Immune System :-

Physical barriers - skin, cilia

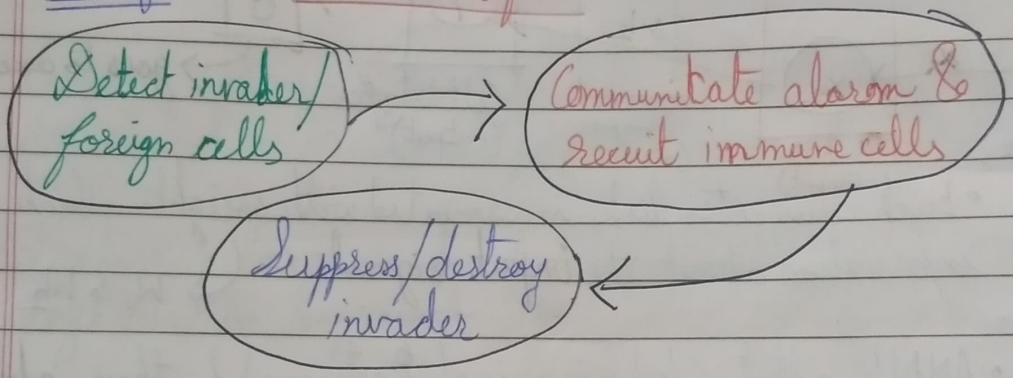
Chemicals - acids, lysozymes

Immune defences

Innate | Acquired

Innate → non specific, immediate response
Acquired → attack a specific pathogen (antigen)

Steps in Immune defence :-

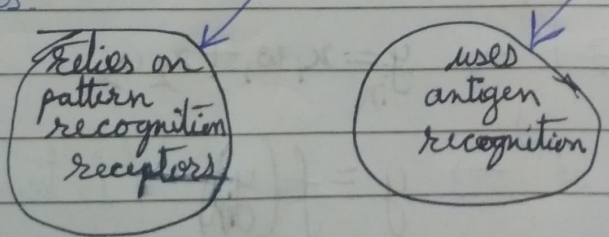


Mechanism of Immune System :-

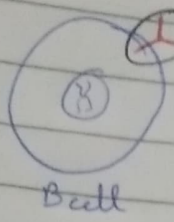
The "discrimination of self from non-self" is a critical function of the immune system, allowing it to recognize and respond to harmful invaders (pathogens)

All the while avoiding attacking the body's own healthy tissues and mount a destructive immune response against non-self

(*) This ability is central to both innate and acquired immune systems/responses.

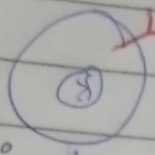


Self v/s Non-self :-



→ B cell receptor :- Binds to foreign bacteria/viruses and help get rid of them

These antibodies/B-cell receptors are coded in the DNA of the B-cell, but they are different for every B-cell.

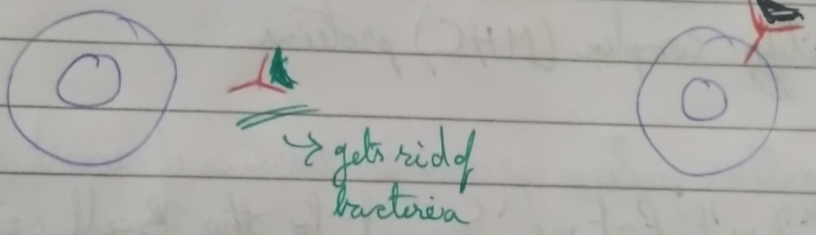


→ These B-cell receptors become → antibodies are generated at random.

∴ A unique antibody is created for each B-cell.

The fact that these antibodies are created at random means that the body is in "danger of creating B-cell receptors or antibodies that can react to the body's healthy cells/tissues.

Eg:- ∯ Suppose, an antibody is created by B cell to get rid of a bacteria



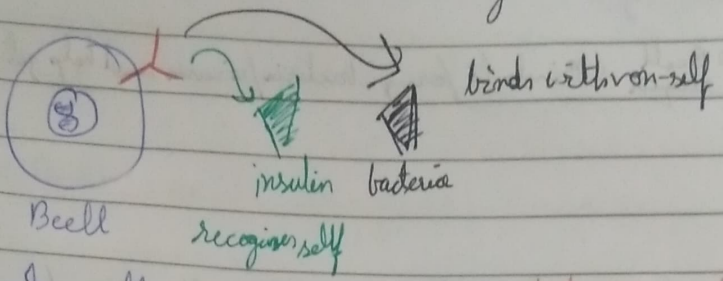
But, at same time, it might create an antibody that reacts to, lets say insulin

Hence it is not possible to make your body from making B-cell receptors/B cells that will react to yourself.

→ equally applicable for T cells

∴ We need a way for B cells / T cells to discriminate between self and non-self.

Bone Marrow :- B cells originate here



Every cell carries same set of distinctive surface proteins that distinguishes you as "self"

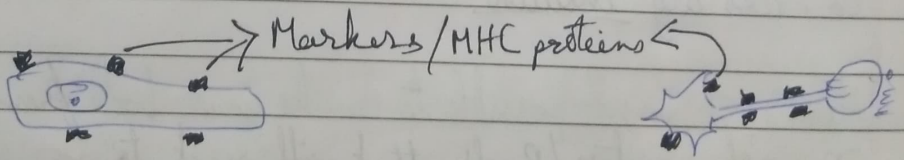
Self-tolerance :-

Immune cells do not attack your own body tissues as it carries surface proteins called self-markers.

It is due to these self-markers / surface proteins that enables your immune system to coexist peacefully with other healthy body cells known as self-tolerance.

(*) This set of unique markers on human cells is called major histocompatibility complex (MHC) proteins

CD47 is another protein present on surface of most healthy cells that sends "Don't Eat me" signal to the B cell receptor that recognises the ~~self~~ healthy cell / self.



Markers of non-self (bacteria, virus) is called ~~PAMP~~ ~~Epitope~~ Epitope, which are distinctive markers on antigens that trigger immune response.