



KING SAUD UNIVERSITY  
COLLEGE OF MEDICINE  
1<sup>ST</sup> YEAR, 3<sup>RD</sup> BLOCK

# Introduction to Antibiotics

# 6



## RESPIRATORY BLOCK

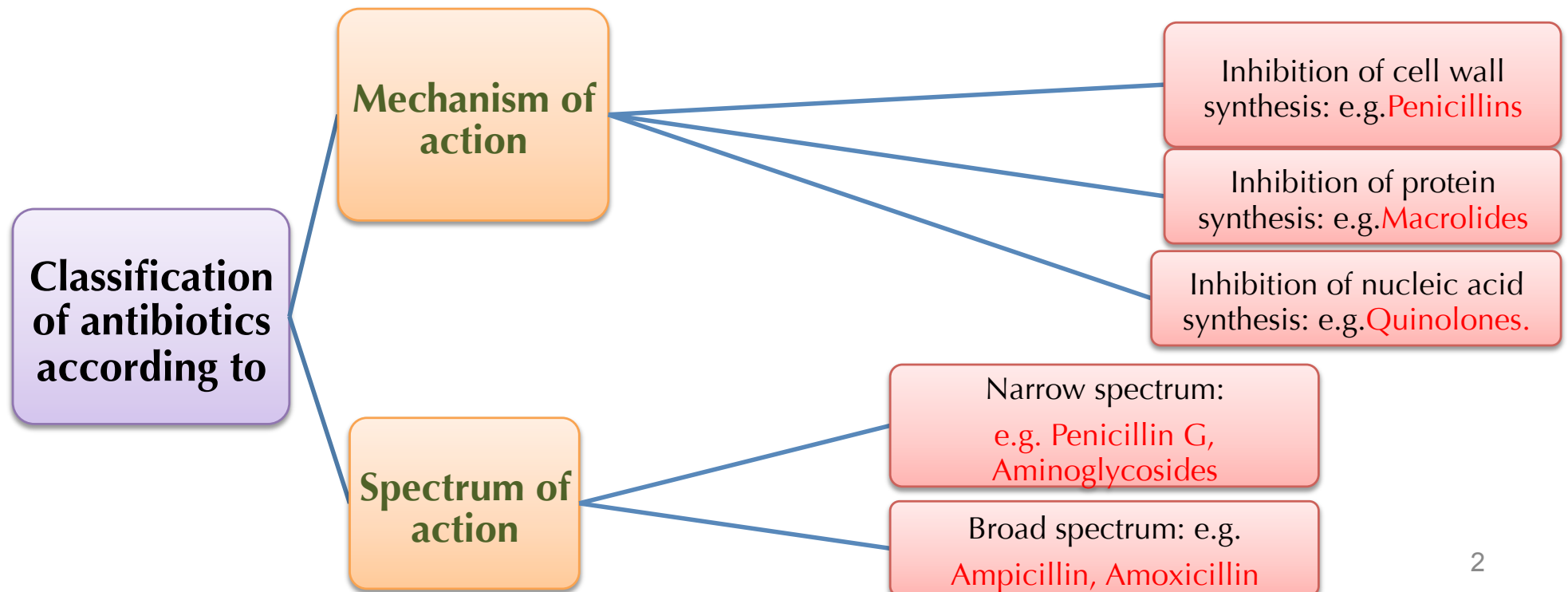
# Definition of Antibiotics:

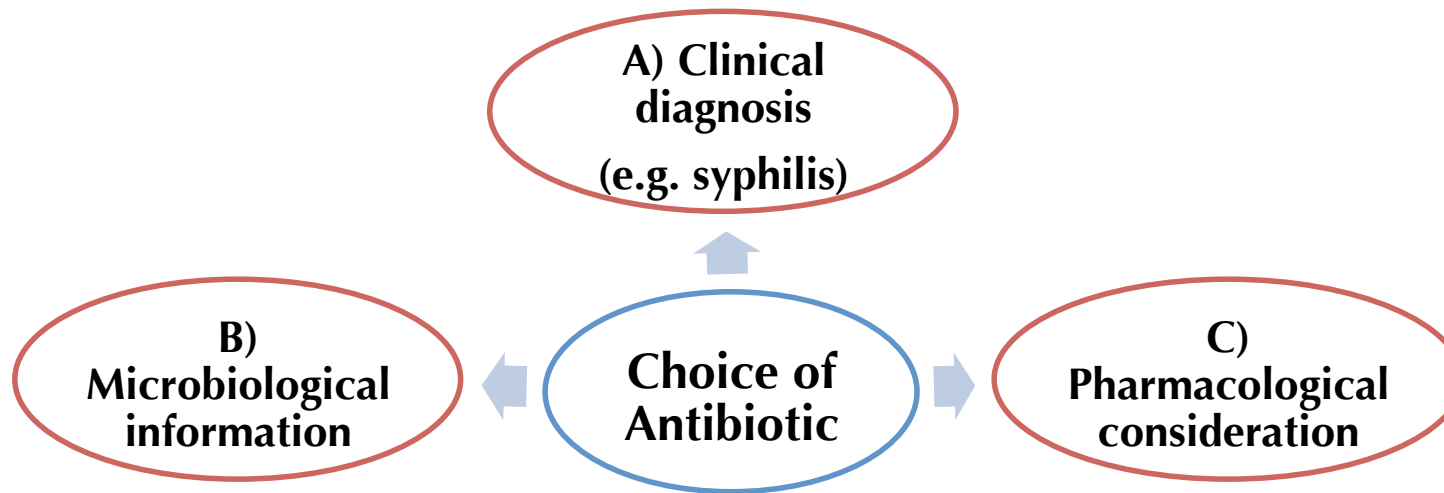
Chemical substances produced by various microorganisms (bacteria, fungi,..) that have the capacity to inhibit or destroy other microorganisms.

