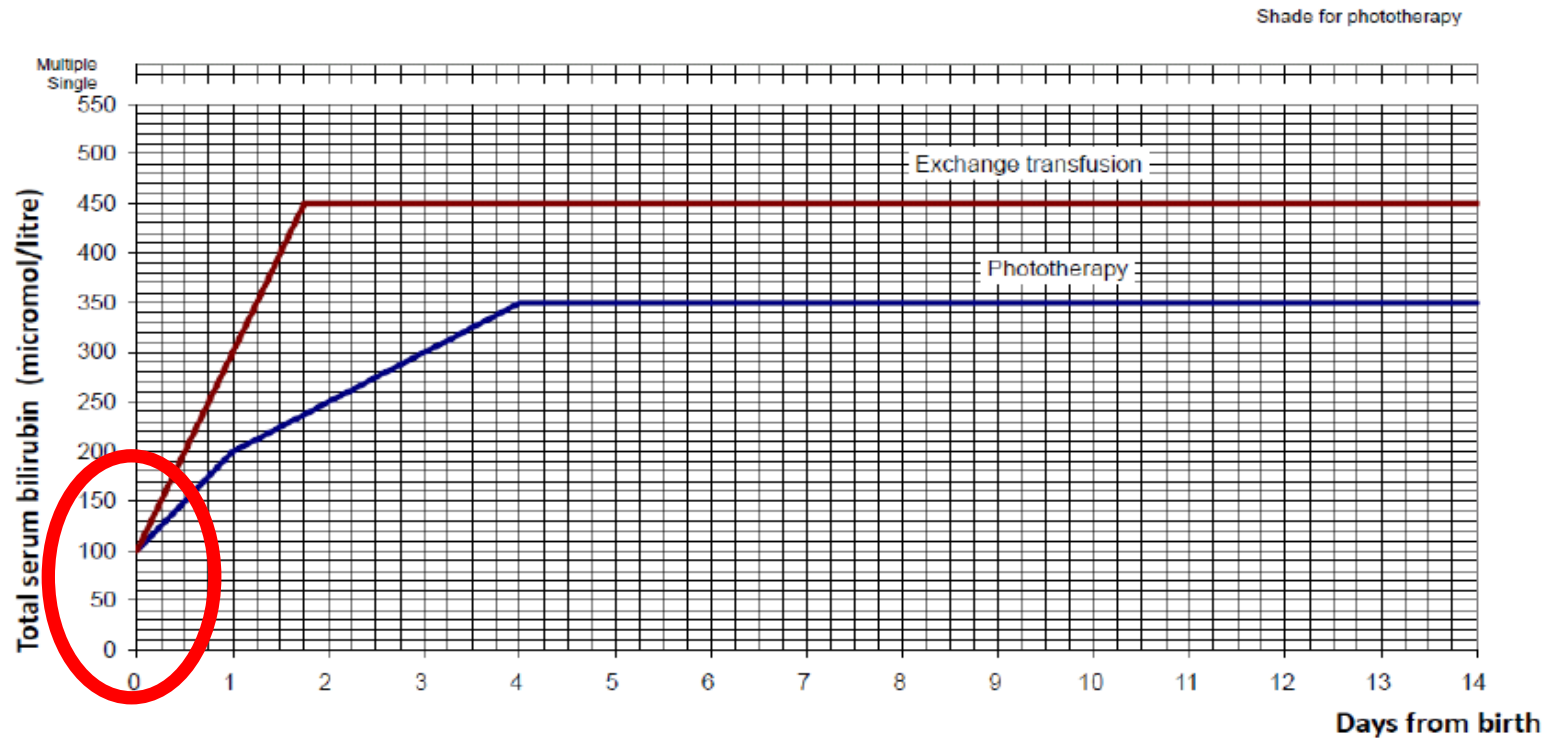
Date of birth \_\_\_\_\_

Hospital number \_\_\_\_\_

Time of birth \_\_\_\_\_

Direct Antiglobulin Test \_\_\_\_\_

**>=38** weeks gestation



Baby's blood group \_\_\_\_\_

Mother's blood group \_\_\_\_\_

When is it significant **early** jaundice?



