

Chapter 7/20

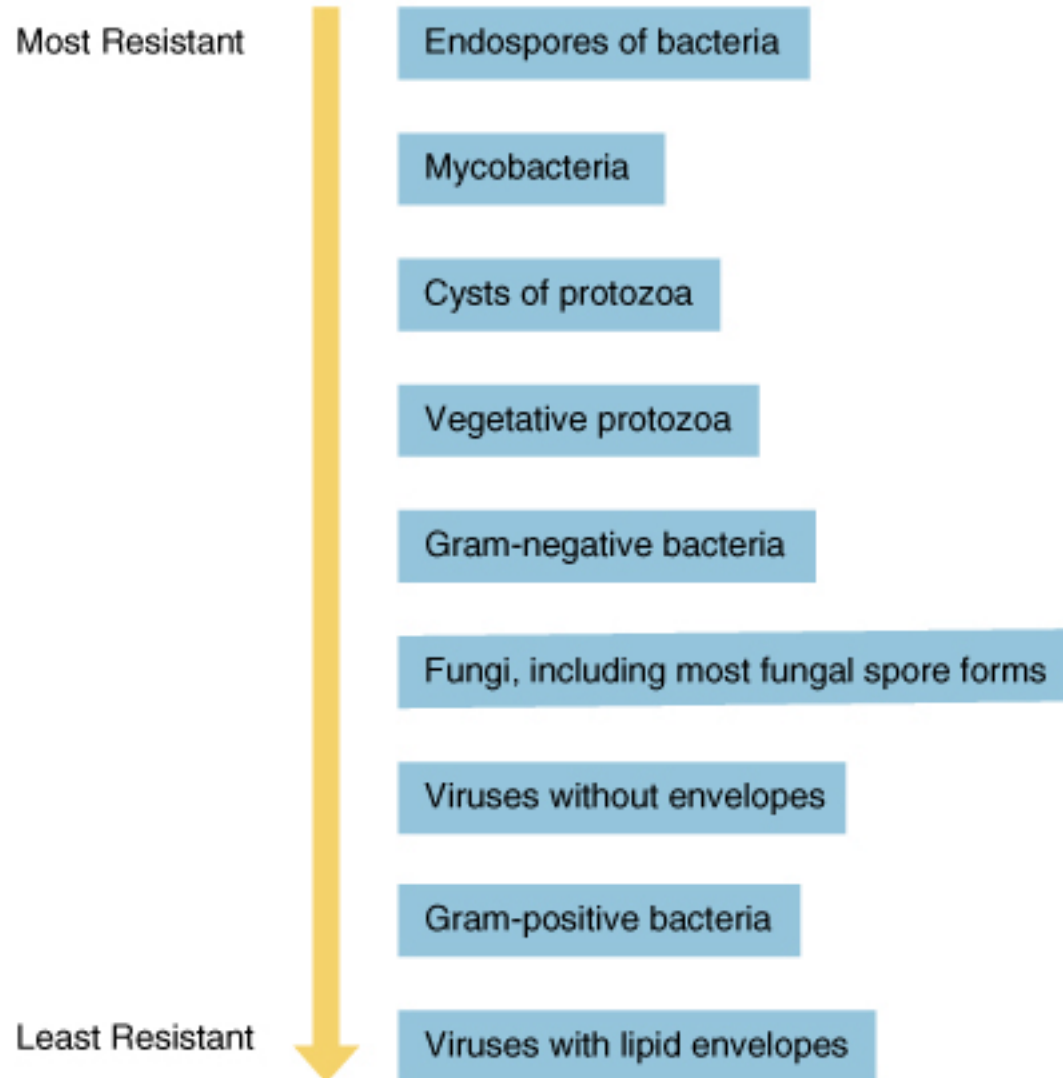
Disinfectants

Antimicrobials

Disinfectants

- Classes
 - Based upon chemical derivative

Evaluating Disinfectant



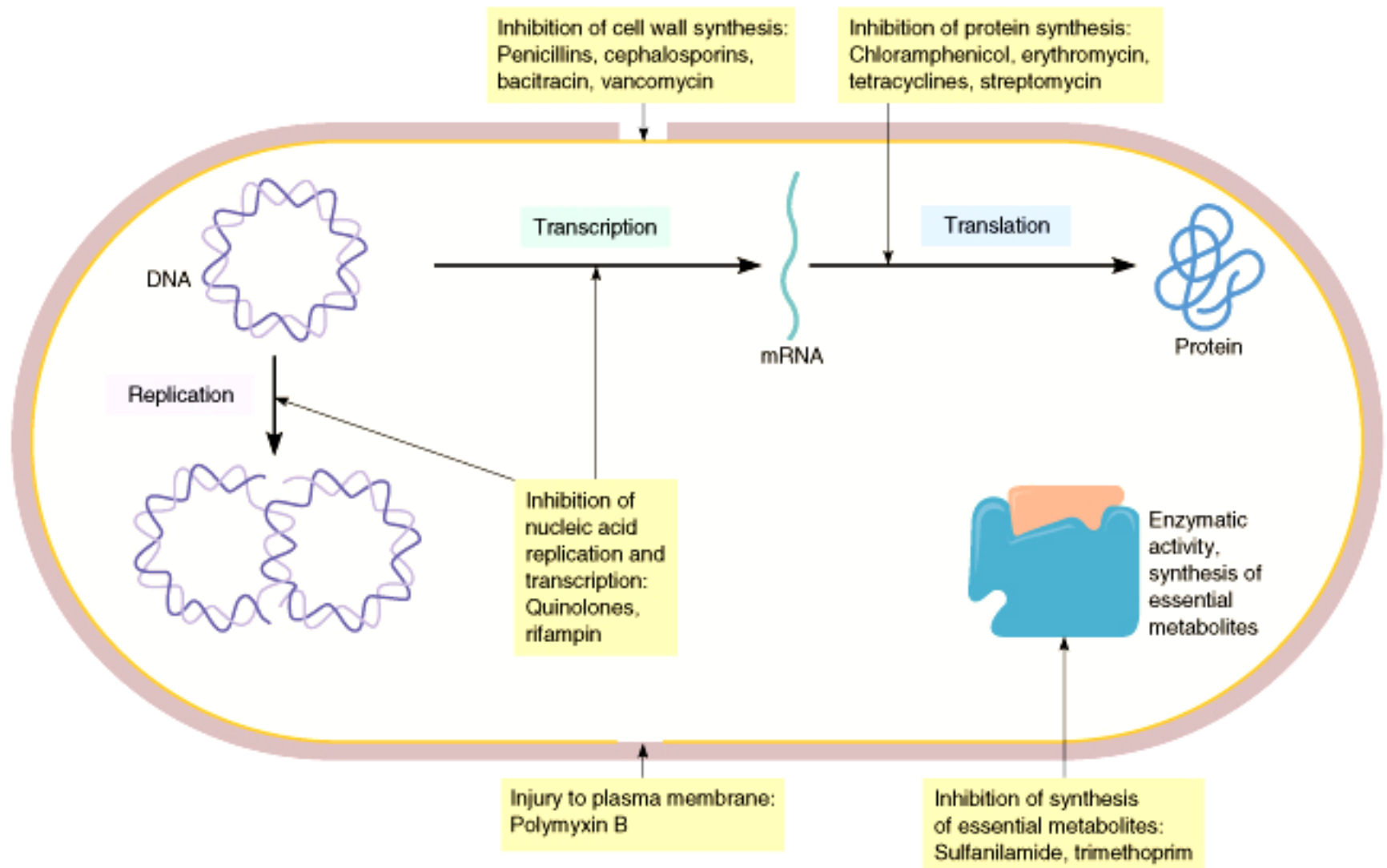
Testing Disinfectant

- Use dilution
 - *Salmonella cholerasuis*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*
 - Bacteria dried on metal rings, placed in disinfectant then transferred to growth medium
- Disc diffusion
 - Filter paper discs soaked with disinfectant
 - Look for area of growth inhibition

