

Alloimmunization



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What is the process of alloimmunization?



- Every human being has an Rh classification – Rh(+) or Rh(-)
- The Rh blood group contains proteins on the surfaces of RBCs
- Being Rh negative means you DO NOT contain these surface proteins
- Being Rh positive means you DO contain these proteins

Blood Groups



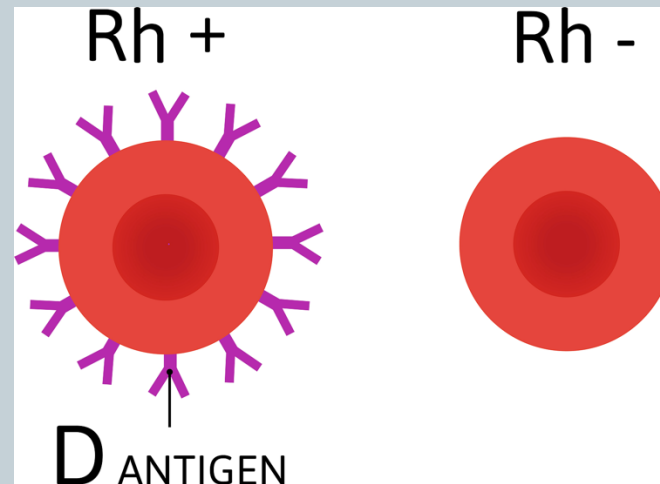
Blood groups

	ABO classification				Rh classification	
	A	B	AB	O	Rh ⁺	Rh ⁻
RBC type						
Group antigens on RBC surface	A 	B 	A & B 	NONE	Rh (D) 	NONE
Antibodies in plasma	Anti-B IgM	Anti-A IgM	NONE	Anti-A Anti-B IgM, IgG	NONE	Anti-D IgG
Clinical relevance	Receive B or AB → hemolytic reaction	Receive A or AB → hemolytic reaction	Universal recipient of RBCs; universal donor of plasma	Receive any non-O → hemolytic reaction Universal donor of RBCs; universal	Can receive either Rh ⁺ or Rh ⁻ blood	Treat mother with anti-D Ig during and after each pregnancy to prevent anti-D IgG formation

Alloimmunization



- If an Rh(-) mom receives or is exposed to blood that is Rh(+), she will make antibodies against the Rh positive antigens
- This is what happens when a mother that is Rh negative carries a baby that is Rh positive!



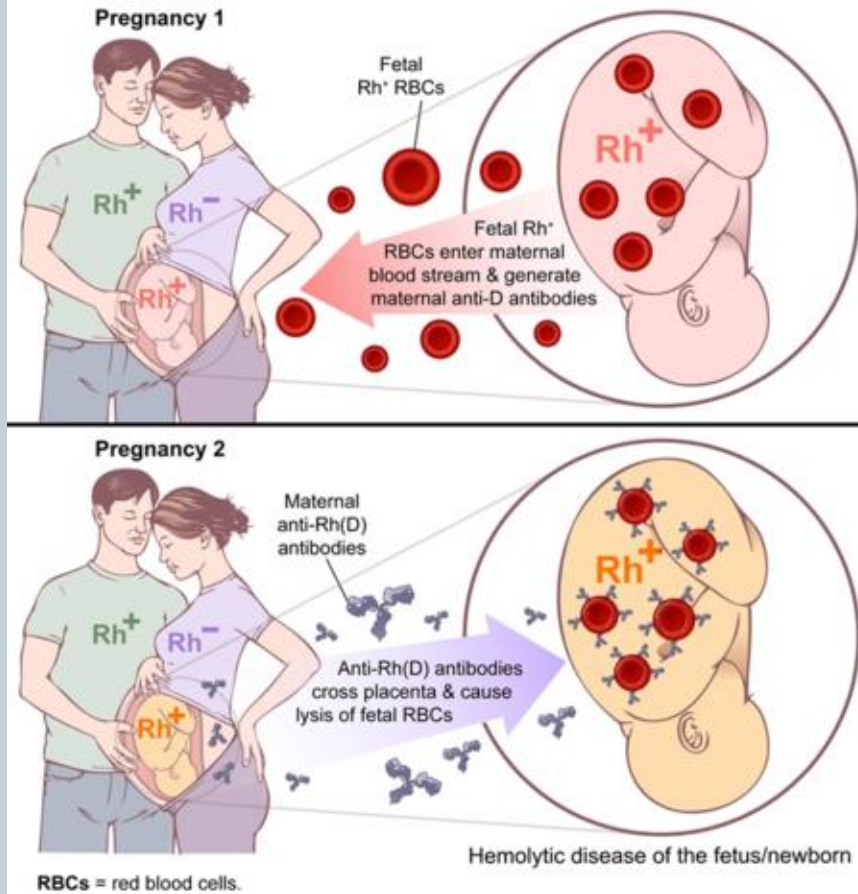
What exactly happens on first exposure?