**Bilirubin**  
**Haemoglobin**



## Consider haemolytic disease if $\geq 1$ of...

- Positive maternal antenatal antibody screening and/or anaemic/hydropic fetus
- Rapidly developing or significant hyperbilirubinaemia not predicted by maternal antenatal antibody screening
- Prolonged postnatal hyperbilirubinaemia
- Haemolysis on postnatal blood film
- Positive postnatal direct anti-globulin test (DAT)



# DAT: Please help us record the result

## Bilirubin thresholds for phototherapy and exchange transfusion in babies with hyperbilirubinaemia

Baby's name \_\_\_\_\_

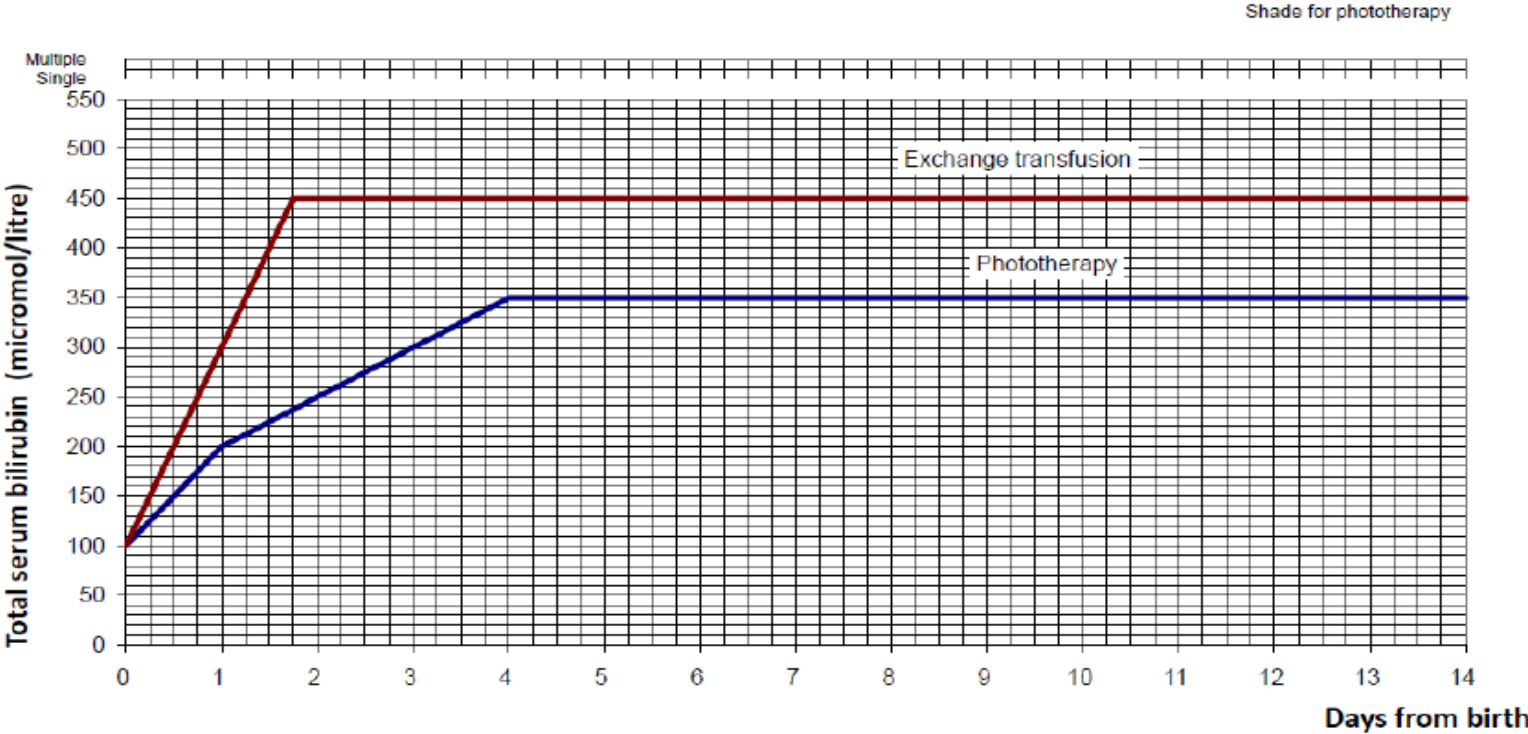
Date of birth \_\_\_\_\_

Hospital number \_\_\_\_\_

