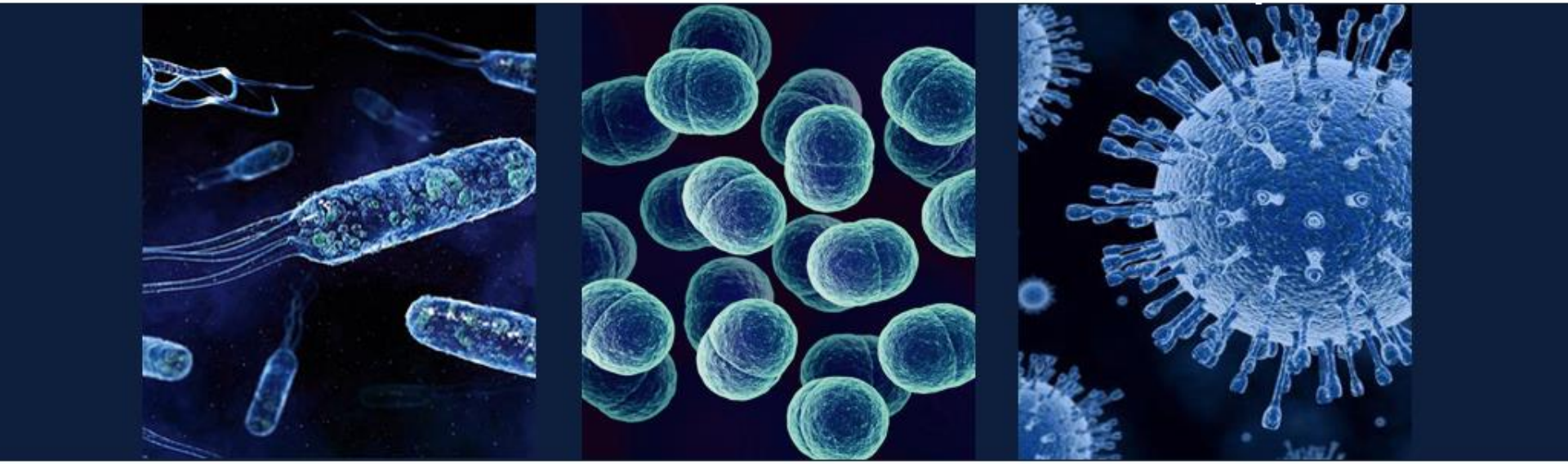
جامعة الملك سعود
King Saud University

MICROBIOLOGY TEAM 435

هذا العمل لا يغني عن المرجع الأساسي للمذاكرة



Host Parasite Relationship

- Important
- Term
- Extra explanation
- Additional notes

Objectives

1-Define the terms:

-Host-parasite Relationship
-Pathogenicity
-Pathogen
-Disease
-Resistance
-Susceptibility
-Infection
-Virulence
-Transmissibility

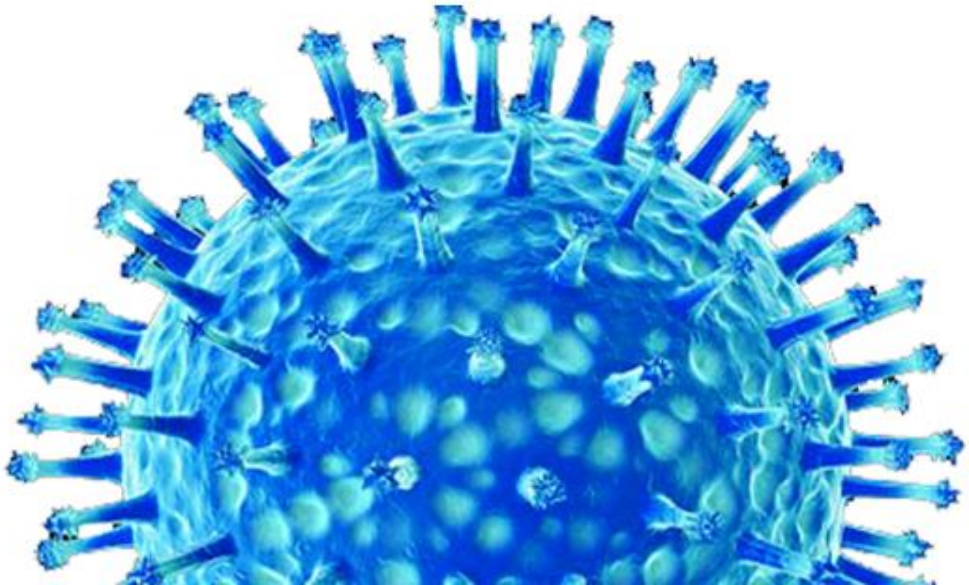
2-Know the division of host resistance to parasite.

