



المملكة العربية السعودية  
جامعة الملك سعود  
كلية العلوم  
قسم الكيمياء الحيوية

المضادات الحيوية (BCH 476)

# Antibiotics

## *Lecture 2*

*Usage of antibiotics, in medicine, veterinary and animal feed; in agriculture and the food industry*

# Applications of antibiotics and its usage

- Antibiotics are now widely used in many fields.
- **It is used in:**
  - Human medicine
  - Veterinary medicine
  - Animal feed
  - Agriculture
  - Food industry

# Applications of antibiotics and its usage

- **Why antibiotics are widely used?**
  - The widespread usage of antibiotics is due to its effect on the target cell or tissue.
- **It can be classified into:**
  - Antibacterial
  - Antiprotozoal
  - Cancerostatic
  - Insecticidal
  - etc
  - Antifungal
  - Antiviral
  - Coccidostatic
  - Immunosuppressive

# a-Usage of antibiotics in medicine

## Clinical applications of antibiotics:

- Antibacterial antibiotics like:
  - $\beta$ -Lactam compounds (especially penicillin and cephalosporins)
  - aminoglycosides (such as tetracyclin, lincomycin, fusidic acid, rifamycins and many others)
- Antifungal antibiotics (like Polyenes, variotin and griseofulvin).
  - Polyenes inhibit many pathogenic & opportunistic fungi (like *Candida*, *Coccidioides*, *Cryptococcus* & *Histoplasma* spp.)
  - Polyenes also inhibit Dermatophytes (like *Epidermophyton*, *Microsporium* & *Trichophyton*).
  - Polyenes inhibit moulds (*Aspergillus* spp.)
  - Polyenes also act as inhibitors for pathogenic protozoa (like *Entamoeba histolytica*, *Trichomonas* & *Trypanosoma*)

- Antibiotics with antiviral activity
  - Like Famciclovir that is used for the treatment of *herpes simplex* virus infections
- Antibiotics with anticancerous activity
  - including actinomycin D, mitomycin C, daunomycin, adriamycin, carminomycin, bleomycin etc.
- Antibiotics with other therapeutic effects
  - Fusaric acid is used in the treatment of Parkinson disease. It inhibits dopamine  $\beta$ -hydroxylase, So it inhibits dopamine degradation.

# **b-Usage of antibiotics in veterinary and animal feed**

- Like in humans, antibiotics are used for treating infectious diseases in animals.
- Small amount of antibiotics have been used in feeds to increase growth and to improve feed utilization.
- The long term use of antibiotics in feeding animals presents a potential ecological hazard, with the spreading of microbial resistant strains.
- One has to note that some antibiotics are excreted in milk or present in the dairy products and meat and that may have dangerous effect on human.



# c-Usage of antibiotics in agriculture and the food industry

- Antibiotics are used in agriculture in three major fields:
  - 1- pesticides - insecticides
  - 2- herbicides
  - 3- growth regulators.
- Streptomycin, cycloheximide, kasugamycin, valinomycin have been used against phytopathogenic microorganism.
- Glutarimide antibiotics such as cycloheximide, nucleoside are used as herbicides.
- Antibiotics have also been used for short term conservation of foods or food raw materials.

# **d-Usage of antibiotics in Molecular Biology research and clinical labs.**

Do you know any application of using antibiotics in the researches of molecular biology and gene cloning?

Open discussion