Time of birth \_\_\_\_\_

Direct Antiglobulin Test \_\_\_\_\_

**>=38 weeks gestation**

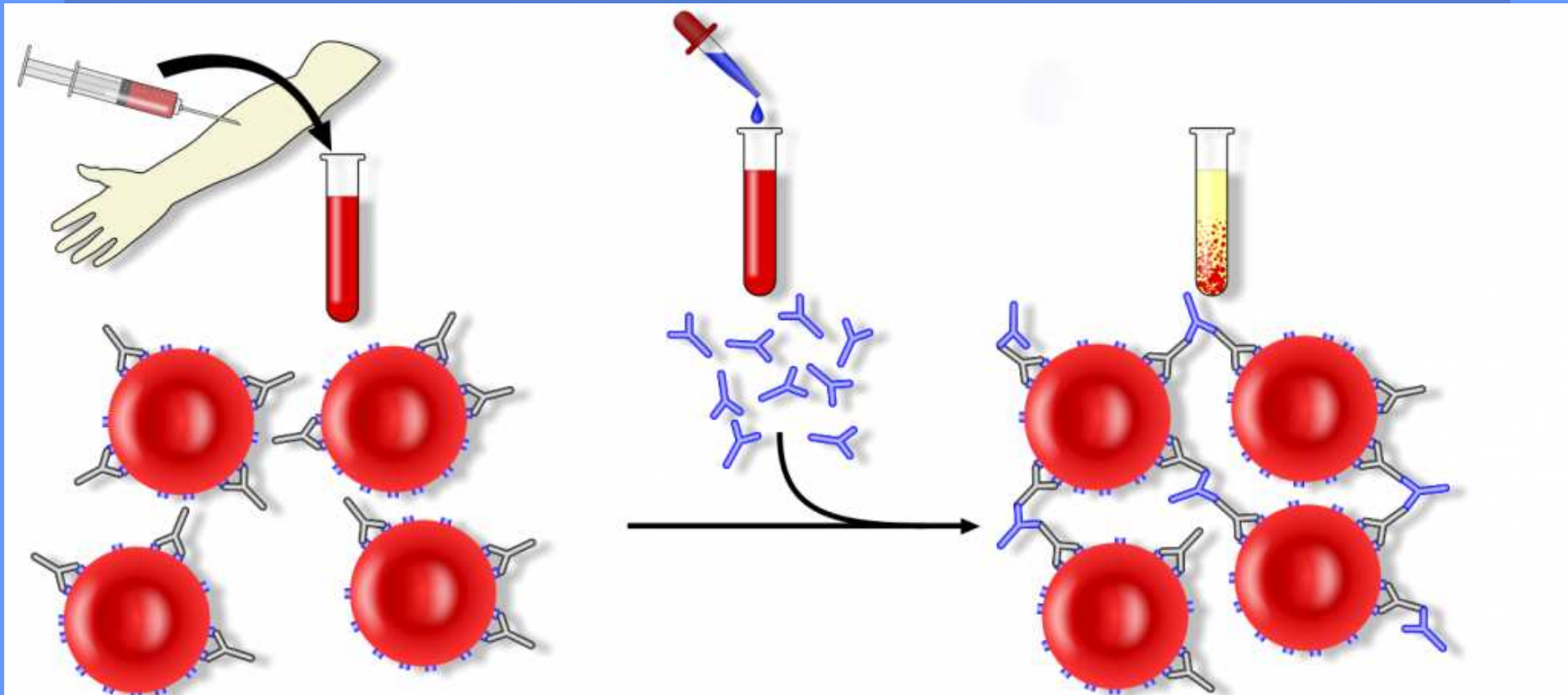


Baby's blood group \_\_\_\_\_

Mother's blood group \_\_\_\_\_



# DAT



## The “problems” with DAT

- 23% of DAT+ required phototherapy
- 100% of DAT 4+ required phototherapy
- 94% DAT+ in ABO-incompatible mother/neonate
- 15% DAT+ from prophylactic anti-D



## Consider haemolytic disease if $\geq 1$ of...

- Positive maternal antenatal antibody screening and/or anaemic/hydronic fetus
- Rapidly developing or significant hyperbilirubinaemia not predicted by maternal antenatal antibody screening
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- Haemolysis on postnatal blood film
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**Who Are These Babies?**



Don't forget about this cause for haemolysis

**SEPSIS**



## Positive maternal antibody screening

- Rh antigens: anti-D (1 in 1,200), anti-c, anti-E
- anti-Kell
- anti-Kidd (Jk)
- anti-Duffy (Fy)
- anti-MNS antigens

***Same attention – no matter ‘how positive’***

1. Maternal antibody screening +
2. DAT +
3. Jaundice
4. Anaemia



# Intrinsic causes of haemolytic disease

- ABO incompatibility
- Red blood cell membrane defect
- Red blood cell enzyme defect
- Haemoglobinopathy:  $\alpha$ -thalassaemia major



