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Pathogens: Definition and Meaning of Pathogens, Pathogenicity

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Meaning of Pathogens

- Pathogens can be defined as the infectious agents that can cause illness and infection.
- The term pathogen came into use in the 1880s.
- Infectious diseases are caused by various pathogenic microorganisms for e. g. virus, bacteria, protozoan, fungi, and other parasites.
- The infectious diseases can be transmitted by animals, humans, insects, or other agents.

Pathogenicity

- It is the potential disease-causing capacity of pathogens.
- An organism can be pathogenic or non-pathogenic, but one cannot be more pathogenic than the other.
- A pathogen may be described in terms of its ability:
 - To produce toxins.
 - Enter tissue
 - Hijack nutrients
 - To immunosuppress the host
 - Immunosuppress is the reduction of activation or efficacy of the immune system.

Context-Dependent Pathogenicity

- Pathogenicity depends on the microbial ecosystem as per the modern view.
- A bacterium may participate in opportunistic infections in immunocompromised hosts. Opportunistic infection means infections caused by pathogens taking advantage of an opportunity normally not available.
- Immunodeficiency or immunocompromise can be defined as a state in which the immune system's ability to fight infectious disease and cancer is compromised or entirely absent.

Classification of Pathogens

Class I

- They should not be part of an identified group.
- The non-pathogenicity of the species has been demonstrated authoritatively both in vivo and in vitro testing.

Class II

- Species spreading diseases in humans or animals might not spread to the humans.
- Having the essential prophylaxis or therapy.

Class III

- Species that cause serious disease in humans, spread to the humans.
- Having the essential prophylaxis or therapy.

Class IV

- Species causing serious human disease likely to disseminate in the human population.
- No prophylaxis or therapy exists.

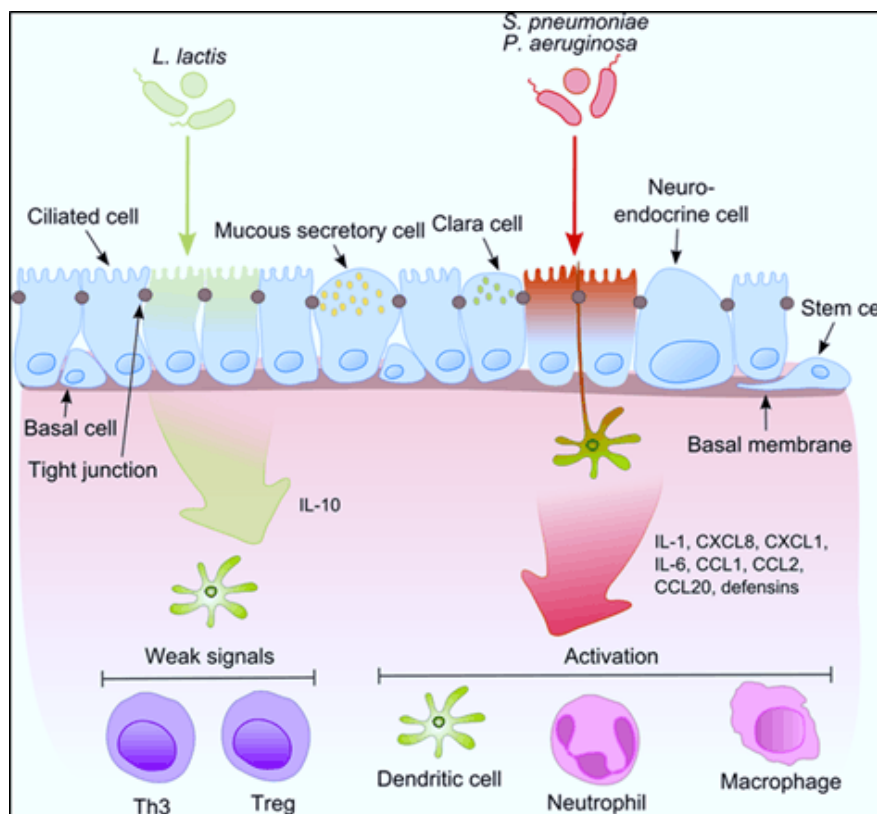
Types of Pathogens

Algae

- Algae are single-celled eukaryotes.
- Eukaryotes are those organisms with cells having a nucleus enclosed within a nuclear envelope.
 - Non-pathogenic although pathogenic varieties do exist.
- Protothecosis
 - A disease found in dogs, cats, cattle, and humans.
 - This disease is caused by a type of green alga known as prototheca that lacks chlorophyll.

Bacteria

- Bacteria are microorganisms made of a single cell.
- Pathogenic bacteria can cause infectious diseases.
- They are diverse having a variety of shapes and features.



Fungi

- They can be found indoors, outdoors, and on human skin.
- The typical fungal spore size is $< 4.7 \mu\text{m}$ in length.
- Fungi cells contain a nucleus and other components protected by a membrane.

Parasites

- These are the organisms that behave like tiny animals, living in or on a host.

- Parasitic infections are more common in tropical and subtropical regions.

Three Main Types of Parasites

Helminths

Commonly known as worms are larger, multi-celled organisms that can live inside or outside the human body.

Protozoa

- These are single – celled organisms that that can live and multiply in the body.
- Ectoparasites are multi-celled organisms that live on or feed off the skin.
- This also includes some insects like ticks and mosquitos.

Viroid's

- These are the smallest pathogens known.
- These are composed solely of a short strand of circular, single-stranded RNA.

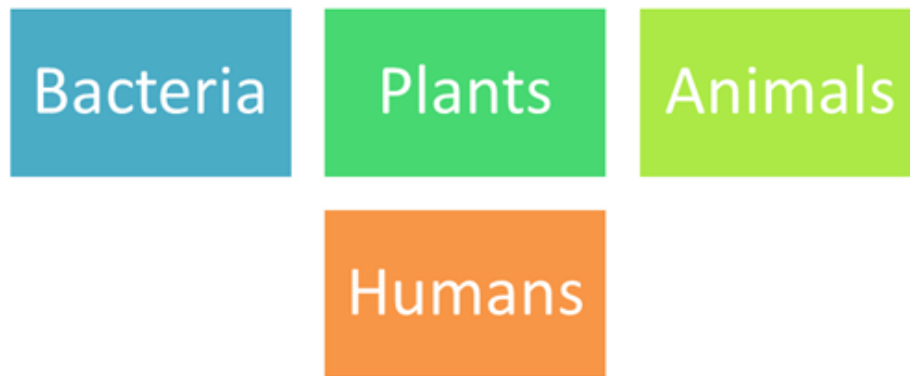
Prions

- These are misfolded proteins that can transfer their misfolded state to other normally folded proteins of the same type.
- They do not contain any DNA or RNA and cannot replicate.

Viruses

- These are small particles typically between 20 and 300 nanometers in length.
- They contain RNA or DNA.
- They require a host cell to replicate.

Pathogen Hosts



FAQs

Q. What are pathogens?

Answer:

A pathogen can be referred to as an infectious agent or simply a germ that can produce diseases. Pathogenicity is the potential disease-causing capacity of pathogens.

Q. What are the four most common types of pathogens?

Answer:

The four most common types of pathogens are:

- i) Viruses
- ii) Bacteria
- iii) Fungi
- iv) Parasites

Q. In how many classes pathogens can be classified?

Answer:

Pathogens can be classified into four classes namely Class I, Class II, Class III and Class IV.