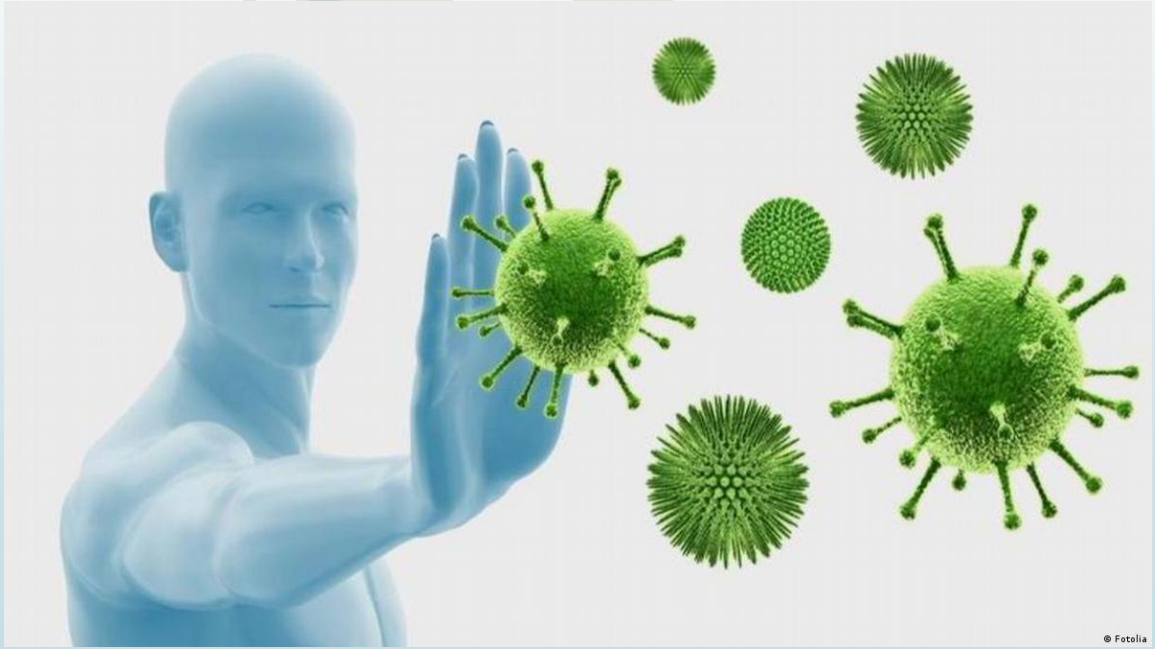
Part II
Immunology



Chapter 6

Role and Components of the Immune System

- Document 1: HLA: A Major "Self" Marker
- Document 3: The "Non-Self"
- Document 4: Cells of the Immune System
- Document 5: Lymphoid Organs
- Document 6: Antigen Recognition by B-lymphocytes
- Document 7: Antigen Recognition by T-lymphocytes
- Solution of Exercises