# ABO incompatibility

## Bilirubin thresholds for phototherapy and exchange transfusion in babies with hyperbilirubinaemia

Baby's name \_\_\_\_\_

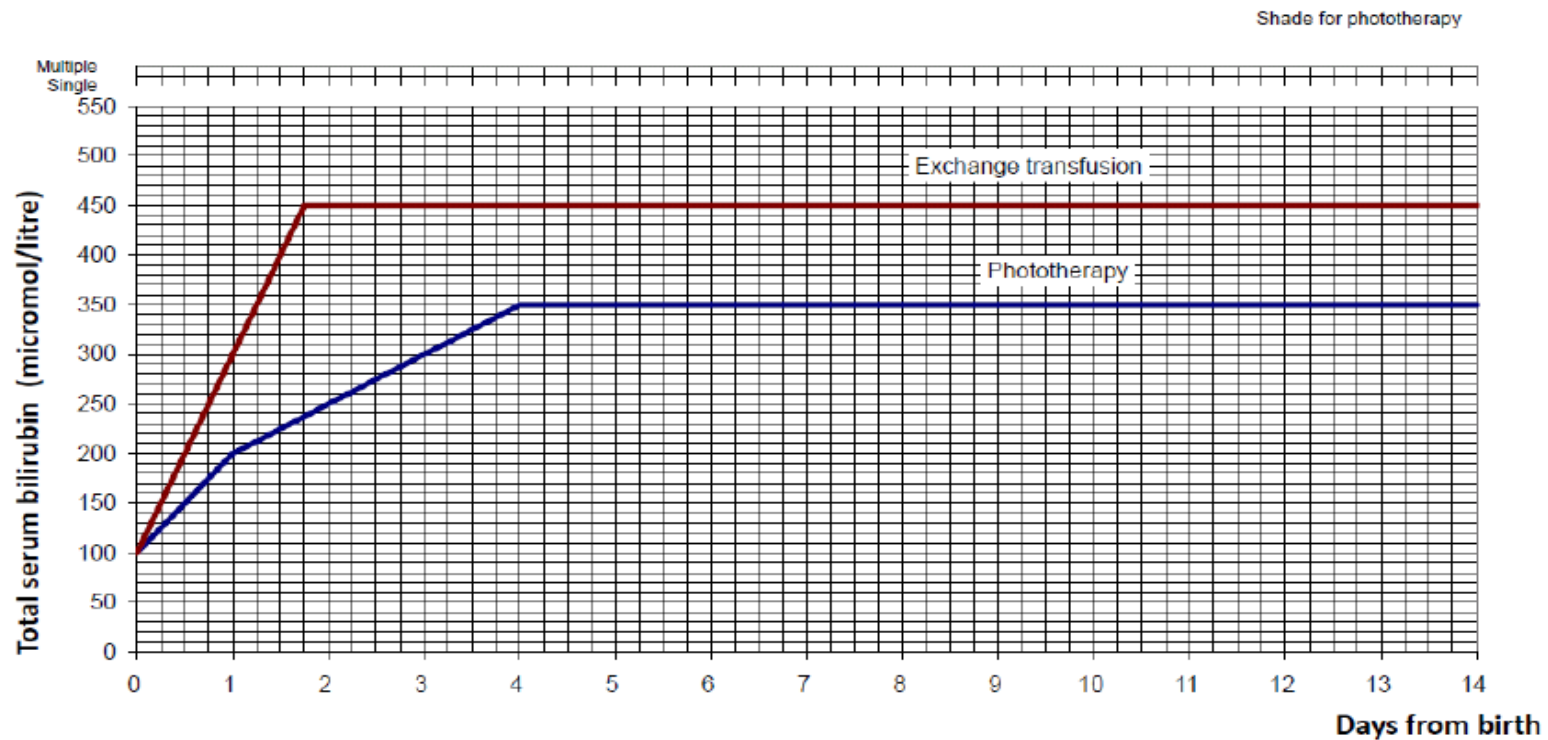
Date of birth \_\_\_\_\_

Hospital number \_\_\_\_\_

