



هَيْمَةُ الأَسْنَان

مركز عيَّة الأَسْنَان - كِلَّة أمر الهَيْمَة

Pharmacology



Chemotherapy

Chemotherapy

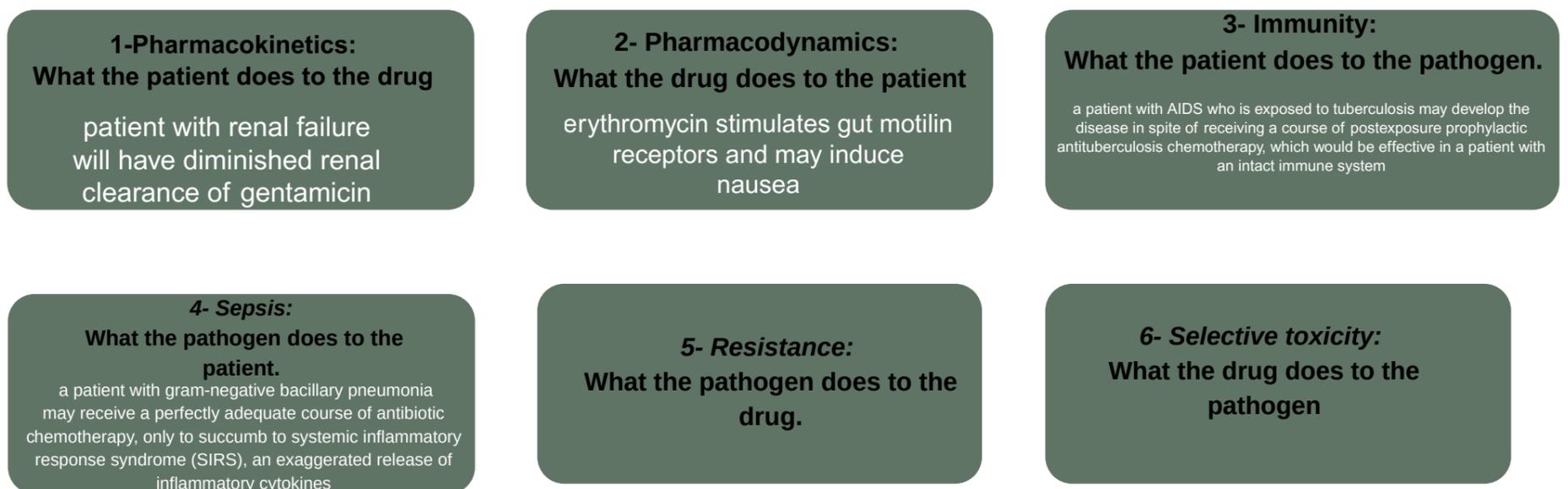
- now refers more broadly to the use of any chemical compound that selectively acts on microbes or cancer
- effective chemotherapeutic drugs is hindered by the common legacy humans share with all living organisms
- success requires exploitation of metabolic or structural differences between normal human cells and disease-producing cells.
- The more closely related the undesirable cells are to normal human cells, the more difficult the task of finding a magic bullet.

(For example, it is easier to cure malaria than cancer)