3-Know the division of pathogens.

4-Know the determinants of pathogenicity.

5-Differentiate between Exotoxin and Endotoxin

6-Know about Koch's Postulates



Host-Parasite Relationship

- Human host is normally in contact with many microorganisms (normal flora), only a small number of these microorganism (primary and opportunistic pathogens) can cause disease.

- Host-parasite relationships: is characterized by fighting the organism to invade the body and the body defending itself by protective measures.

Host-Parasite Relationship can be discussed under:

A- Pathogenecity

B- Normal flora

Pathogenicity

- The ability of a microorganism to cause disease (الامراضية)
- Host resistance to parasite invasion is divided into:

A. Non specific resistance:
It is part of natural constitution of the host.
Ex:
- ✓ Skin mechanical barrier .
- ✓ Ciliated epithelium of respiratory tract .
- ✓ Competition by normal flora
- ✓ Low PH in the stomach .
- ✓ Cough .
- ✓ Neutrophils .
- ✓ Peristalsis (1)
- ✓ Lysozymes (2)

B. Specific "Acquired" resistance:
It is specific to a certain organism.
Ex:
- ✓ Antibodies

(1)The progressive wave of contraction and relaxation of a tubular muscular system, especially the alimentary canal by which the contents are forced through the system.
(2)An enzyme that is destructive of bacteria and functions as an antiseptic.

Pathogen : a microorganism having the capacity to cause disease in a particular host.

Can be divided according to **the degree of Pathogenecity** into:

a) Primary pathogens:

-When the organism is able to produce disease even in an apparently healthy host

-Cause disease in non- immune host to that organism.

e.g. - Bordetella species
- Mycobacterium tuberculosis

b) Opportunistic pathogens:

-When the organism causes disease only when the host's defenses are impaired

-Having low pathogenecity and infect people with low immunity.

e.g. -Pseudomonas

Disease : is the end product of an infectious process

- **Resistance:** the ability of the host to prevent establishment of infection by using its defense mechanisms.

- **Susceptibility:** the lack of this resistance and establishment of disease

- **Transmissibility:** the ability to **spread** from one host to another. This enables microorganism to maintain continuity of its species in the event of death of original host.
- **Infection:** is simply invasion of cells and multiplication by microorganisms **WITHOUT** tissue destruction.

- **Virulence:** in an ability to invade and DESTROY tissue to produce disease.

It is measured by the Lethal Dose 50 "LD50" which is the number of organisms or mg. of toxins that will kill 50% of susceptible lab animal. If the LD50 is small the microorganism is considered highly virulent and when it is high the microorganism will be lowly virulent.

Determinants of Pathogenecity

Before causing disease, the microorganism should have the ability to:

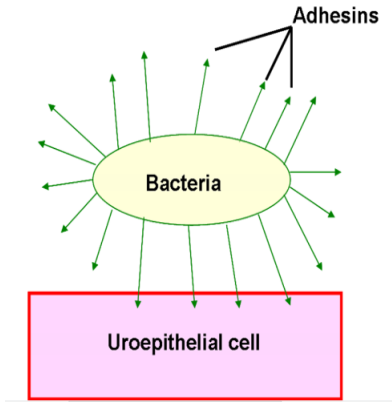
a) **Adhere:** the ability to attach firmly to host epithelial surface.

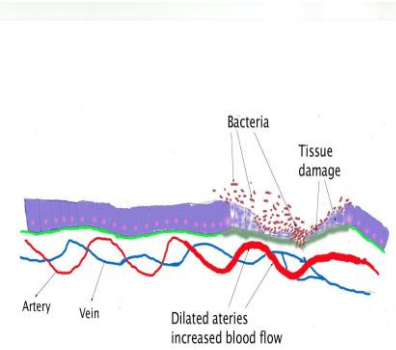
b) **Survive** host natural defense mechanisms.

c) **Multiply** to large numbers.

d) **Tissue Destruction:** the ability to overcome host defense , invade the tissues and cause destruction to produce clinical disease.