Nowadays they are chemically synthesized.

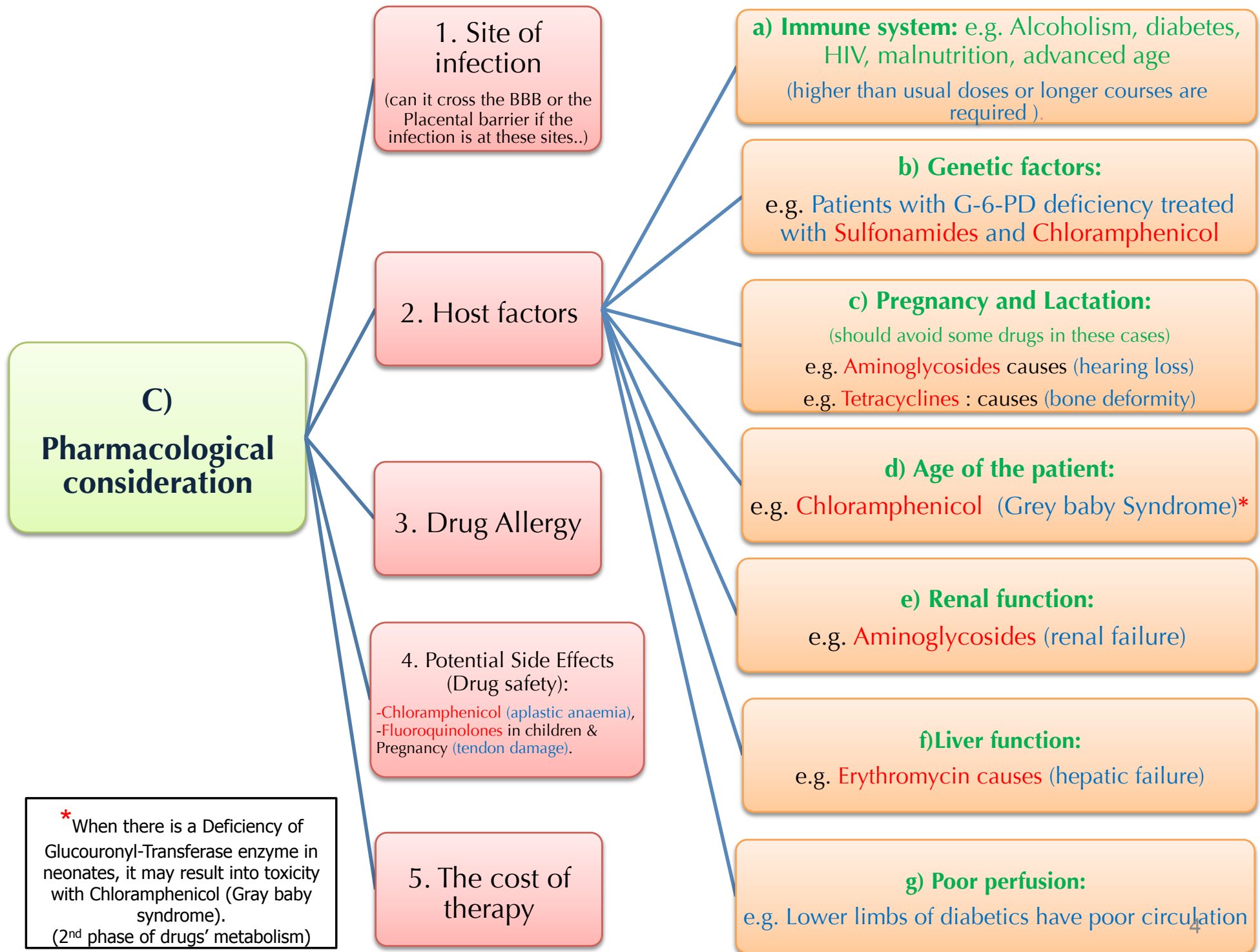
They either:  
\*kill bacteria (bactericidal)  
\*or keep more bacteria from growing (bacteristatic).

