Part II

Immunology

24-3-2015

page 112

* It's the science that study immunity and to protect our body from infection agents and its cellular contents are white blood cell.

Document 1

(page: 114)

Problems:

. What are the main markers of the "self"?

. What is their role.

aspect = manifestation ⇒ Ms.

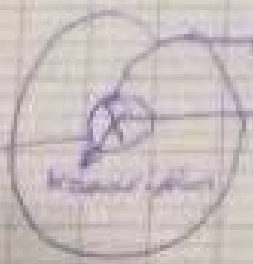
* As the incompatibility ↗ the % of survival ↘

doc b) Role of HLA. responsible for accepting or rejecting a transplant

H L A

Human Leucocytes Antigens.

(WBC nucleated)



and this part of HLA has 6 genes with ∞ # alleles and they will produce protein.

doc C)

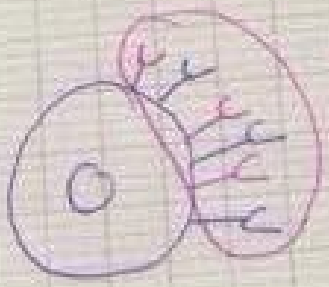
class II : Immune cells are not found on all body nucleated cells

class I : are found on all body nucleated cells

→ Immune cells

+Le immune cell is related class I + II

→ Body cells



we put in them P peptides (self protein)

- Imm. self : Is the association between the self peptide and HLA (doc F) P: III
- HLA is classified in 2 classes I & II class I ABC class II DP DQ DR.
- HLA alleles are expressed in codominance
- Transplant is in 3 types Allo Auto Xeno..

Document 2

24-3-2016

Blood Groups + Another Self Markers

* HLA and Blood groups are self markers because they are nucleated

* only to give blood RBC are taken and plasma
* Blood cells has 2 antigens A & B & they are expressed on the membrane of Red Blood cells.
* Serum = plasma

Agglutination

Agglutinins are the antibodies for (anti_a & anti b)
blood ~~body~~ antigens

Agglutinogens are the bd antigens (Antigen A + Antigen B) on the surface of of red blood cells

△ Antigen A
○ " B

agglutination

Red blood cell in bd type AB

anti a = ♡
anti b = ♡

Aggutilation

Blood type A ⇒ anti B
Blood type B ⇒ anti A

Conclusion: Blood type A → Antigens A, Anti-b

Blood type B → Antigen B, Anti-a.

Blood type AB → Antigen A+B, no Antibodies

Blood type O → No antigens
universal donor: agglutinins: anti-a + anti b

Blood transfusion: The agglutinogens of the donor must not react with the agglutinins of the recepient

Self Markers
Major → HLA
Minor → Rhesus, ABO system
ABO system → Agglutinogen B, Ag A

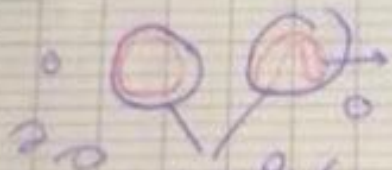
n°6 page 318 probing

a) When a serum of a rabbit was added to RBC's of, macaque monkey, Rh^+ human, and Rh^- human the result was no agglutination However when the rabbit was previously injected with red blood cells of macaque monkey and serum was isolated from it to be added over RBC's of macaque, human +ve and human -ve, the result was agglutination in both macaque and human +ve only This means that the serum of the rabbit contains anti Rh antibodies after the 1st contact with RBC's of Rh^+

very imp

b) The ABO system has antigens and antibodies at birth, while the Rh system has antigens at birth, but antibodies are induced and provoked after the 1st contact

Document 4



R.B.C are Anucleated disc shaped

a. b) Stem cells are the cells that are able to undergoe mitosis

Pluripotent: has the ability to give other stem cells.