Adhesion&
Tissue Destruction





Adherence

By means of adhesions (**attachment apparatus**) on bacterial surfaces.

e.g. a) Pili
b) Other protein surface structures

-Structures on host cells include:

a) Fibronectin
b) Proteins and glycopeptide parts

Tissue destruction is produced by:

a) Toxin production ,either:
- Exotoxin, or
- Endotoxin

b) Invasion by:
- Capsulated ,or
- Non-capsulated organism

Capsulated organisms :	Non capsulated organisms
bacteria that have capsule. Bacterial capsules are all made of **polysaccharide** except that of **Bacillus anthracis** (made of polypeptide). **-Capsule prevents phagocytosis.** But such organisms are readily killed once they are phagocytosed. So called **extracellular organisms** e.g. **Pneumococcus**	resist intracellular killing so called **intracellular organisms.** e.g. **Mycobacterium tuberculosis** **Salmonella typhi,** **Brucella species, etc.**

Exotoxin vs Endotoxin

Exotoxin can be:

a) A – B exotoxins

e.g.Cholera toxins

A : Active unit

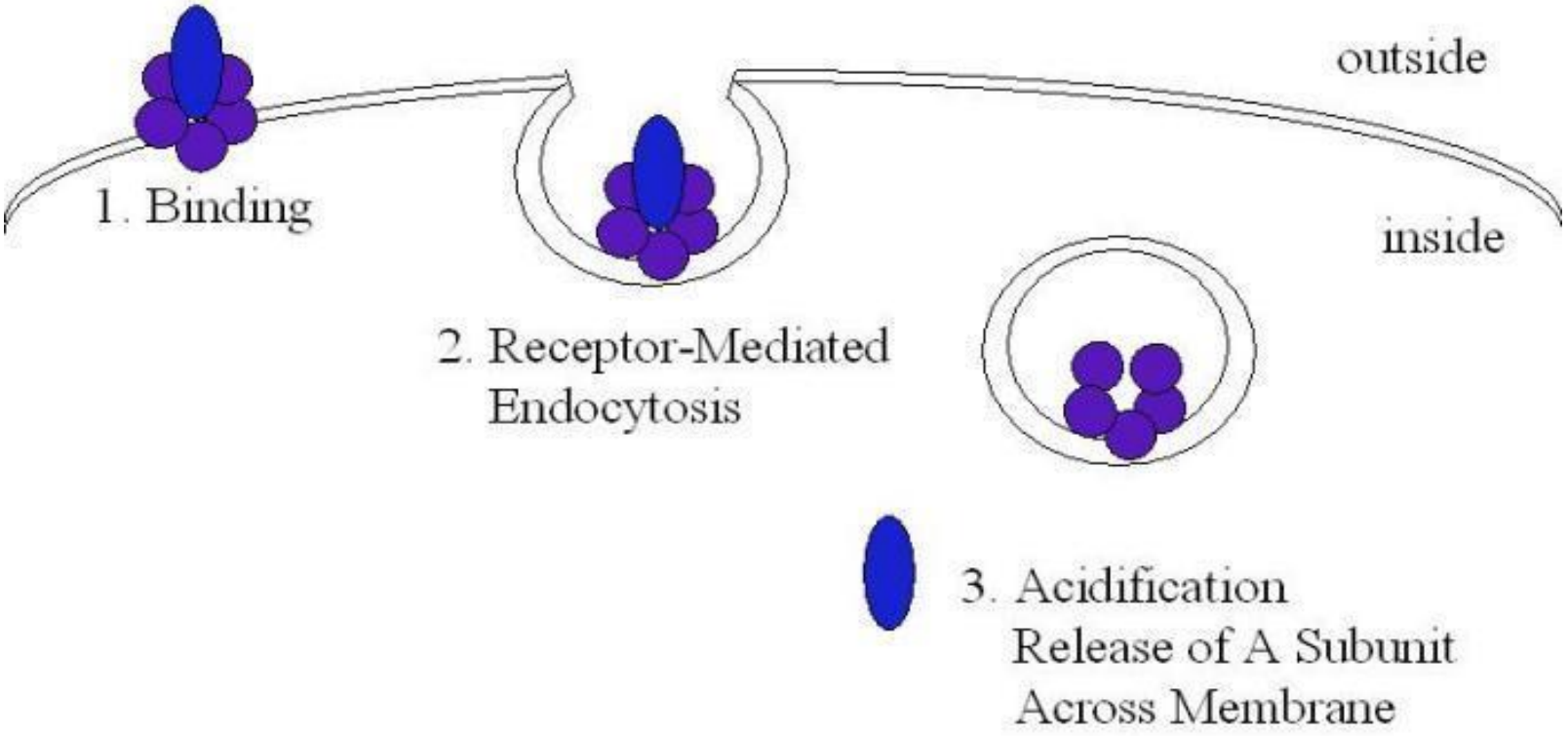
B : Binding unit for attachment

b)Membrane active exotoxin

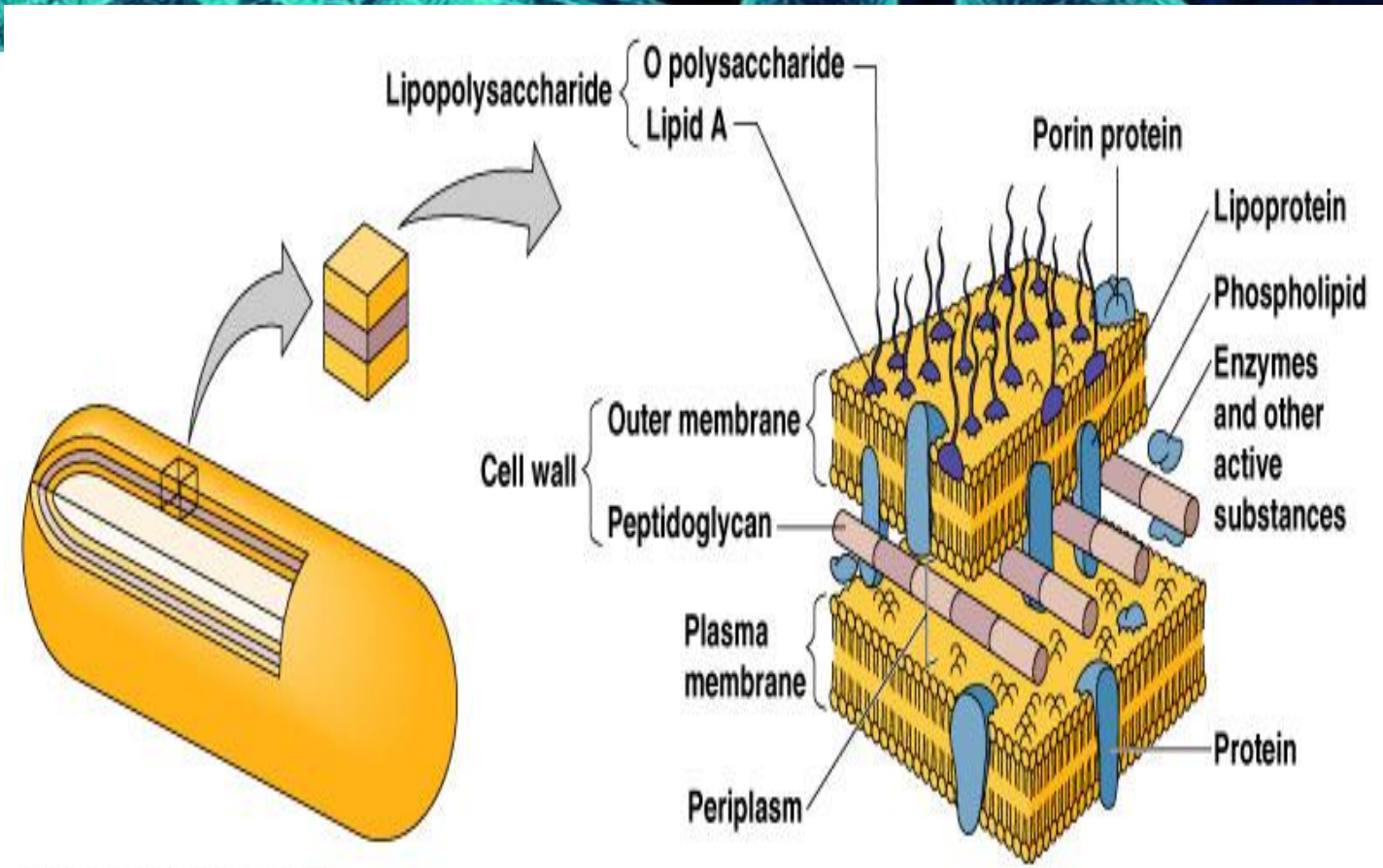
e.g. Haemolysin of group A Streptococci

Exotoxin	Endotoxin
protein	Lipopolysaccharide
Soluble	Part of cell wall
Heat Labile	Heat stable
Pharmacologically specific action	Non-Specific
High Immunogenicity	Low Immunogenicity
Inactivated by chemicals to toxoids	Do not form toxoids
No Fever	Induce Fever