Antibiotics

- Made by living microbes
- Spectrum
 - Broad – not always best choice
“superinfections”
 - Narrow
 - Prokaryotic
 - Eukaryotic

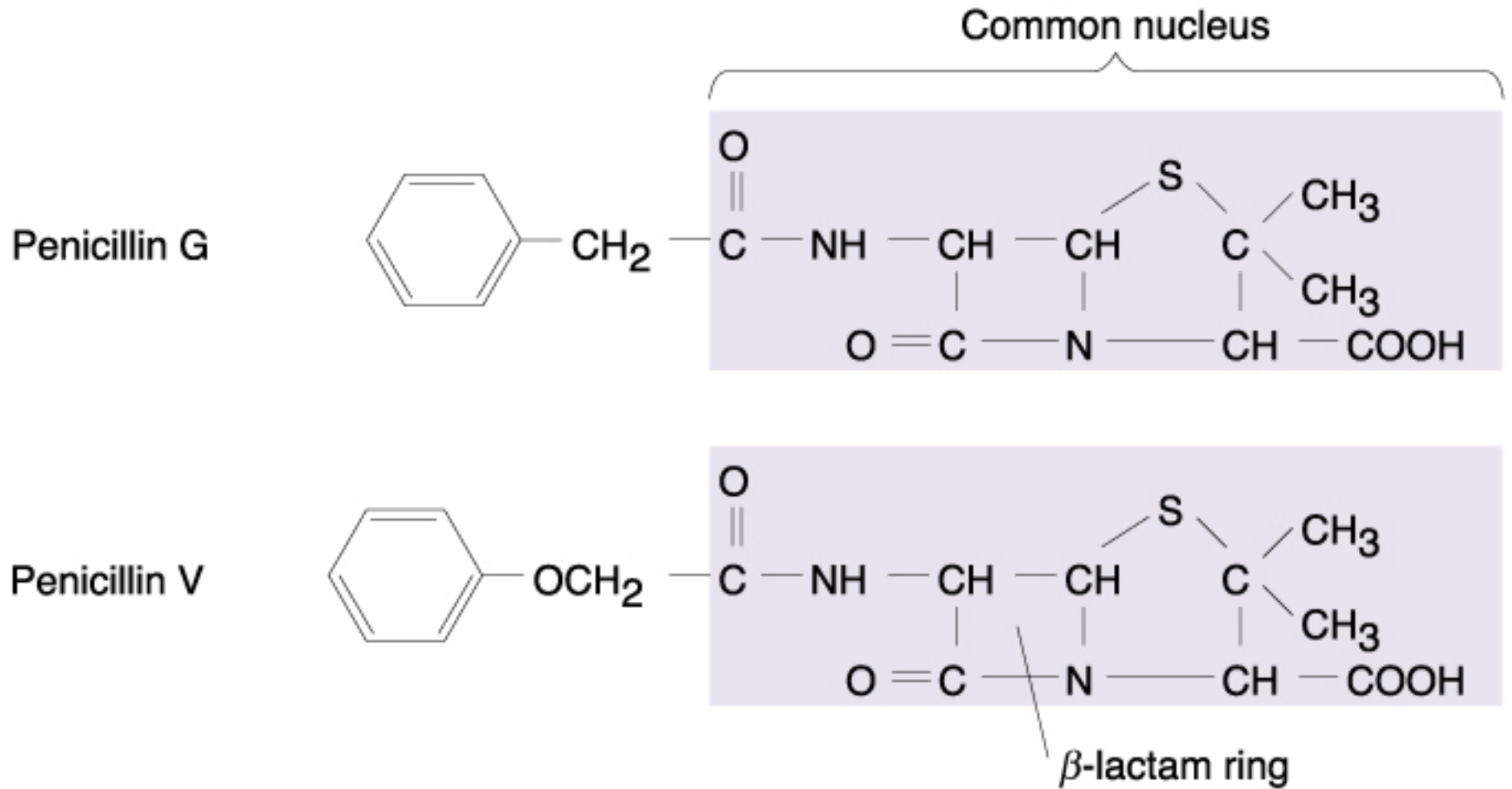
Modes of Action



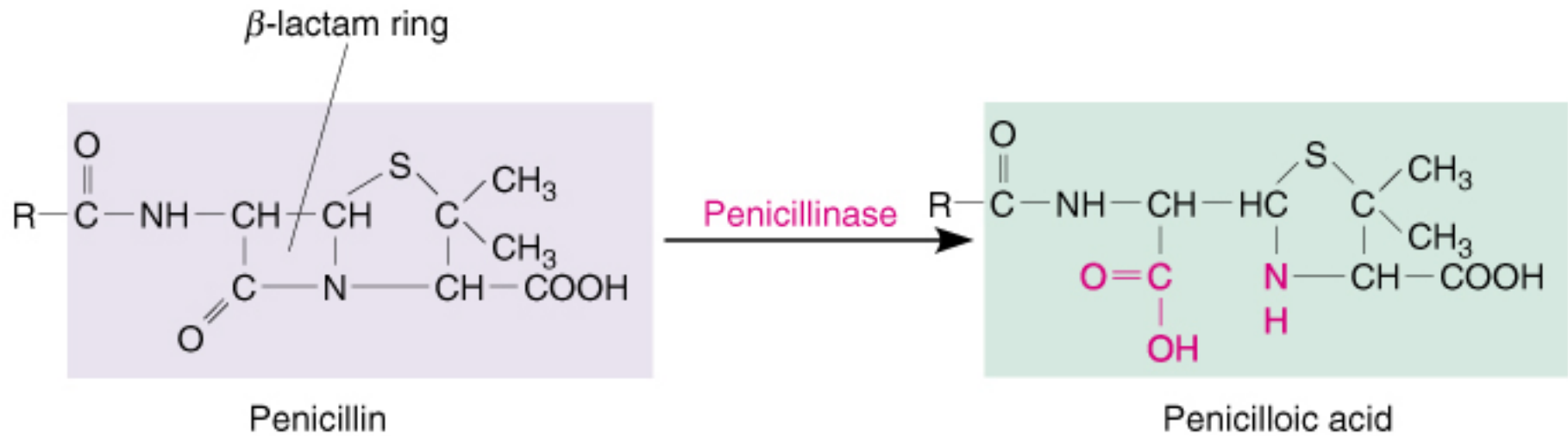
Cell Wall

- Penicillin
 - Natural –rapidly excreted, inactivated by acid
- Semisynthetic – modified penicillin
- Cephalosporins – six member ring
- Carbapenems – modified Beta-lactam ring
- Bacitracin – inhibits earlier stage than penicillin
- Vancomycin
- Isoniazid/Ethambutol – Mycobacterium tuberculosis