Document 1

HLA: A Major "Self" Marker

I. **HLA: Human Leukocytes Antigens**

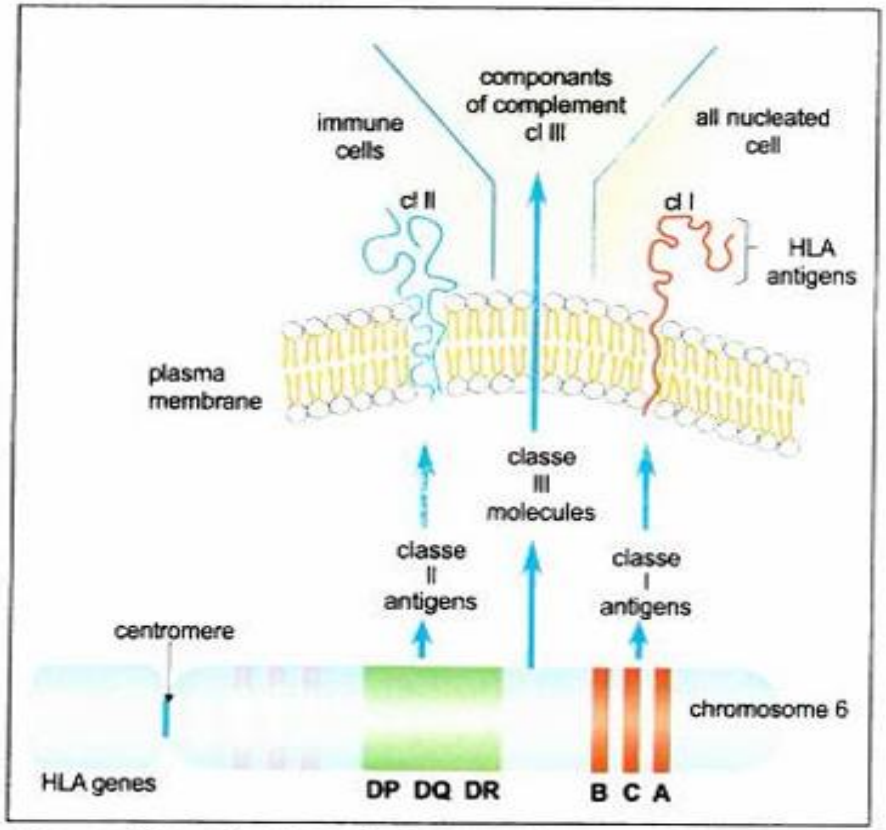
- They are group of proteins expressed on the membrane of all nucleated cells of the body.
- They are called “Self markers” and form the biological identity card of each individual.
- HLA markers are the same on all the cells of the same body, but they differ from one individual to another, except for identical twins they are the same.

- HLA are coded by 6 genes: DP, DQ, DR, A, B and C. Doc. c

- **There are two classes of HLA:**

1- HLA class I: coded by 3 genes A, B and C, and they are expressed by all the nucleated cells of the body.

2- HLA class II: coded by 3 genes DP DQ and DR, and they are expressed by some cells of the immune system.



Doc.c Organization of MHC in Man.

- Each of the 6 genes coding for HLA molecules has large number of alleles, then HLA molecules are highly polymorphic. Doc.d

DP 72 alleles	DQ 49 alleles	DR 199 alleles		B 188 alleles		C 63 alleles	A 82 alleles
DPw1	DQw1	DR1	Dw1	Bw4	Bw47	Cw1	A1
DPw2	DQw2	DR2	Dw2	B5	Bw48	Cw2	A2
DPw3	DQw3	DR3	Dw3	Bw6	B49	Cw3	A3
DPw4	DQw4	DR4	Dw4	B7	Bw50	Cw4	A9
DPw5	DQw5	DR5	Dw5	B8	B51	Cw5	A10
DPw6	DQw6	DRw6	Dw6	B12	Bw52	Cw6	A11
.	DQw7	DR7	Dw7	B13	Bw53	Cw7	Aw19
.	DQw8	DRw8	Dw8	B14	Bw54	Cw8	A23
.	DQw9	DRw9	Dw9	B15	Bw55	Cw9	A24
.	.	DRw10	Dw10	B16	Bw56	Cw10	A25
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w= workshop

Doc.d *Examples of allelic polymorphism of MHC in Man.*

- Each individual has two alleles of each gene, one of paternal origin and one of maternal origin.
  ⇨**Presence of 12 alleles for the expression of MHC molecules.**
- Expression of MHC alleles is codominant.
  ⇨ **Each individual expresses on the cell membrane the proteins corresponding to both alleles of each gene. Doc.e, p.115.**