Time of birth \_\_\_\_\_

Direct Antiglobulin Test \_\_\_\_\_

**>=38** weeks gestation



Baby's blood group \_\_\_\_\_

Mother's blood group \_\_\_\_\_

# ABO incompatibility

15-25% mat/neo ABO incompatibility



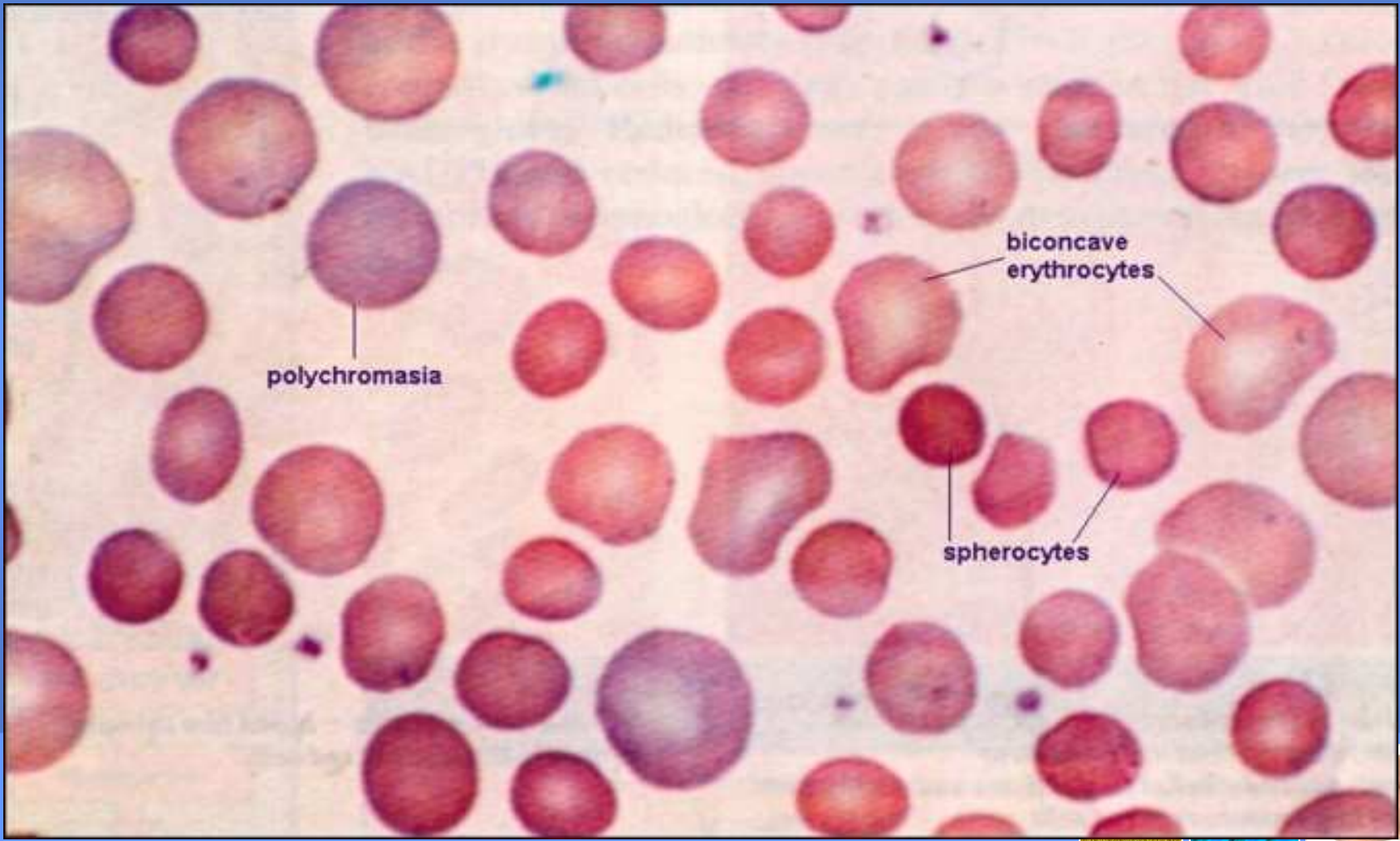


# ABO incompatibility: **DAT+** jaundice (+ anaemia)



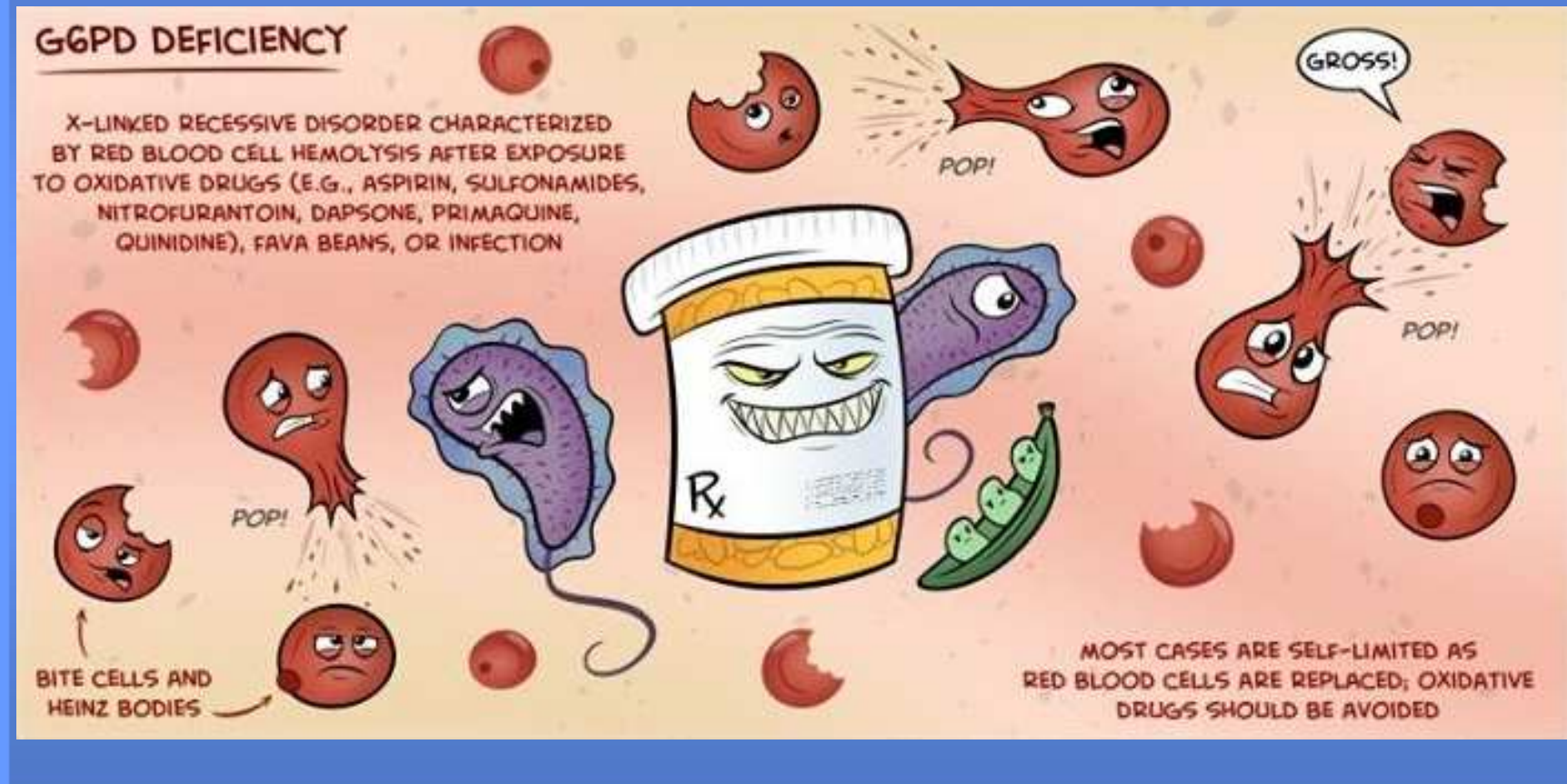
## RBC membrane defects: **DAT- jaundice** (+ anaemia)

Hereditary spherocytosis (1 in 5000 births in northern Eur.)