A-B Toxin Entry

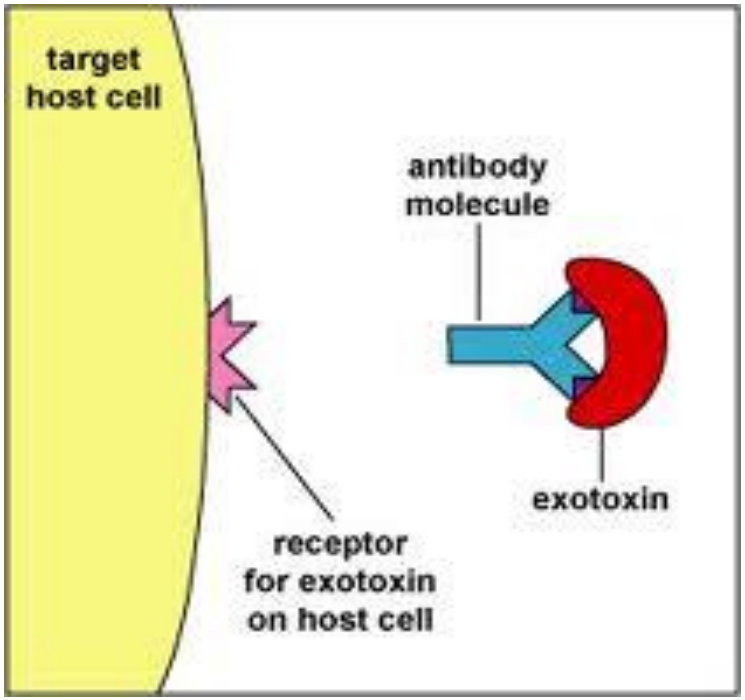


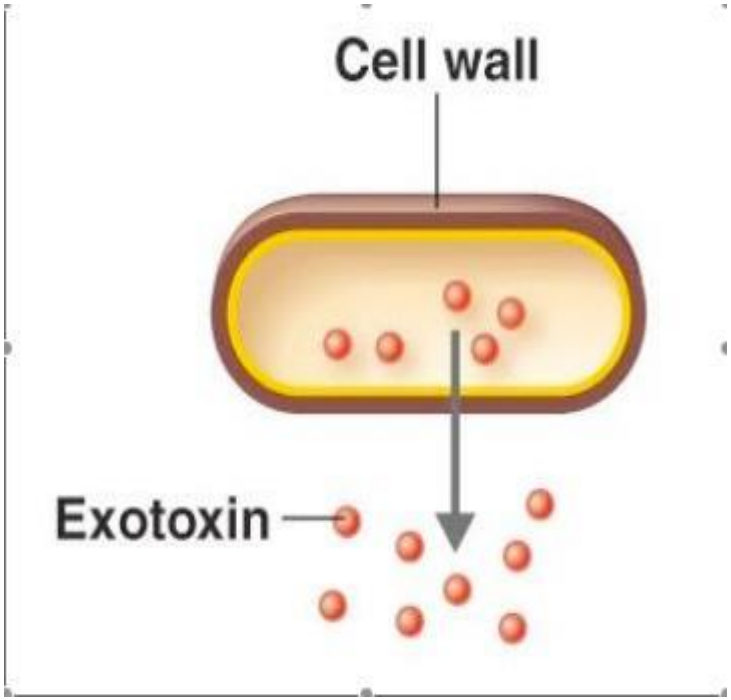
Endotoxin

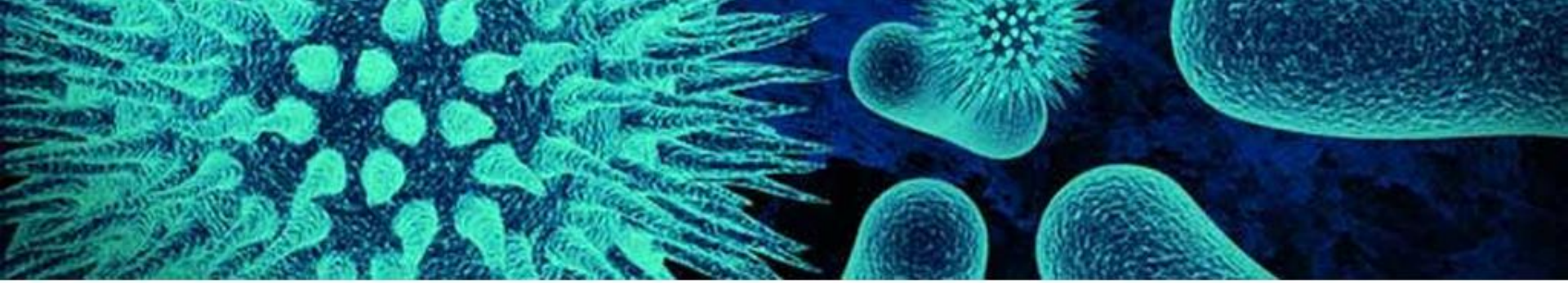


(c) Gram-negative cell wall

Exotoxin


target
host cell
antibody
molecule
exotoxin
receptor
for exotoxin
on host cell


Cell wall
Exotoxin



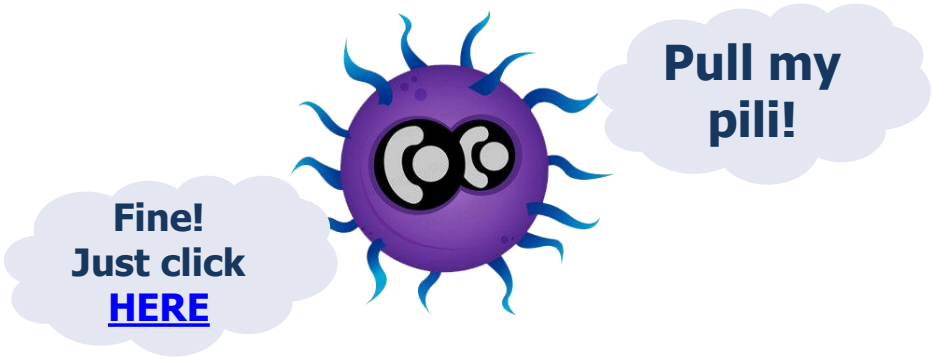
Koch's Postulates:

❖ For a microorganism to be accepted as the cause of an infectious disease it must satisfy all or most of these criteria:

1. The organism must be found in all cases of the disease and its distribution in the body must correspond to that of the lesions observed in the host.
2. The organism should be cultured in pure culture from all cases of the disease.(1)
3. The organisms should reproduce the disease in other susceptible animal hosts.
4. Antibodies to the disease usually develop in the course of the disease.

(1)Some organisms are yet to be cultured in the lab. Ex: Treponema pallidum, Mycobacterium leprae.

Online Quiz



Books that could help you

- Microbiology made ridiculously simple
- Sherris Medical Microbiology

MiRobiology

TEAM 435

We do things better

Boys Team

- **Ali Alzahrani**
- Khalid Sharahily
- Ahmad Alzahrani
- Zeyad Alsalem
- Muhammad Dossary
- Meshal Alhazmy
- Hamzah Alfiar

Girls Team

- **Lamya Alsaghan**
- Nojood Alhaidri
- Monera Alayuni
- Alanoud AlOmair
- Shahad Alenezi
- Aisha Al-Sabbagh
- Bodour Julaidan
- Noura AlTawil
- Deema AlFaris
- Sara Al-Hussein
- Suha Alenezy
- Latifah Alsukait
- Dalal Alhuzaimi
- Reema Allhaidan

Girls power!

Microbiology.435@gmail.com

@microbiology435

http://ask.fm/microbiology435

Contact us!