RH protein is on the surface of RBCs

Myeloid cells

① Granulocytes
- granulated cells cytoplasm
- lobed nucleus (Multinuclear cells)

② Monocytes
- horse shoe nucleus. (A)
- monocytes are macrophages in tissues (in blood)

③ Mast cells
- rounded nucleus
- Granulated cytoplasm (filled with histamine granules)

 receptors for certain antibodies

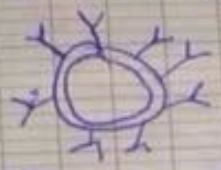
* types of granulocytes:
* Eosinophils
phagocytosis for antigens antibodies complex

* Neutrophils
phagocytosis and distruction of bacteries.


3 nucleus and granulated.

* Basophils: amplification of allergic reactions.

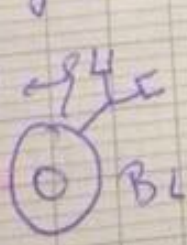
Lymphoid cells

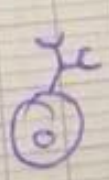
B lymphocytes:
- undergo their maturation in Bone marrow
- 
- Their receptors have antibodies
- helper activate B lymphocytes to become plasma cells or plasmocytes (it's without receptors)

T lymphocytes:
- In the thymus
- 
- Their receptors are TCR
- Are a helper T_4 or killer T_8 lymphocytes
- help other immune cell
- kill infected cells

Document 5

Organs of the immune
- Primary
  - Bone marrow
    - Maturation of BLs
    - Production of Ls
  - Thymus
    - Maturation of TLs
- Secondary

receptor





it has specific receptor on its surface

self Ag: ○ □

The one that will bind to self will

Maturation of BLs

selection

BL that recognize the self Ag undergo diminated

BLs that don't recognize self Ag undergo maturation

↓ HLA
Non self peptide

Maturation of TLs

those that recognize the self HLA preserved

those that doesn't recognized (elemination)

self HLA that immunological self ⇒ diminator

Preserved

① TLs that recognize the (self peptide)

② TL that recognize the non self peptide Modified self preserved

Maturation of TLs

those that recognize the self HLA

those that doesn't recognize the self HLA. diminated

↓ Preserved

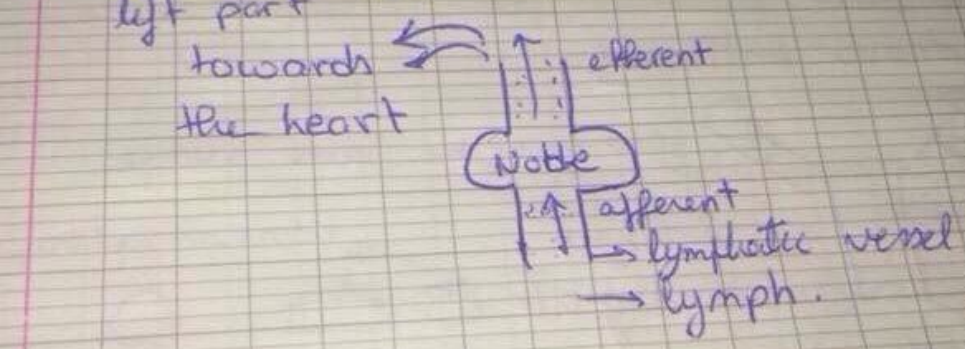
double recognition

TL that recognize the self peptide Immunological self (elemination)

TL that recognize the 2nd non self peptide Modified self (Maturation)

The site (lymph nodes) response against antigens carried by lymph

spleen is the site of response against antigens carried by blood



Lymph

WBCs Plasma

* permanent surveillance :

Document 6

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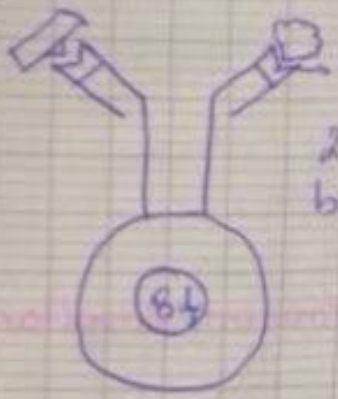
Antigen Recognition By B Lymphocytes

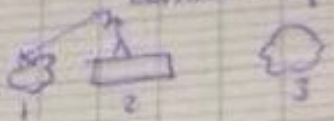
- to draw antibody



stem must be same shape

common epitop (Ag determinator)

2 antigen binding site



1st BLs

1 or 2 are suitable

4 p.p.c

2nd BLs

the nucleus of BLs is big rounded nucleus.