Doc.e *Gene combinations and their expression in MHC molecules.*

II. Experimental Study of Body Responses Against Cells deriving from Different Origins.

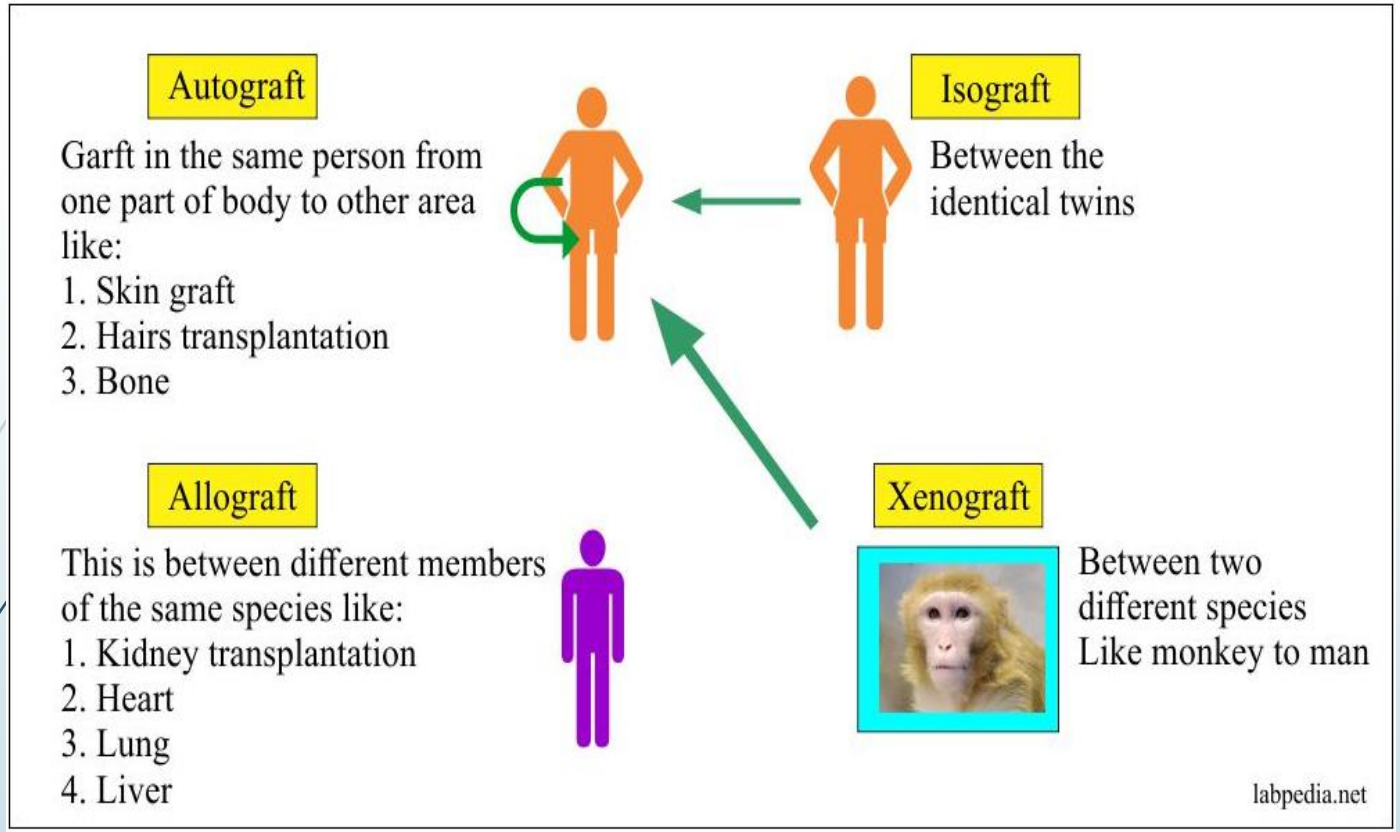
- **Graft:** is the transplantation of tissue or organ within the same body or from one individual to another.

