



Virtual Learning

Medical Interventions

HLA Typing

May 14, 2020



Medical Interventions

Lesson: May 14, 2020

Objective/Learning Target:

Use blood typing and HLA typing results to determine to match an organ donor with a compatible recipient. (4.3.2)



Let's Get Started:

1. Organ donors and recipients must have compatible blood types or the organ transplant will fail. Review the concepts surrounding [blood typing](#) and play this Nobel Prize [game](#) to refresh your memory on the topic.
2. Complete the pedigree and answer the questions on genotypes in this [blood typing practice](#).



Lesson Activity

It's not enough to just have a blood type match. Further tests are needed to ensure the organ does not get rejected by the immune system. Watch [this video](#) to learn about HLA typing and answer the questions below.

1. What is HLA?
2. What is the role of HLA in the body?
3. Why is HLA typing more complex than blood typing?
4. What does a close HLA match allow?
5. How is HLA inherited and what is the ideal HLA match for most doctors?



Lesson Activity - **Answers**

It's not enough to just have a blood type match. Further tests are needed to ensure the organ does not get rejected by the immune system. Watch [this video](#) to learn about HLA typing and answer the questions below.

1. What is HLA?
 - a. Human Leukocyte antigens, found on most of the cells in body
2. What is the role of HLA in the body?
 - a. Determine what belongs and what doesn't belong in the body
3. Why is HLA typing more complex than blood typing?
 - a. There are many more versions of HLA that make a person unique as opposed to blood typing
4. What does a close HLA match allow?
 - a. Engraftment
5. How is HLA inherited and what is the ideal HLA match for most doctors?
 - a. Half from each parent, at least 8-10 HLA marker match



Practice

Complete the chart below to determine who would be the best match for patient A.

Blood Sample	Agglutination with Anti-A Serum (+/-)	Agglutination with Anti-B Serum (+/-)	Agglutination with Anti-Rh Serum (+/-)	Blood Type	Possible Genotype(s)	HLA-A, HLA-B, and HLA-DR Antigens
Patient A	+	-	+			HLA-A2, HLA-A10, HLA-B7, HLA-B16, HLA-DR11, HLA-DR8
Donor 1	+	-	+			HLA-A 1, HLA-A 10, HLA-B 3, HLA-B 16, HLA-DR 8, HLA-DR 35
Donor 2	-	+	+			HLA-A 1, HLA-A 6, HLA-B 3, HLA-B 9, HLA-DR 35, HLA-DR 4
Donor 3	+	-	+			HLA-A 10, HLA-A 2, HLA-B 7, HLA-B 16, HLA-DR 8, HLA-DR 11
Donor 4	-	-	+			HLA-A 6, HLA-A 2, HLA-B 7, HLA-B 9, HLA-DR 11, HLA-DR 4
Donor 5	-	+	+			HLA-A 2, HLA-A 40, HLA-B 7, HLA-B 6, HLA-DR 11, HLA-DR 5
Donor 6	+	+	+			HLA-A 1, HLA-A 10, HLA-B 8, HLA-B 16, HLA-DR 20, HLA-DR 8
Donor 7	-	-	+			HLA-A 1, HLA-A 2, HLA-B 8, HLA-B 7, HLA-DR 11, HLA-DR 20



Practice - Answer

Donor 3 would be the best match with both compatible bloody types and HLA typing.

Blood Sample	Agglutination with Anti-A Serum (+/-)	Agglutination with Anti-B Serum (+/-)	Agglutination with Anti-Rh Serum (+/-)	Blood Type	Possible Genotype(s)	HLA-A, HLA-B, and HLA-DR Antigens
Patient A	+	-	+	A+	IAIA or IAi	HLA-A2, HLA-A10, HLA-B7, HLA-B16, HLA-DR11, HLA-DR8
Donor 1	+	-	+	A+	IAIA or IAi	HLA-A 1, HLA-A 10, HLA-B 3, HLA-B 16, HLA-DR 8, HLA-DR 35
Donor 2	-	+	+	B+	IBIB or IBi	HLA-A 1, HLA-A 6, HLA-B 3, HLA-B 9, HLA-DR 35, HLA-DR 4
Donor 3*	+	-	+	A+	IAIA or IAi	HLA-A 10, HLA-A 2, HLA-B 7, HLA-B 16, HLA-DR 8, HLA-DR 11
Donor 4	-	-	+	O+	ii	HLA-A 6, HLA-A 2, HLA-B 7, HLA-B 9, HLA-DR 11, HLA-DR 4
Donor 5	-	+	+	B+	IBIB or IBi	HLA-A 2, HLA-A 40, HLA-B 7, HLA-B 6, HLA-DR 11, HLA-DR 5
Donor 6	+	+	+	AB+	IAIB	HLA-A 1, HLA-A 10, HLA-B 8, HLA-B 16, HLA-DR 20, HLA-DR 8
Donor 7	-	-	+	O+	ii	HLA-A 1, HLA-A 2, HLA-B 8, HLA-B 7, HLA-DR 11, HLA-DR 20



Additional Practice/Resources

1. After the blood testing and HLA typing is complete, further testing is needed to ensure there is histocompatibility- learn about the PRA and crossmatch tests [here](#).
2. Explain to a family member the process of finding an organ donation including the testing that ensures a successful procedure.
3. Check your understanding by reviewing with these [flashcards](#).
4. Read about a new technique that may be able to detect rejections using a [smartphone, CRISPR, and your own pee](#).