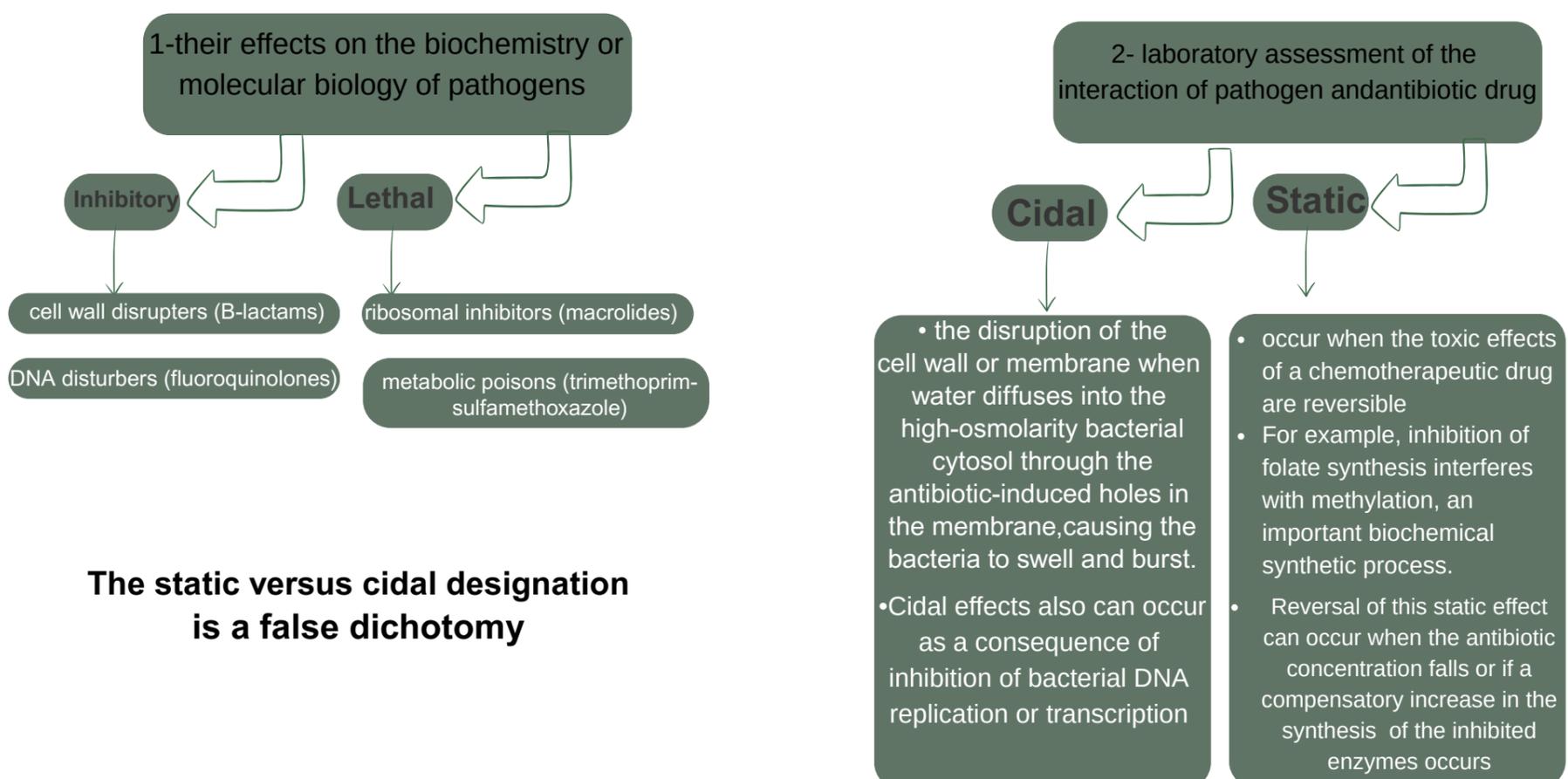
THE PATIENT–DRUG–PATHOGEN INTERACTION

- In the laboratory the strain of pathogen, the number of infecting organisms, the culture medium, the antibiotic concentration, and the duration of antibiotic exposure can be precisely specified
- chemotherapy of human disease is complex, as it depends on a complex patient–drug–pathogen interaction

This interaction has six components :



Antibiotics can be classified according to:



The static versus cidal designation is a false dichotomy

The calcification of a drug will depend on:

- the pharmacological properties of the drug
- immune system function,
- inoculum size,
- Drug concentration in tissue
- duration of therapy.

- A cidal drug may prove to be merely static if an inappropriately low dose or short treatment course is prescribed.
- A static drug may be cidal if given in high doses for prolonged courses to exquisitely sensitive pathogen

