

GENERAL CHEMOTHERAPY

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Chemotherapy

- It is the use of drugs and chemicals that selectively inhibit or destroy specific agents of disease or pathogens [as bacteria, fungus, virus, parasite]
- The use of drug in treatment of neoplastic disease is also known as chemotherapy because malignant or cancerous cell have a similarity with pathogenic microorganisms.

Chemotherapeutic agents

- These are the drugs used in chemotherapy to interfere functions of pathogens. Exa. – antibiotics, antifungal, antiviral, antiprotozoal , antineoplastic.

History of chemotherapy

- Divided into three periods
 - 1 . Pre Eherlich period
 - 2 . Eherlich period
 - 3 . Post eherlich period

- Antibiotics – these are chemical substances produced by various species of microorganisms that kill or suppress growth of microorganisms. eg-Penicillin, streptomycin etc.
- Antimicrobial agent – these are natural, synthetic or semi-synthetic chemical substances that kill or suppress the growth of microorganisms. eg-Sulfonamide
- Selectivity [selective toxicity]-the ability of antimicrobial agents to kill invading microbes without harming host cell.

- Potency – antimicrobial activity per mg or microgram of chemotherapeutic agent.
- Chemotherapeutic Index –ratio of maximum tolerated dose of drug to its minimum curative dose.
- Therapeutic index –ratio of dose toxic to host to the effective therapeutic dose.
- Minimum inhibitory concentration – it is the lowest concentration of antimicrobial agent /antibiotic that inhibit visible growth of bacteria under standard condition outside the body.
- MIC₉₀ - it is minimum inhibitory concentration necessary to inhibit 90 percent of microorganisms tested.

- Minimum Bactericidal Concentration[MBC]- it is the lowest Concentration of antimicrobial drug that kills 99.9% of original inoculum or bacteria outside the body in a given time.

Antimicrobial agents are regarded as bactericidal if $MBC = 4$ times of MIC

- Minimum antibiotic Concentration[MAC]-it is concentration of an antimicrobial drug that reduces growth of an microbes invitro by factor of 10.

$$MAC = \frac{1}{10^{TH}} \text{ of MIC}$$

CATEGORIES OF ANTIBIOTICS

2 types

1. Bactericidal – these drugs kill target bacteria or pathogen , more effective and mostly preferred .
 - To treat infection where defence mechanism is poor as endocardium, meninges , bonemarrow and these site have required immediate eradication of infection .
 - These drugs are also used for weak and debilitated animals in which defence system is not strong. Eg – aminoglycosides, fluoroquinolones, beta lactams etc.

2. Bacteriostatic

- these drugs reversibly inhibit growth of bacteria or pathogen .
- For these drugs duration of therapy must be sufficient to allow cellular and humoral defence mechanism to eradicate the bacteria as they allow the normal host defence to destroy they pathogen .
sEg. Sulphonamides , chloramphenicol etc.

- Post antibiotic effect [PAE]- It is the growth inhibition that continues for a varying period after concentration of antibiotics is below MIC

Selection Of Antimicrobial agents

1. Organism related factor
 - a. Target organism
2. Drug related factor
 - a. Type of activity
 - b. Pharmacokinetic profile
 - c. Drug interaction
 - d. Route of administration
 - e. Relative toxicity
 - f. Cost of therapy
 - g. Spectrum of activity