Fc fragment fixation for certain receptors

Fab: fragment antigen binding

TLs → one antigen binding site

2 p.p.c.

* constant region presents slight variation in BLs.
* Classes : IgM , IgD , IgG , IgA , IgE
* antigen binding site on antibody.
* Identification coord of antibody is epitoped.
* In doc 8 page 126 we have 2 + antigens with same epitope which is called cross react.

Document 7

Antigen Recognition By T lymphocytes

	Anti bodies	TCR
structure	- Y shaped	- Rod shaped molecule
//	- 4 polypeptidic chain	- 2 polypeptidic chain
no of binding site	- 2 antigen binding site	- one Ag binding site
//	- Have a const and a variable region	- Have a const and a variable region
location	- Found on the surface of BLs and/or circulating	- found on the surface of TLs
	Recognize non self Ag	Double recognition recognize self HLA + non self peptide

Notes:
Tc recognize the infected body cells by virus
T_H has recognized class II HLA (macrophages produces it)
Macrophages are going to suck the bacteria

* Classes of TLs Tc & TH
* Immunoglobulins come from a slight variation in cost region.
* recognition of non self.
* the infected tissue produce lymph to be collected by blood in the left part of heart.

Chapter 7 The Immune Response

2 types of immune responses:
① Immidiate response which is triggered within a few hours after invasion (non specific)
② Delayed response which needs several days develop against given invader (specific)

Document 1

p:138 * skin rich in sebacious glands that produce fatty acids which have anti-microbial properties

* Sweat is secretion ⇒ chemical.

Reactions
- signals by cytokines revealed by cell.
- enlargement of blood vessels
- local blood vessels will increase in diameter
- increase blood flow
- cells of nbs will separate and there will be spaces.

phagocytosis: inflamatory rxn → mechanism in blood
the 2nd mechanism phagocytosis.

Mechanism of non specific in inflamatory & phagocytosis

Steps of phagocytosis:

page 139 **Adhesion:** 1st step where a phagocyte adhere or approach a bacterium.

Absorption: 2nd step where the engulfment will go deeper and deeper to infest totally the bacteria, during which lysosomes appear to approach the engulf bacterium.

Digestion: 3rd step where the lysosomes secreate their enzymes (lysozymes) or enzyme to digest the phagosome

Hypothesis on doc c p:139 case 1 & 2
Enzymes are not inactivated or don't affect this type.
Bacteria will resist this type of infection.
or enzyme is infected for such bacterium.

Intruder

Natural Barriers
- Chemical: fails to eliminate with the intruder so it enters non specific
- Mechanical

Non Specific
- Inflamation
- Phagocytosis: 1st case elimination, 3rd & 2nd case fail

Specific

?

Document 2

The specific Immune Response

(p: 140)

* Adaptive : conditional (acquired reflex or mechanism that will arise through to a certain condition)

* Conclusion of doc A: This conclude that the immune response is specific

Doc "a" shows that any particular specific immune response is protective agins the only agent induced it

(doc b) Humoral its related to serum Cells are the protective agents.

Document 3

April 7th, 2016

Induction of the Specific Immune Response

* Macrophages are indespensible of activating a lymphocyte.

* Non specific
↓ followed by.
Induction
by macrophages
↓
Specific immune response
↓ clonal proliferation → Maturation.
specific immune cell Th lys.

* Th will multiply to increase in no, differentiate into interleukin cells.

