

ABO incompatibility/comments

Why is the incompatibility of ABO "worst" in transfusions?

Blood groups are many - ABO, Rh, MN, Duffy, Lewis, Kell... So why transfusion incompatibility is the most dramatic *in the ABO system*? This is because (naturally occurring) antibodies (*anti-A* and *anti-B*) occur in the blood in high titers.

Natural antibodies

- Antibodies that each individual begins to produce soon after birth (and often create a lifetime) without obviously immunizing,
- antibodies against common environmental antigens, which (perhaps surprisingly) include ABO antigens (of course, the individual does not produce antibodies against his group),
- In other systems, antibodies are produced only after specific immunization (typically with blood), which is quite rare in the population.

In case of incompatibility

Incompatible erythrocytes ABO are immediately attacked by the recipient's highly excited immune system. The result is often death in tens of minutes. The immune system, which conducts open war throughout the body (after circulating blood directly into the circulation), has enough arsenal to kill its owner - cytokines, immunocomplexes, vasoactive substances, activation complement, circulatory failure etc.

In the other groups, immunization takes place first - activation of antibody production (hours to days). The reaction of the immune system is not so stormy, so it is not lethal.

CAVE: With repeated transfusions, the recipient may be gradually immunized against other groups (other than ABO) with an increased risk of transfusion reaction.

Red Blood Cell Compatibility Chart for Potential Transfusion of ABO Family.									
Recipient (Percentage of Potential Donors)	Blood Type	Donor (percentage of Americans with particular blood types)							
		O-	O+	A-	A+	B-	B+	AB-	AB+
		6.6% All Transfusions	37.4% Red Blood Cell	6.3% Plasma Donors	35.7%	1.5%	8.5%	0.6%	3.4%
6.6% All Transfusions	O-	✓	✗	✗	✗	✗	✗	✗	✗
44% 100%	O+	✓	✓	✗	✗	✗	✗	✗	✗
42% 12.5% 44%	A-	✓	✗	✓	✗	✗	✗	✗	✗
42% 86% 46%	A+	✓	✓	✓	✓	✗	✗	✗	✗
1.5% 8.1% 10%	B-	✓	✗	✗	✗	✓	✗	✗	✗
10% 51% 4%	B+	✓	✓	✗	✗	✓	✓	✗	✗
0.6% 15% 4%	AB-	✓	✗	✓	✗	✓	✗	✓	✗
4% 100% 4%	AB+	✓	✓	✓	✓	✓	✓	✓	✓

✓ Accepts Red Blood Cells from
✗ Red Blood Cells Not Compatible

Light Yellow = Accepts Plasma Transfusion only
Bright Yellow = Accepts Full Blood Transfusion
White = No Plasma Compatibility

Blood compatibility

Links

Related Articles

- Transfusion
- Pre-transfusion examination

Recommended literature

- TROJAN, Stanislav. *Medical physiology*. 4. edition. Prague : Grada, 2003. 772 pp. Chapter 4.11. pp. 151-154. ISBN 80-247-0512-5.