➢ **Types of graft:**

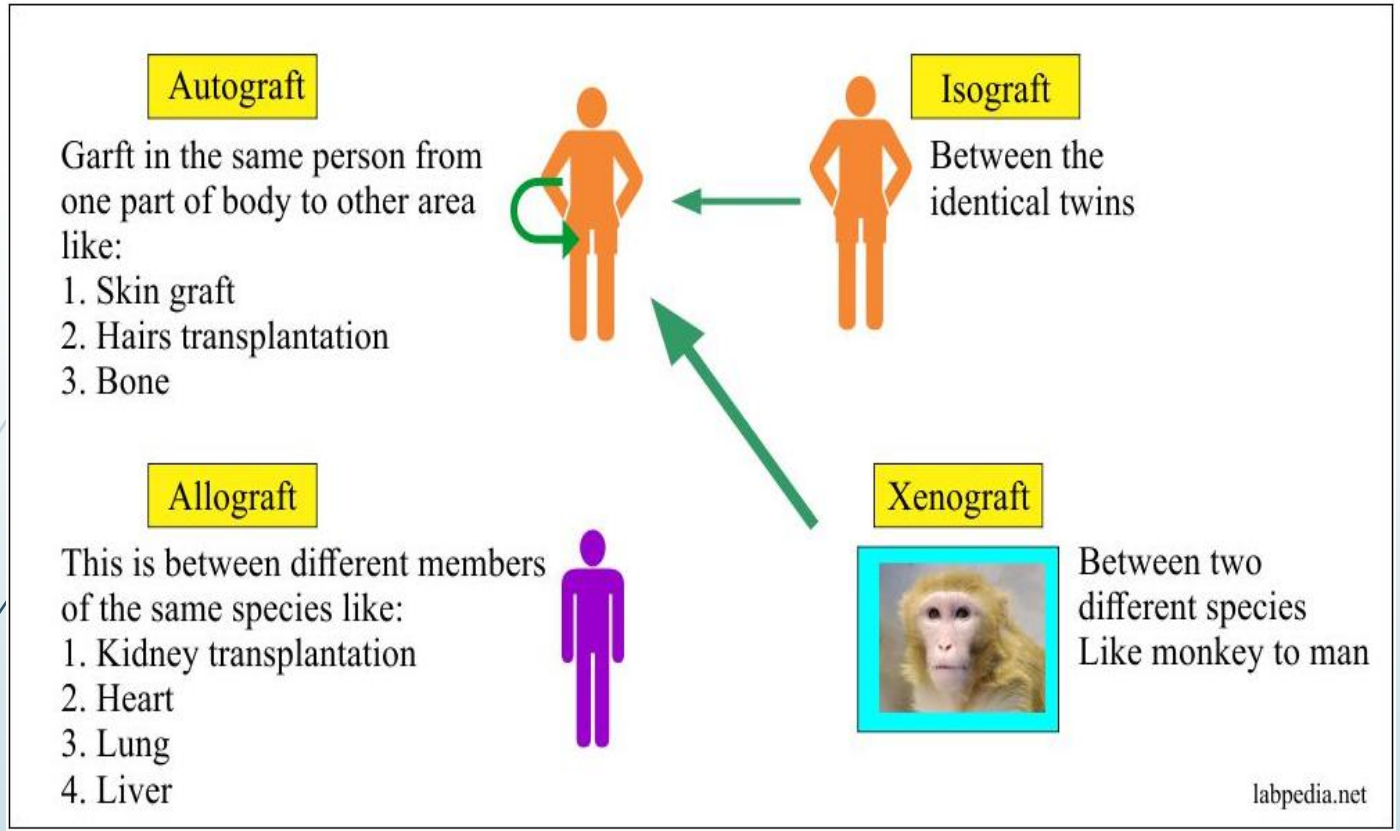
1- Auto graft.

2- Allograft.