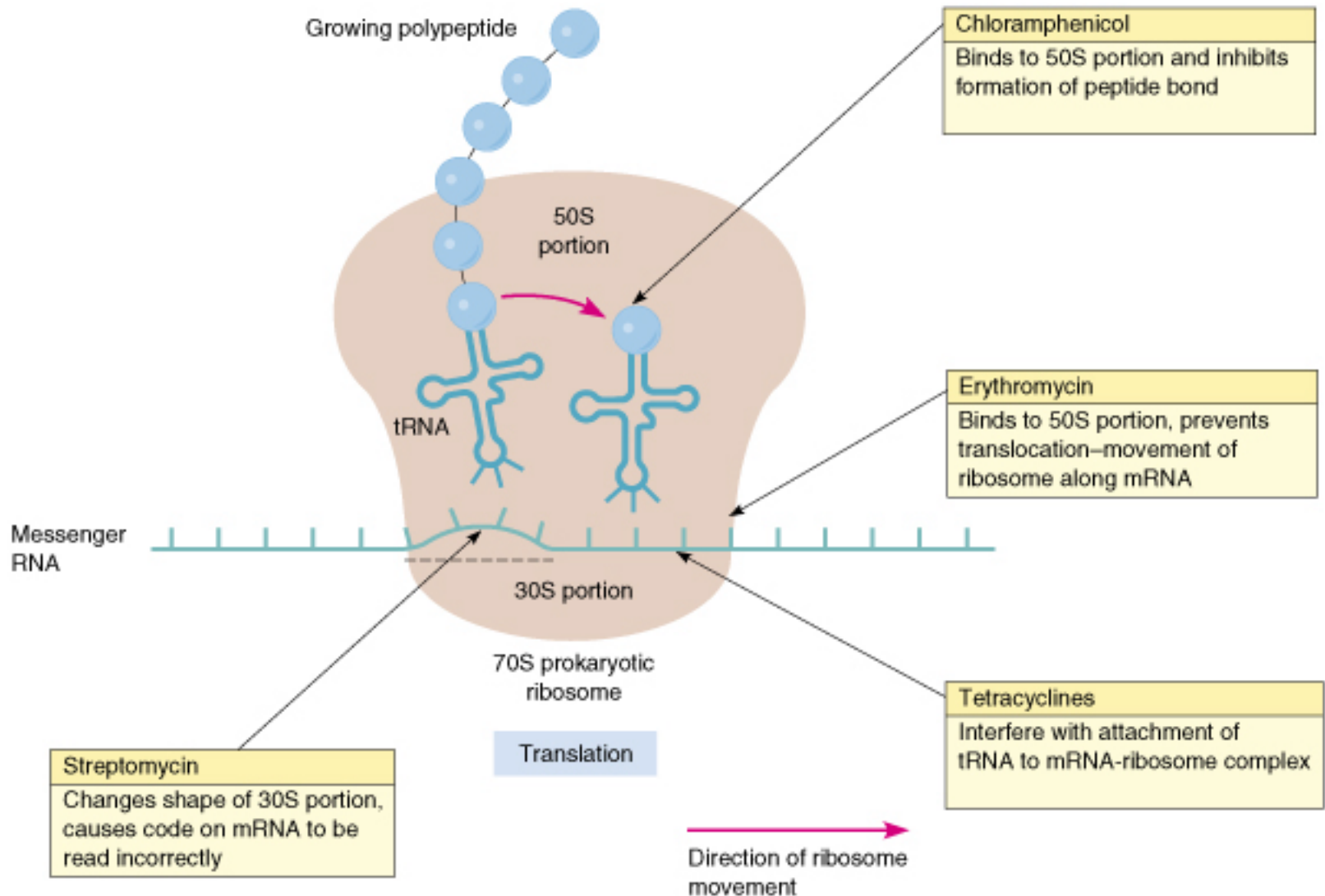
Penicillin



β -Lactamase



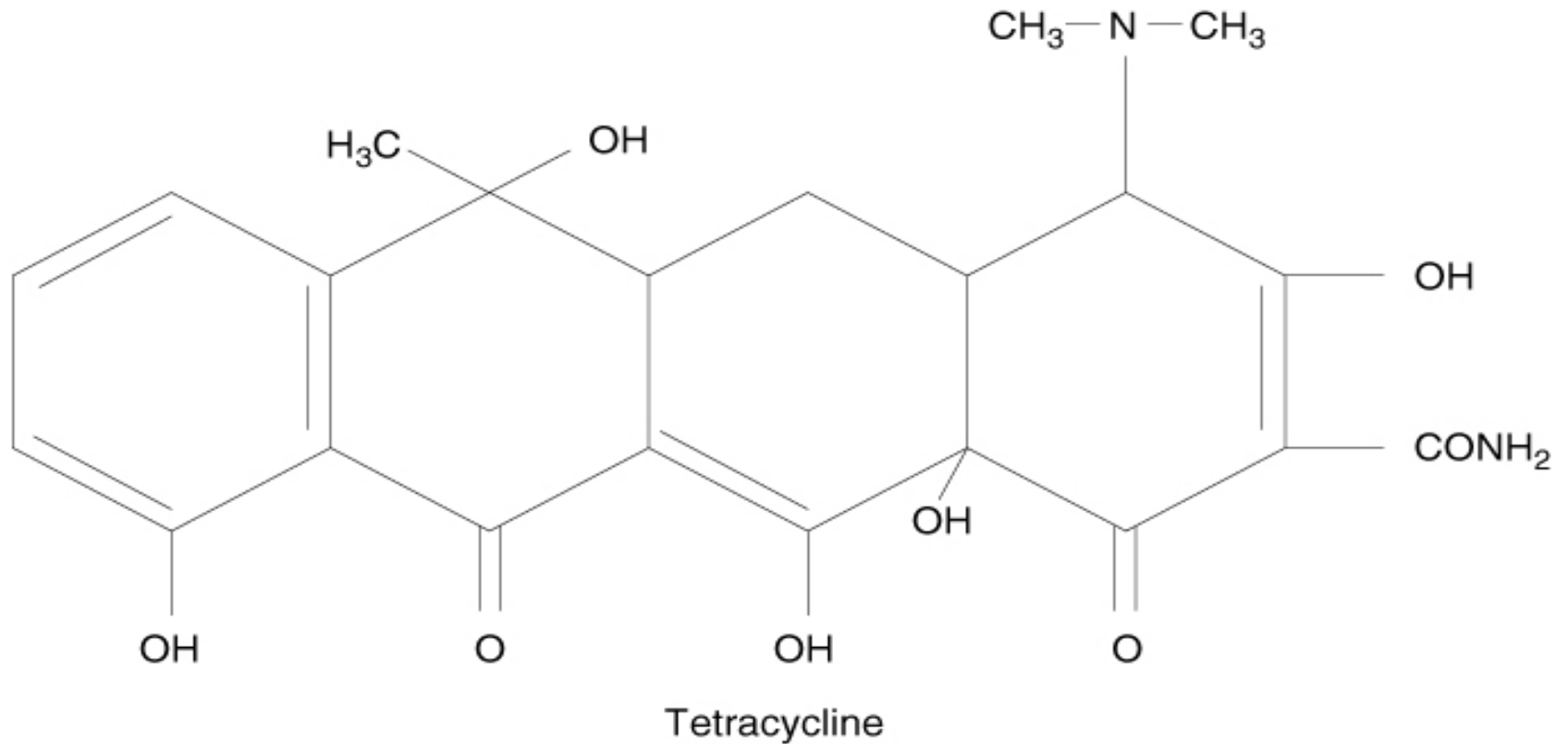
Protein Synthesis



Protein Synthesis

- Aminoglycosides – gram negative,
Streptomycin – toxic, mRNA mis-read
- Tetracyclines – Rickettsia and Chlamydia
- Chloramphenicol – suppresses bone marrow
- Macrolides – erythromycin, similar to penicillin in spectrum