**Antibiotics will not cure infections caused by viruses.**





	Advantages	Disadvantages
<b>B) Bacteriological informations</b>	<ul style="list-style-type: none"> <li>*know the exact antibiotic to be used.</li> <li>*Know the most effective and reject the one with little or no activity.</li> <li>*Choose the least toxic.</li> <li>*Choose the cheapest.</li> </ul>	<ul style="list-style-type: none"> <li>*The bacteria isolated may not be the prime cause of the disease.</li> <li>*Do not take in consideration site of infection.</li> <li>*Some bacteria can't be cultivated or take time to grow ( e.g. M.Leprae, M. Tuberculosis )</li> <li>*Bacteriological services are not available at all hospitals.</li> </ul>



## BACTERIAL RESISTANCE:

- One result of the widespread use of antibiotics has been the emergence of resistant pathogens that have been sensitive in the past.



- Not too brief therapy or too prolonged therapy (some exceptions, e.g. TB)
- Note:** Combination of antibiotics may be required to delay resistance (e.g. TB)

**GENERAL PRINCIPLES OF CHEMOTHERAPY:** Administer drug in:



Full Dose,



proper interval (e.g. every 8 hours..) and by the best route (do not prescribe drugs by parenteral administration if taken more than once a day).

**Note:** continue antibiotic for **about 3 days** further to avoid relapse when apparent cure achieved.

\* Skipping doses may decrease effectiveness of antibiotic & increase the incidence of bacterial resistance.

**\* Two or more antimicrobials should not be used without good reasons, e.g.:**

- Mixed bacterial (polymicrobial) infections.
- Desperately ill patient of unknown etiology "Idiopathic".
- To prevent emergence of resistance (e.g. TB ) "That's why we use a multiple antibiotics in a case of TB".
- To achieve synergism "caused a significant effect when they applied in combination"

**eg. Piperacillin + Gentamicin  
(P. aeruginosae)**

**\* Disadvantages of multiple antibiotics**

- Increased risk of sensitivity or toxicity.
- Increased risk of colonization with a resistant bacteria
- Possibility of antagonism
- Higher cost

**\* Note:**

- In some infections bacteriological proof of cure is desirable ( e.g. TB, UTI )
- Measurement of plasma conc. of antibiotics is seldom needed, **except. Streptomycin in renal TB; I.M gentamicin.**

## Indications for antibiotics prophylaxis

### Surgical prophylaxis:

- Bowel surgery.
- joint replacement.
- Some gynecological interventions to prevent postoperative.

### Immunosuppressed Patients:

- Very old.
- Very young.
- Diabetics.
- Anaemics.
- AIDS Patients.
- Cancer Patients.

### Dental extractions:

- Patients with total joint replacements.
- Patients with cardiac abnormalities.

## MISUSES OF ANTIBIOTICS

Treatment of untreatable infections.

(**wrong diagnosis**)

e.g. **viral infections.**

Improper dosage.

Therapy of fever of unknown origin.

Presence of pus or necrotic tissues, or blood at the surgical site.

Excessive use of prophylactic antibiotics in travelers.

Lack of adequate bacteriological information.

# SUMMARY

\***Antibiotics**: are chemical substances produced by various microorganisms that have the capacity to inhibit or destroy other microorganisms.

\***Antibiotics will not cure** infections caused by viruses.

\*we can classify antibiotics according to :

1- Mechanism of action		2- Spectrum	
Inhibition of <b>cell wall</b> synthesis	e.g. Penicillin	<b>Narrow</b> spectrum	e.g.: penicillin G , aminoglycosides
Inhibition of <b>protein</b> synthesis	e.g. Macrolides	<b>Broad</b> spectrum ,	e.g.: ampicillin , amoxicillin
Inhibition of <b>nucleic acid</b> synthesis	e.g. Quinolones.		

\*To choice of antibiotics , we depend on :

- 1) **Clinical diagnosis** . (sometimes enough to choice antibiotics like case of **Syphilis** )
- 2) **Microbiological information**. (to choice the exact antibiotics, most effective, the least toxic and cheapest)
- 3) **Pharmacological consideration** .

\***Bacterial Resistance** : **no response** to antibiotics, It happened when you use antibiotics **frequently**.

To prevent it : use antibiotics in **absolute required**, in **adequate** dosage for **sufficient** period of time.



# M C Q S

**1: Which one of the following acts by inhibition of nucleic acid synthesis :**

- A: Macrolides
- B: Quinolones
- C: Penicillins
- D: A and C

**2: Which one of the following is the Broad spectrum :**

- A: Ampicillin
- B: Aminoglycosides
- C: Amoxicillin
- D: A and C

**4: Which one of the following is not use to treat Pregnancy and Lactation:**

- A: Aminoglycosides
- B: Sulfonamides
- C: Tetracyclines
- D: A and C

**5: Which one of the following causes renal failure :**

- A: Erythromycin
- B: Sulfonamides
- C: Aminoglycosides
- D: Penicillin

**6: Which one of the following causes tendon damage for children Pregnancy:**

- A: Fluoroquinolones
- B: Aminoglycosides
- C: Tetracyclines
- D: sulfonamides

**7: Which one of the following acts by inhibition of cell wall synthesis:**

- A: Quinolones
- B: Penicillins
- C: Macrolides
- D: A and C

1-B, 2-D, 4-D, 5-C,  
6-A, 7-B

We hope we made this lecture easier for you  
Contact us for any questions or comments  
Good Luck !

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