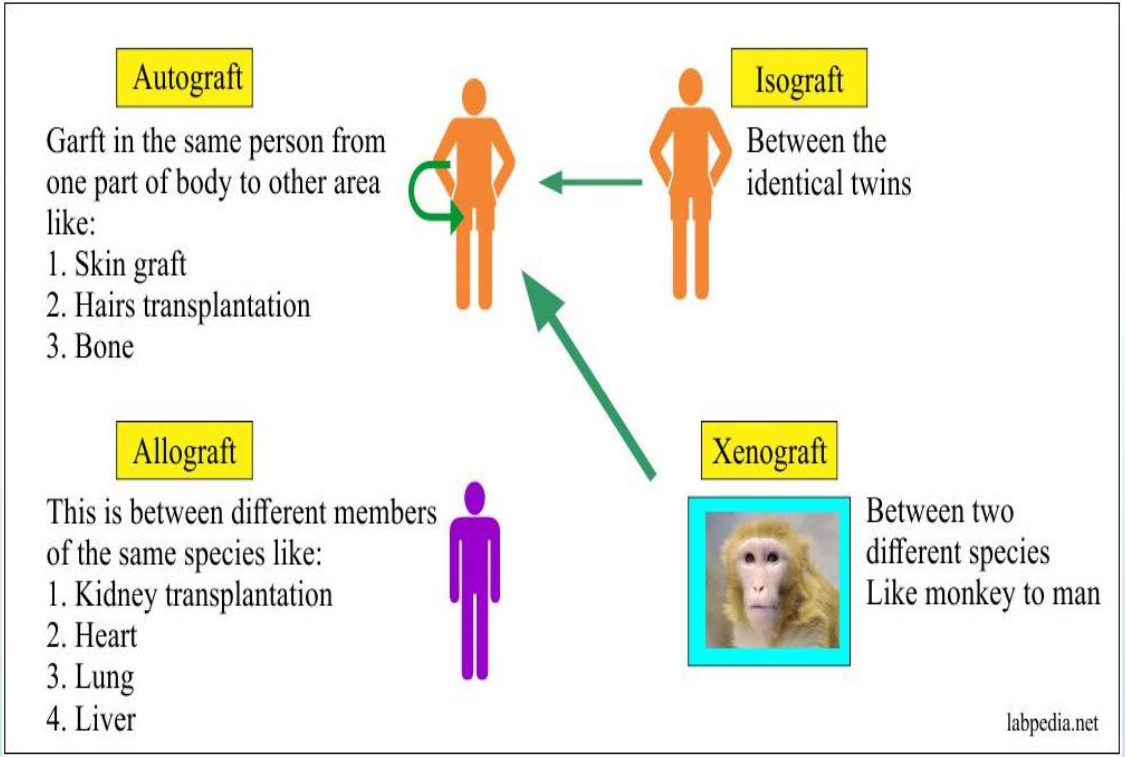
3- Isograft.



1- Auto graft: is a graft done within the same body. The immune system recognizes the graft as self (same HLA), so it is accepted.



2- Isograft: is a graft done between identical twins. The immune system recognizes the graft as self (same HLA), so it is accepted.



3- Allograft: is a graft done between two genetically different individuals. The immune system recognizes the graft as non-self (different HLA), so it may be accepted or rejected depending on the similarity of HLA between the donor and the recipient.

-Application 1:

Document a p.114 shows different types of skin graft in mouse and the aspect of this graft at different time intervals.

-Referring to Doc.a, p.114:

1- Formulate the tested hypothesis.

Hypothesis: Success of graft depends on the similarity of MHC between the donor and the recipient.

types of the graft	aspects of the graft		
	2 days later	one week later	15 days later
Autograft 	vascularization appears around the graft (pinkish aspect)	graft is integrated into neighboring cells	graft is accepted
Isograft 	vascularization appears around the graft (pinkish aspect)	graft is integrated into neighboring cells	graft is accepted
Allograft 	vascularization appears around the graft (pinkish aspect)	redness and edemas appear around the graft	graft turns black, dry and is rejected

***Doc.**a Evolution of different types of skin graft in mouse.*

Be Smart ACADEMY

2- Referring to the results obtained, specify if your hypothesis was validated.

Yes, since the graft in case of auto graft and isograft (where the MHC is similar), was accepted 15 days later. While in case of allograft (where the MHC is different), the graft turns black, dry and was rejected 15 days later.

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Doc.a *Evolution of different types of skin graft in mouse.*