Inhibits tRNA attachment to ribosome
Animal feed additive



Plasma membrane

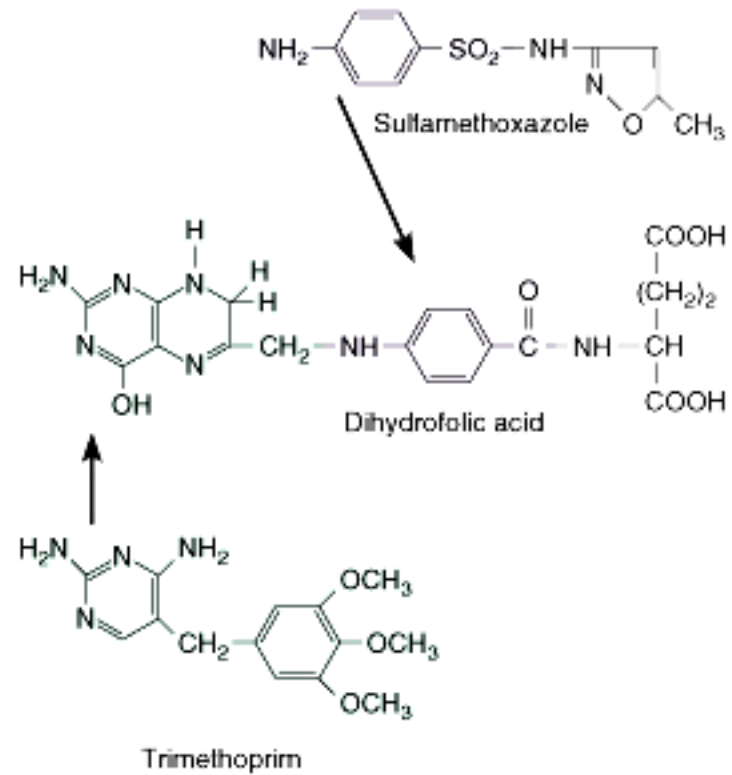
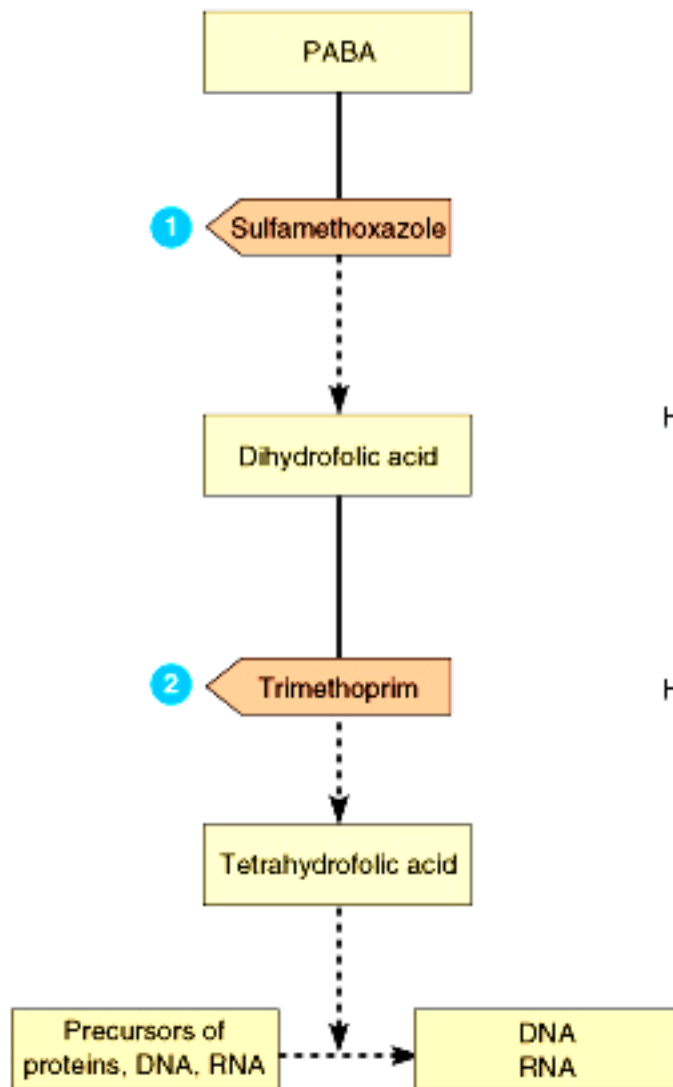
- Polymyxin B – gram negative
- Amphotericin B – antifungal, binds to sterols

