Introduction to Antimicrobials Cheat Sheet

by Carm (Carmilaa) via cheatography.com/49544/cs/15398/

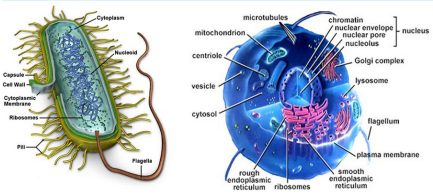
Chemotherapy:

Antimicrobials:	Anti-cancer Drugs:
> antibacterials	> alkylating agents
> antivirals	> natural products
> antiprotozols	> hormones
> antifungals	> antimetabolites
> anthelmitics (antiparasitic)	

Chemotherapeutic Agents:

Chemicals intended to be **toxic** to the pathogenic organism, but **innocuous** to the host.

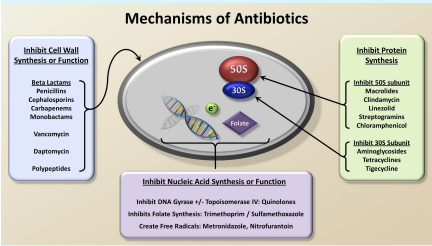
Humans vs. Microorganisms:



prokaryotic cell (bacteria)

eukaryotic cell (protists, fungi, animals, plants)

Mechanisms of Antibiotics:



Antibacterial Drug Targets:

1. Inhibit cell wall synthesis and function
2. Inhibit nucleic acid cell wall and function
3. Inhibit protein synthesis

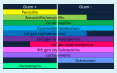
> Human cells have no cell wall

> Human cells have 60S and 40S ribosomal units

> Human cells have different forms of enzymes

Different Types of Bacteria"

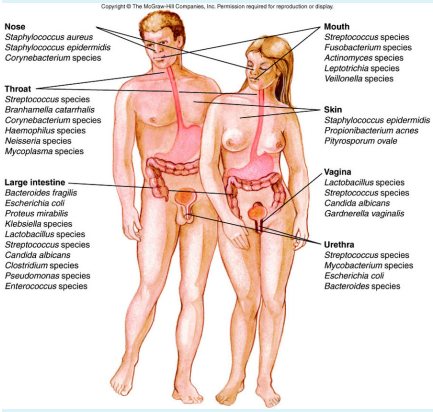
Antibiotic Activity for Microorganisms:



An antibiotic that inhibits peptidoglycan synthesis?

β-Lactam antibiotics are bacteriocidal and act by inhibiting the synthesis of the peptidoglycan layer of bacterial cell walls. The final step in the synthesis of the peptidoglycan is facilitated by penicillin-binding proteins (PBPs).

Normal Flora of Body:



General side effects of antibiotics:

Vomiting.
Severe watery diarrhea and abdominal cramps.
Allergic reaction (shortness of breath, hives, swelling of lips, face, or tongue, fainting)
Rash.
Vaginal itching or discharge.
White patches on the tongue

Resistance:

3 ways in which resistance is spread:

1. Transfer of resistant bacteria between people
2. Transfer of resistance genes between bacteria (plasmids)
3. Transfer of resistance genes between genetic elements within bacteria (transposons)

Genetic determinants of AB resistance:

1. CHROMOSOMAL DETERMINANTS: MUTATIONS: Division may give rise to a mutation in a gene, probability of a mutation causing a change in drug sensitivity to drug resistance can be quite high.

Genetic determinants of AB resistance: (cont)

The presence of a few mutants is not sufficient to produce resistance: despite the selective advantage that the resistant mutants possess, the drastic reduction of the population by the antibiotic usually enables the host's natural defenses to prevail at least in acute, if not chronic, infections. However, the outcome may not be quite so happy if the primary infection is caused by a drug-resistant strain.. 2. GENE AMPLIFICATION: treatment with antibiotics can induce an increased number of copies for pre-existing resistance genes such as antibiotic-destroying enzymes and efflux pumps

3. EXTRACHROMOSOMAL DETERMINANTS: PLASMIDS exist free in the cytoplasm. These are also genetic elements that can replicate independently. Plasmids that carry genes for resistance to antibiotics (r genes) are referred to as R plasmids. Much of the drug resistance encountered in clinical medicine is plasmid determined. It is not known how these genes arose.

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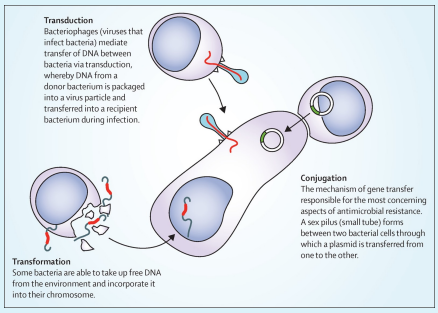
Transfer of resistance between bacteria:



Biochemical mechanisms of resistance:

1. Alteration of drug-sensitive or drug-binding site	> Mutation
2. Production of an enzyme that inactivates the drug	> Destruction or inactivation
3. Alteration of enzyme pathways	> Destruction or inactivation
4. Decreased accumulation in bacterium	> Efflux

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