- In the 1st pregnancy of an Rh(-) mother with an Rh(+) fetus -
 - Antibodies against the Rhesus antigen will be created as soon the mother's blood mixes with the baby's blood
 - This can happen in the next cases –
 - ✦ During delivery
 - ✦ During amniocentesis or chorionic villus sampling
 - ✦ During an abortion
 - ✦ Ectopic pregnancy
 - ✦ Mole
 - ✦ 2nd and 3rd trimester bleeding
 - ✦ External cephalic version



Rh alloimmunization



First time exposure



- This always happens on first time exposure!
- The mother makes IgM antibodies against the Rhesus antigen
- IgM antibodies do NOT cross the placenta, so at first nobody notices
- Eventually IgG antibodies are made which DO cross the placenta
- So on the next exposure (baby number 2) the IgG antibodies will cross the placenta and attack baby's RBC cells
- This may lead to fetal anemia!

Who do we screen?



- In the 1st prenatal visit we screen all mom's for their Rh blood type
- Rh(+) moms have nothing to worry about
- If mom is Rh(-) and dad is Rh(+) or unknown
- If the paternity is unknown can perform an amniotic fluid PCR to determine if baby is Rh+/-
- In order to check whether an Rh(-) mother has already alloimmunized, perform an antibody screen
– INDIRECT COOMBS TEST!

Screening for fetal anemia



- Screen with an U/S doppler of the MCA (middle cerebral artery)
- Increased flow = most likely fetal anemia
 - Think of it as “water flows faster than ketchup”
- If the MCA-PSV ≤ 1.5 MoMs for gestational age = ok, not anemia, can deliver at 38 weeks
- If the MCA-PSV > 1.5 MoMs for gestational age and < 35 weeks of gestation, check the amount of hemoglobin via the umbilical cord and perform a transfusion. Then deliver 3 weeks after the transfusion.
- If the MCA-PSV > 1.5 MoMs for gestational age and > 35 weeks of gestation – deliver without transfusion

Preventing alloimmunization



- Instead of dealing with all the complications of fetal anemia, we can prevent alloimmunization before it develops!
- Give Rhogam-D
 - This binds to the rhesus antigen and hides it from the mom's immune system
 - She never “sees” the antigen and does not make antibodies against it
- If a mother is already Rh(-), but antibody positive, it's too late to give Rhogam-D

When is Rhogam-D given?



- Only if mom is Rh(-), has not yet made antibodies against rhesus antigen, AND under these criteria:
 - At 28-32 weeks of gestation
 - <72 hours after delivery of an Rh(D) positive infant
 - <72 hours after a spontaneous abortion
 - Ectopic pregnancy
 - Threatened abortion
 - Mole
 - Chorionic villus sampling, or amniocentesis
 - Abdominal trauma
 - 2nd-3rd trimester bleeding
 - External cephalic version
- Bottom line – any time there is mixing of maternal and fetal blood!!!



75. בת 35, מגיעה לחדר לידה בלידה פעילה. לא נלקחה תרבית ל- GBS (Group B Streptococcus) במהלך ההיריון. איזה מבין הפרטים הבאים מהווה התוויה למתן טיפול אנטיביוטי מניעתי (פרופילקטי)?

- a. היולדת בשבוע 36 להריונה
- b. בלידה הקודמת היה חום במהלך הלידה
- c. ירידת מים מקוניאליים מזה כשעתיים
- d. תרביות שתן חוזרות עם צמיחה של E.coli במהלך ההיריון



81. בסקר נוגדנים בשבוע 18 להריון שני נמצאו נוגדני אנטי D בדם האם בטיטר 1:4 ובבדיקה חוזרת שבועיים אחר כך בטיטר 1:16. המטופלת לא קבלה זריקת אנטי D.
מה ההמלצה הנכונה למטופלת?

- a. הפסקת הריון
- b. מעקב אחר טיטר הנוגדנים
- c. בדיקת סיסי שליה
- d. מעקב סונוגרפי אחר סימני אנמיה עוברית