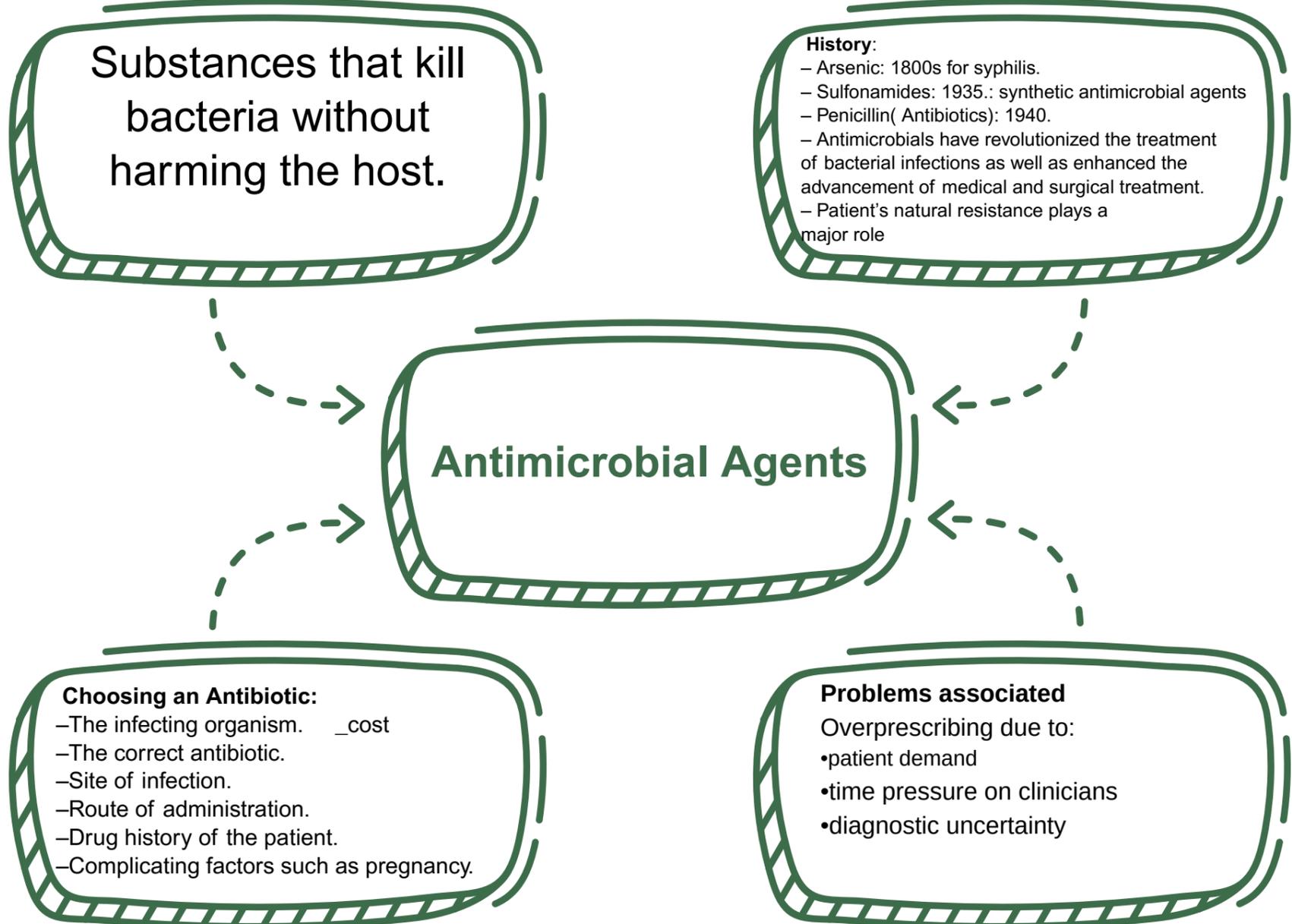
MANAGING CHEMOTHERAPY:

- **Physicians must select**
- a drug,
- Administration route,
- dosage,
- and dosing interval.
- **These may be changed several times during therapy.**
- **the regimen is adjusted according to the results of culture and sensitivity testing**
- **Once a chemotherapy regimen has been selected, the next step is to define the outcome measures**
- **Patients should be instructed to continue antibiotics for the full duration indicated, even if they feel Better**
- **If the patient's recovery is delayed from what is reasonably expectable, the diagnosis should be reconsidered**
- **Many patients receive lengthy courses of antibiotics that probably should not have been started.**
- **More than half of courses of antimicrobial chemotherapy are inappropriate**
- **There should be Careful sequential evaluation of seriously ill patients who really need these antibiotics to be prescribed**

Example
 Defining therapeutic success of pneumonia by:

- resolution of fever
- purulent sputum production,
- normalization of the white blood cell count,
- reversal of tachypnea and hypoxia

- Influenza pneumonia and viral upper respiratory infections, for example, are not controlled by antibiotics, although many patients with these illnesses receive such antibiotics
- Of course, influenza may be complicated by post influenza staphylococcal pneumonia, for which antibiotics are indicated.



