**General introduction:**

Antibiotics in language of pharmacology, is a class of drugs that possess their pharmacological action against microorganism. in a more specific way are also called antimicrobial agents. there is a long list of harmful microbes against which antibiotics can be administered. conventionally, people refer antibiotics only to its sub-type "antibacterial", which is totally wrong in terms of pharmacology.

**Classification Of Antibiotics:**

classification of antibiotics is an extended topic. for convenience classification is subdivided into the following main subdivisions.

- Classification based upon Nature of organism
- Mechanism of action based classification
- classification based upon nature of action
- chemical structure based classification
- Spectrum based classification
- source based classification (the source from which the antibiotics are synthesized or isolated).

**Nature Of Organism:**

on basis of microbes nature antibiotic may be used for any of the following therapies.

- antibacterial therapy
- anti fungal therapy
- antiviral therapy
- antiprotozonal therapy - includes antimalarial and anti amoebic drugs.
- antimycobacterial therapy - because of clinical significance this is a separate class. includes anti t.b and anti leprotic drugs.

**Mechanism / mode of action based classification:**

This classification classify antibiotics keeping the mechanism in view under which they brought their pharmacological action. Following are the sub classes.

- cell wall synthesis inhibitors
- cell membrane disrupters
- protein synthesis inhibitors
- folic acid synthetase inhibitors
- Nucleic acid function inhibitors

**Cell wall synthesis Inhibitors:**

As the name indicates these antimicrobial prevent cell wall formation in the infectious microbes, thus leading to cell lysis and so on, the death of microbe.

antimicrobial included in this class are as follows;

- pencillin
- cephalosporin
- monobactem
- azerenam
- bacetracin
- vancomycin
- echinocandins (Antifungal).

**Cell membrane disrupters:**

these antibiotics possess their pharmacological ability to disrupt the cell membrane of microorganisms. Azoles, polyene (antifungals) and polymaxin-b are included in this class).

**Action based classification:**

action and mechanism of action are slightly different things. this classification means that after interacting with antibiotics what lethal effects would result in microbes. on this basis antibiotics are classified in **bacteriostatic** and **bactericidals.** (both of them are antibacterials)

**bacteriostatic:**

these antibiotics are agents that prevent bacterial population from increasing and not necessarily killing them. however a bacteriостatic in high dose is essentially a bactericidal. Chlorampheninical, tetracycline, sulfonamide and macrolide are included in bacteriostatic.

**Bactericidal:**

bactericidal are drugs that kills off the microbes by any mechanisms discussed earlier. **pencillin and other beta lactames, fluroquinolones, co-trimoxazole, aminoglycosides, metranedazoles etc** are included in bactericidal.
Chemical structure based classification:

On the basis of chemical structure we relate antibiotics on the basis of same basic nucleus. Following sub-classes are included in this classification.

**Beta lactames:**

beta lactames includes pencillin, cephalosporin, monobactam, carbaphenem.

**Tetracyclines:**

they are 4 cyclic structures resembling benzene.examples are Doxycycline & tetracyclines.

**Macrolides:**

These include large cyclic ketone structures. *Erythromycin* and *clarithromycin* are included in this class.

**chloramphenical:**

nitrobenzenes derivatives are included in this class.

**quinolines:**

ciprofloxacin is quinoline antibiotic.

**Azoles:**

*Metronedazole, ketoconazole* are structurally composed of nitrogen containing rings.
polyene (many double bonds):
nystatin, and amphotericin-b are polyenes in structure.

polypeptides:
poymaxin-b and bacitracin are structurally polypeptides.

Glycopeptides:
vancomycin is structurally glycopeptide.

**Spectrum based classification:**
This classification give us an idea about the range of microorganisms against which the antibiotics are effective.

**very narrow range antibiotics:**
antistaphylococcal drugs and pencillin class are antibiotics of very narrow therapeutic range.

**Narrow spectrum antibiotics:**
isoniazid and pencillin G are narrow spectrum antibiotics.

**Extended spectrum antibiotics:**
ampicillin is an extended spectrum antibiotic. means it is effective against a range of microbes broader than the former two.

**Broad spectrum antibiotic:**
their range is much larger than the classes discussed earlier. 
broad spectrum antibiotics are effective against a large number 
of microbes. 
drugs included are;

- tetracycline
- chloramphenical
- coamoxiclave
- cotrimoxazole
- 3rd and 4th generation cephalosphorin.

**Source Based Classification:**

by source we generally refer to the the source from which the 
antibiotic is obtained.
on the basis of source antibiotic maybe;

- Microbial source
- semi-synthetic source
- synthetic source

**Antibiotics Of Microbial Source:**

from microbes various antibiotics are isolated. the 
microorganisms from which antibiotics are isolated are bacteria, 
actinomycetes, and fungi.

bacitracin is obtained from bacteria.

tetracyclines, chloramphenical, 
streptomycets, aminoglycosides and macrolodes are 
obtained from actinomycetes.
pencilllin, cephalosporin and griseofulvin (antifungal) are 
obtained from Fungi.
Semi-synthetic Antibiotics:

semi-synthetic means that the starting material of them is of natural source which is chemically modified to form the product. following are semisynthetic antibiotics.

- aminopencillin
- amoxicillin
- ampicillin

Synthetic Antibiotics:

synthetic antibiotics do not have natural starting material. they are developed entirely in laboratories. Following are the examples;

- Sulfonamides
- most antimalarial
- isoniazid
- most antiviral
- most anthelminthes