Nucleic Acid

- Rifamycins – mRNA synthesis, therapeutic levels in cerebrospinal fluid
- Quinolones – inhibits DNA gyrase

Metabolite Analog

- Sulfa drugs – para-aminobenzoic acid
 - Trimethoprim-sulfmethoxazole
 - Pneumocystis (AIDS associated fungal infection)



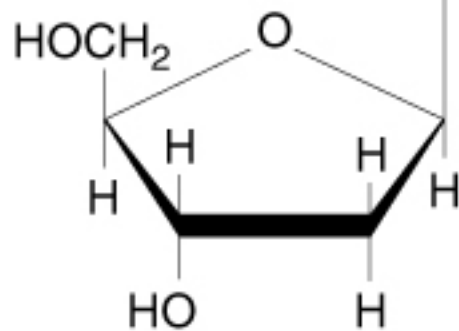
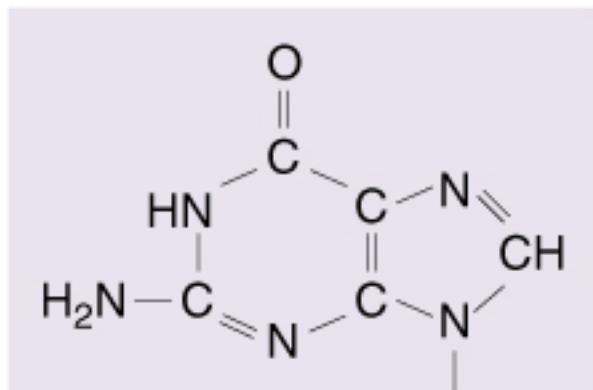
Anti-Fungals

- Polyenes – amphotericin B
- Azoles – imidazole (miconazole)
- Griseofulvin – dermatophytes (binds keratin)
inhibits microtubules

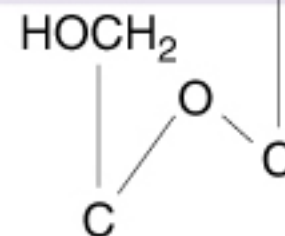
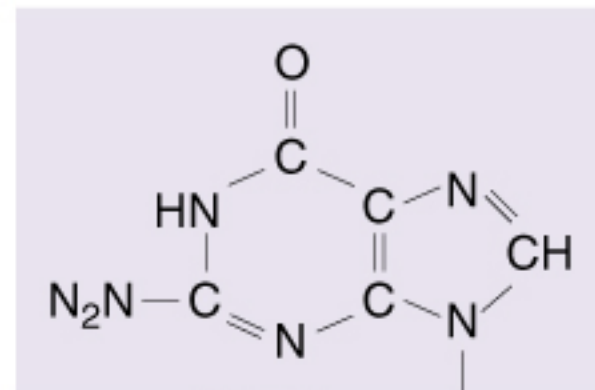
Anti-Viral

- Nucleoside/Nucleotide analogs
- Enzyme inhibitors – protease inhibitors
 - Influenza – relenza and tamiflu
 - HIV - indinavir

Guanine



Deoxyguanosine



Acyclovir

(a) Structural resemblance between acyclovir and guanine-containing nucleoside

Copyright © 2001 Benjamin Cummings, an imprint of Addison Wesley Longman, Inc.

Anti-protozoal and Anti-helminthic

- Protozoal
 - Quinine – malaria
 - Metronidazole (Flagyl) – protozoa and anaerobes
- Helminthic
 - Praziquantel – alters membrane permeability