Substances that kill bacteria without harming the host.

History:
 – Arsenic: 1800s for syphilis.
 – Sulfonamides: 1935.: synthetic antimicrobial agents
 – Penicillin(Antibiotics): 1940.
 – Antimicrobials have revolutionized the treatment of bacterial infections as well as enhanced the advancement of medical and surgical treatment.
 – Patient's natural resistance plays a major role

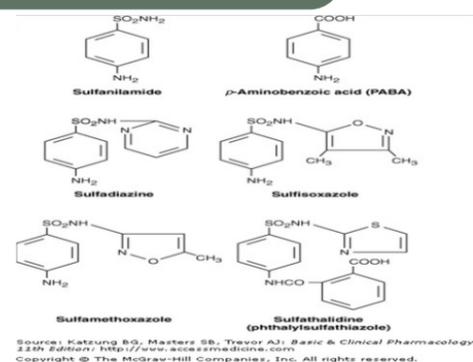
Choosing an Antibiotic:
 –The infecting organism. _cost
 –The correct antibiotic.
 –Site of infection.
 –Route of administration.
 –Drug history of the patient.
 –Complicating factors such as pregnancy.

Problems associated
 Overprescribing due to:
 •patient demand
 •time pressure on clinicians
 •diagnostic uncertainty

Sulphonamides:

the presence of abnormal material in the blood, usually applied to diseases affecting blood cells or platelets. Evidence of dyscrasia can be present with a WBC count of over 1,000,000.

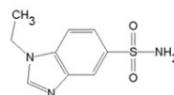
- Almost obsolete nowadays because of:
 - Bacterial resistance.
 - bacteriostatic
 - Toxicity:
- Nausea.
- Rashes
- Blood dyscrasi
- Precipitation (crystallization) in urinary tract and stone formation.



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Chemical features

- SO₂NH₂ group is not essential as such
- the important feature is that the sulfur is linked directly to the benzene Ring
- The NH₂ group is essential



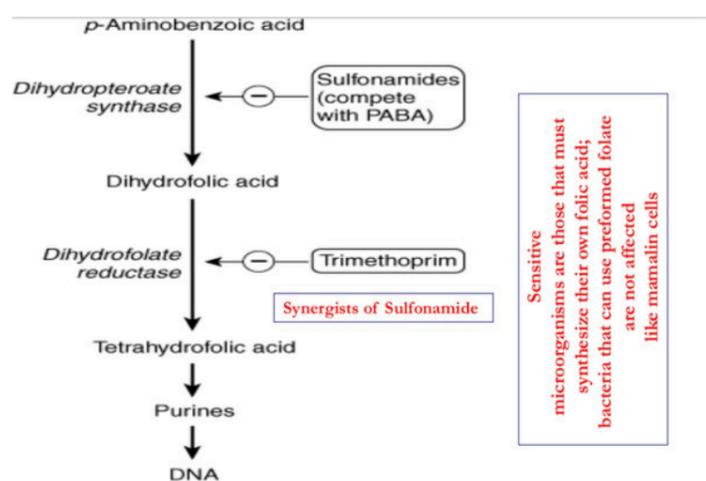
Cotrimoxazole- Trimethoprim Combination (Bactrim, Septrin, Balakatrin):

- One of the few, still used, sulfa drugs.
- Very effective fixed combination.
- No resistance.
- Very useful in UTI, RTI, Salmonella, and pneumocystis pneumonia, an opportunistic infection in AIDS patients.



Mechanism of Action:

- structural analogs and competitive antagonists of **para- aminobenzoic acid (PABA)**
- Prevent normal bacterial utilization of PABA for the synthesis of folic acid



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Quinolones:

- Interfere with cell division of bacteria.

• Nalidixic Acid:

–Very old urinary antiseptic.

• Norfloxacin:

–Used only for UTI.

–3-day course.

• fluorinated 4-quinolones

_such as **ciprofloxacin** (CIPRO), moxifloxacin (AVELOX), and gatifloxacin (TEQUIN)

Ciprofloxacin:

-Wide range of activity, even Botulinum.

-Expensive.

-Prophylaxis for meningitis.

-Can cause g.i upset, and epilepsy

- Botulinum toxin is produced by Clostridium botulinum bacteria