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Lecture title: **Immunology concepts and terms**

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Summary:

1- Learning what the immunity is
2- The most common definitions, concepts, and terms that are always used in immunology
3- Types of Immune responses

Immunology

Science that studies immune responses in the body and the cellular and molecular events that occur after an organism encounters microbes and other foreign macromolecules.

*Immunity

The Latin term immunis, meaning "exempt"; in English, immunity refers to all mechanisms used by the body as protection against environmental agents that are foreign to the body.

*Immune system

The cells and molecules responsible for the immune response, the immune system, have a multi-layered organization that provides immunity to infectious organisms

*Immune response

The collective and coordinated response from the immune system to the foreign molecules

*Antigens

substances that bind to specifically or not specifically to immune cells (lymphocyte receptors) and stimulate immune responses

*Immunogens

Any substances that specifically stimulate immune responses are called immunogens.

*Innate immunity

means all those elements with which an individual is born and that are always present and available at very short notice to protect the individual from foreign antigens

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The innate immunity include

- Physical and chemical barriers protect the body from invasion and include things like the skin and eyelashes, while substances at these barriers, such as tears, mucous, blood clotting factors and stomach acid help to stop and destroy them.
- Chemical defenses consist of proteins able to interact directly or indirectly with invaders, activating cascades of reactions to cause inflammation and recruit further immune mediators that help to defend the body. Examples include the complement system, interferons and interleukin-1.
- Cellular defences identify things that are non-self, take steps to neutralize or destroy them and activate the adaptive immune system. Examples include phagocytes, natural killer cells and mast cells.

Characteristic of Innate immunity

*Does not involve specific recognition of a microbe

*Provides a rapid, early response

*Innate immunity does not have a memory response

*No more rapid and stronger immune reaction to the same microbe at a later date

* Acquired immunity

The individual is born with the capacity to mount an immune response to a foreign invader; this immunity is acquired by contact with the invader and is specific to that invader only. Acquired immunity is more specific than innate immunity

Acquired immunity is induced by immunization, which can be achieved in several ways:

Active immunization:

immunization of an individual by administration of an antigen.

Passive immunization :

immunization through the transfer of specific antibodies or immune cells from an immunized individual to a non-immunized individual.

Characteristics of the acquired immune response:

-Specificity: the ability to discriminate among different molecular

-Adaptiveness: is the ability to respond to previously unseen molecules that may never have naturally existed.

-Discrimination between self and non-self: is the ability to recognise and respond to molecules that are foreign (non-self) and to avoid making a response to those molecules that are self.

-Memory: the ability to recall previous contact with a foreign molecule and respond to it with a more rapid and larger response.

Adoptive immunity:

This immunity is developed after exposure to diseases or when we're immunized against them with vaccines.

Compare between Innate and adaptive immune response

	Innate Immune Response	Adaptive Immune Response
Takes Effect	Immediately	Over time (days to weeks)
Response Type	Non-specific	Specific
Types	• Physical barriers • Chemical barriers • Chemical defences • Cellular defenses	• Cell-mediated response • Humoral response • Active immunity • Passive immunity
Also Known As	Natural immunity; genetic immunity	Acquired immunity
Length of Efficacy	Lifelong	Short-term, long-term, lifelong

Humoral immunity: المناعة الخلطية

immunity produced by antibody molecules found in the blood and mucosal secretions which are produced by cells called B lymphocytes

Cell-mediated immunity (Cellular immunity) المناعة الخلوية

Defence against intracellular microbes (viruses and some bacteria, survive and proliferate inside phagocytes and other host cells and are not attached to circulating antibodies) is a function of cell-mediated immunity which is mediated by T lymphocytes that destroy microbes residing in phagocytes or the killing of infected cells to eliminate reservoirs of infection