

CHEMOTHERAPY

Synthetic drugs, drugs produced by bacteria and fungi called antibiotics

Selective toxicity

- I. Ehrlich 1906 - Chemotherapy idea
- II. Sulfonamides 1930 - Sulfanilamide - PABA analog
PABA → FOLIC ACID (VITAMIN)
Streptococcus pyogenes and urinary tract infections
- III. Antibiotics
 - A. Penicillin - Fleming - *Penicillium notatum*
Inhibitor of cell wall peptidoglycan synthesis
 - B. Streptomycin - Waksman - *Streptomyces griseus*
Mycobacterium tuberculosis
protein synthesis inhibitor on 70S ribosomes
others: Tetracycline, Erythromycin, Chloramphenicol
- IV. Drug Mechanisms
 - A. Cell wall synthesis inhibition
 - B. Effects on membranes
 - C. Protein synthesis inhibition
 - D. Nucleic acid synthesis inhibition
- V. Anti-viral Drugs
- VI. Complications of Drug Use
 - A. Hypersensitivity - Penicillin
 - B. Toxicity - Streptomycin - Otic nerve damage
Chloramphenicol - pernicious anemia
 - C. Normal flora destruction -
Microbial antagonism
Prolonged use of antibiotic
Opportunistic pathogen
Candida albicans - Thrush, Vaginitis
 - D. Spread of multiple drug resistance
Pencillinase - *S. aureus*
Resistance plasmids - resistance factors
RTF (plasmid replication, plasmid transfer, drug resistance)
Multiple drug resistance - Japan - resistance to Sulfonamide, Streptomycin,
Chloramphenicol, and Tetracycline

% *Shigella* with multiple drug resistance

	<u>1954</u>	<u>1964</u>
Japan	0%	50%

	<u>1962</u>	<u>1965</u>
London	3%	61%

VII. Transposons

Mobile genetic elements - jumping genes
Carry antibiotic resistance genes