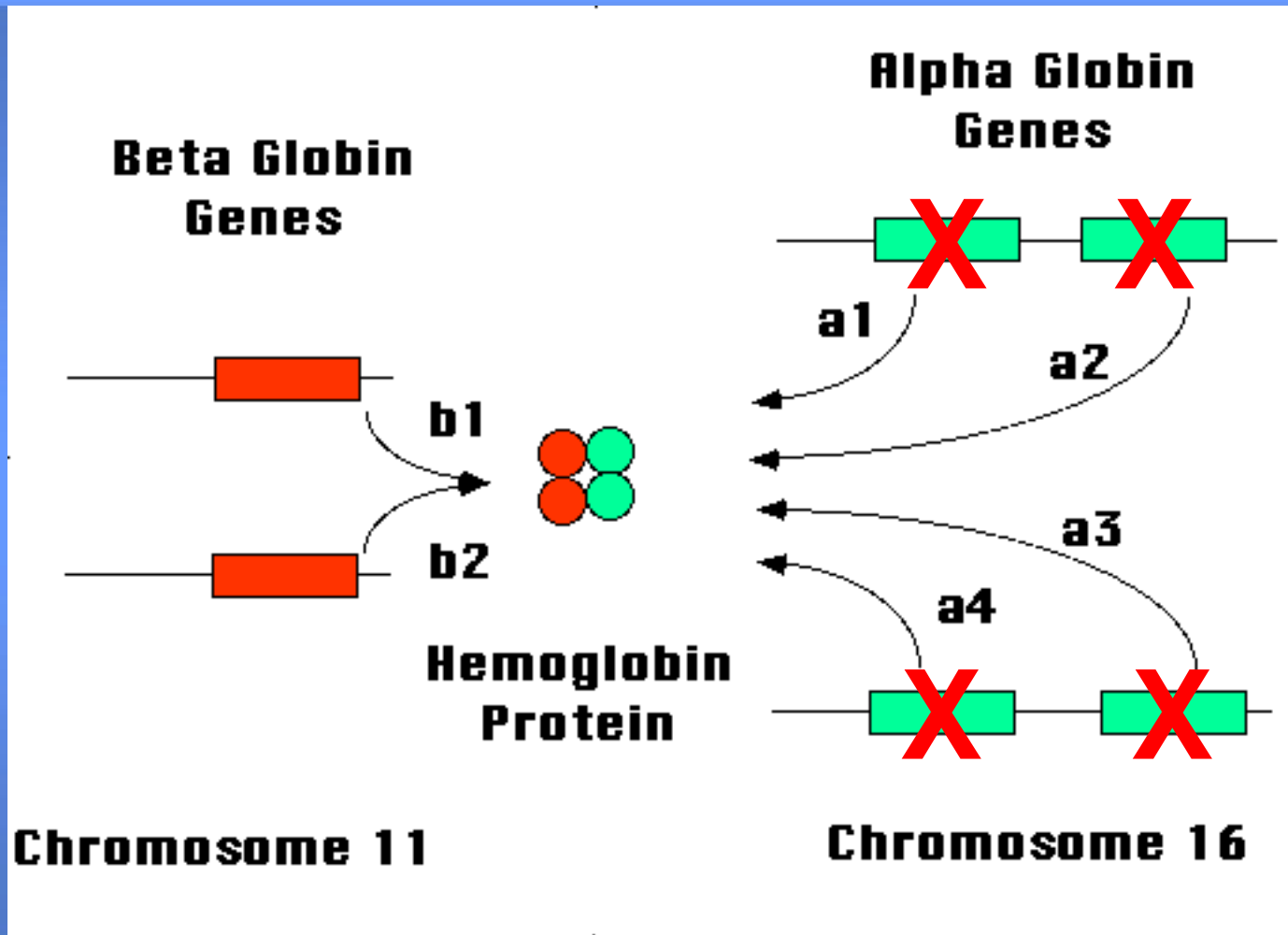


# Red blood cell enzyme defects: **Jaundice +**

X-linked G6PD deficiency (high prev. central Africa & Med.)



# $\alpha$ -thalassaemia major (pred. south east Asian families)



2<sup>nd</sup> trimester fetal anaemia & hydrops



# Postnatal management

1. Cooperation: let us know – again & again
2. A-B-C-D
3. (Cord) blood test: bilirubin, Hb, group, DAT, blood film
4. Maternal blood sample
5. Transcutaneous bilirubin
6. Appropriate hydration & nutrition
7. Screen and treat for infection
8. Early and effective phototherapy
9. Comfort incl. body temperature control
10. Folic acid 0.5 mg daily



# Effective phototherapy...



# Postnatal management

1. Cooperation: let us know – again & again
2. A-B-C-D
3. (Cord) blood test: bilirubin, Hb, group, DAT, blood film
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6. Appropriate hydration & nutrition
7. Screen and treat for infection
8. Early and effective phototherapy
9. Comfort incl. body temperature control
10. Folic acid 0.5 mg daily
11. May need NICU Ax, Iv Ig, exchange transfusion



# Follow-up

- Anaemia, part. after intra-uterine & exchange transfusions
- 1-2 weekly for 6-8 weeks
- Top-up transfusions may be needed
- Folic acid till weaning