* APC: antigen presenting cell

*

specific immune cell (Th L)
↙ Action phase ↘
Memory cell Inter L secreating cells.

Natural barriers :- First line of defense formed of its of 2 Types
chemical and mechanical barriers

* IL secreating cells
  - IL-2 → proliferation → Tc lym → Memory cells / Activated Tc
  - IL-4 → proliferation → BLs → Memory cell / plasma cells → Humoral s.p.

cell mediated response

Tc are which is specific to non self peptide and HCA I

* Macrophage induces the specific immune response how do they induce by after digesting the intruder and presenting its peptide on HCA class I its going to migrate to the nearest lymph node to become antigen presenting cell. its going to undergo double recognition on TCR

Epithelium

Monocyte in blood → Macrophage (Tissue directed) → migration → APC in lymph node

ability of making diapedesis

- pseudo podia
- amoeboid movement
- its going to squeeze itself
- false feet retraction

Memory cell / IL secreting cells

Differentiation

double recognition by a T_HL_s

Clonal proliferation

$T_H T_H$ / $T_H T_H$ a set

and T_H will bind to a specific TCR

class I HCA Tc
class II HCA T_H

From TH Ls that are absent in nude mice as they lack their thymus.

	Granulocytes	Monocytes	Mast cells	BLs	TLs
Origin	Myeloid	Myeloid	Myeloid	Lymphoid	Lymphoid
Mophology	• Granulated cyt. • Multilobed nucleus	Horse shoe shaped nucleus Macrophages with rounded nucleus in tissues	Rounded nucleus . cytoplasm filled with histamine	Big rounded nucleus . reduced cytoplasm	Big round n Reduced cytp
Receptors	No receptors	No receptors	Receptors for certain Abs	Antibody receptor	TCR
Role	Phagocytosis amplification of allergic rxn.	Phagocytosis	Released histamine	produce and release of Abs once activated to become Plasmocyte	THLs help other immune cells TC kill infected cells

Document 5

Specific humoral Immune Response

produced and released into the body's fluid

Mechanisms:

occurs in extracellular

1- Neutralization by specific antibodies

2- Elemination of intruders
   a- opsonization
   b- complement activate

Probing The Activity page 147

1) The serum contains anti-snake antibodies that are going to directly neutralize the antigens of the toxin, thus preventing their function

Endocytosis ⇒ target cell bg molecule under consideration

Note: This individual was submitted to serotherapy which contains ready made antibodies for

* Macrophage attack without recognizing and its not specific because it doesn't have receptors

immediate treatment, it doesn't leave a memory (it didn't activate our immune response).

2) No, because intracytoplasmic bacteria has entered the cytoplasm escaping the fixation to specific antibodies. Antibodies are those that prevent the bacterial attachment to their targets

3) The reverse is also true, because after the formation of immune complex opsonization occurs by antibodies and macrophages through the constant regions of antibodies, then macrophages will undergo phagocytosis (doc c)

(Doc d) After the formation of membrane attack complex by the the complements (non-specific) and bursting of the cell C_5 fragment will attract phagocytes to the inflamation site and C_3 will attract eosinophils to the inflamation site. so, since phagocytosis and inflamation are mechanisms of non specific immune response then the reverse is true

Tc is effector for cell mediated

TH helps Lys to be activated once induced by macrophages.

Document 6

p: 148

Specific cell mediated Immune Response

* Mechanism of doc a : Mechanism of cytotoxicity of Tc Lys of apoptosis
  ↳ programed cell death

Document 7

Immunological Memory

* it can be produced after first attack and activates by the 2nd attack (bi yeje l marad)
* Memory cells will remain because they will not lose their receptors
* zero antibodies ⇒ that tetanus toxin didn't activate its immune response, thus the toxin is violent

→ Analysis of doc a p 150 & Interpret

A rabbit was injected by tetanus toxin, it died this means that the toxin is violent (fatal) antigen Moreover Abs were zero ⇒ the toxin didn't activate any immune response.