3. Host factors

a. host defence mechanism

b. pathological condition

c. pregnancy

d. genetic factors

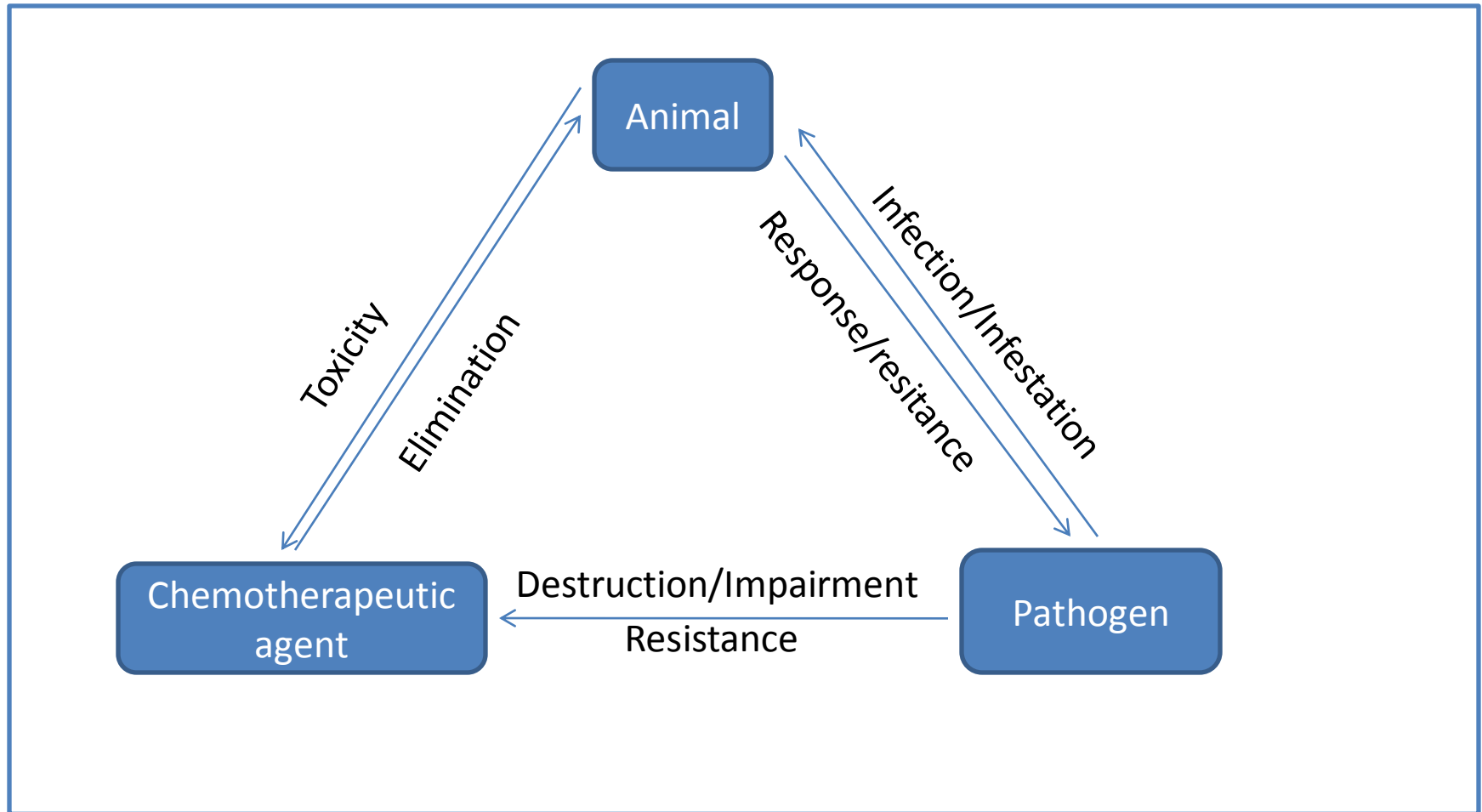
e. spices

f. age

g. local factors

h. PHs

Chemotherapeutic Triangle



Principles of successful chemotherapy

1. Identification and characterization of pathogen
 - a. antimicrobial sensitivity
 - b. selection of antimicrobial agent based on site of infection and lesion.
2. Effective concentration of indicated antimicrobial agent for sufficient period at infection site.
 - a. Dose dependent antimicrobial
 - b. Time dependent antimicrobial
3. Correct dose rate, frequency, route of administration, duration of therapy atleast 7days.
4. Specific and appropriate supportive therapys

Effect of combination therapy

1. Synergism – eg. Penicillin G and streptomycin
2. Addition - eg. Tetracyclin and chloramphenicol
3. Antagonism – eg. Tetracyclin and Penicillin

THANKYOU