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BMED 328.01: Antimicrobial Agents

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INSTRUCTORS: David Freeman, Office - SB 308, Phone: 243-4772, E-mail: david.freeman@umontana.edu
Office Hours: Tuesday and Thursday, 11:00 - 1:00 p.m. and Friday, 1:10 - 4:00 p.m.
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EXAMS AND GRADING:

First Exam: Wednesday, FEB. 14 60 points
Second Exam: Friday, MAR. 23 80 points
Third Exam: Friday, APRIL 27 80 points
Final Exam: Monday, MAY 7 100 points
10 Point Quizzes: Best 5 or 6 out of 6 scores. . 50 or 60 points
Total Points: 370 or 380 A>92% A->90% B+>88% B>82% B->80% C+>78% C>72% C->70% D>65%

1. All EXAMS are comprehensive
2. All exams and quizzes must be taken at scheduled times
3. Instructor must be informed BEFORE missing a scheduled exam period for GOOD REASONS
4. Missed exam periods must be made up within 2 days
5. Corrections to exams or quizzes must be requested within 7 days after returning

STUDENT PERFORMANCE OBJECTIVES:

- 1) Know the normal relevant biochemical pathways and the major biochemical mechanisms of action for the different classes of drugs
- 2) Know the biochemical mechanisms involved in the development of resistance to different classes of antimicrobial agents
- 3) Given a representative chemical structure or name of a drug, know its biochemical mechanisms of action and for development of resistance
- 4) Given a representative chemical structure or name of a drug, know its major chemical, pharmacologic, or therapeutic categorization
- 5) Given a representative chemical structure or name of a drug, know its major therapeutic uses and spectrum of activity
- 6) Given a representative chemical structure or name of a drug, know important aspects of its absorption, pharmacokinetics, and metabolism
- 7) Know important chemical features (i.e., polar or lipophilic properties, labile groups, etc.) that affect the absorption, distribution, metabolism, elimination, potency, stability, or formulation of a class of antimicrobial agents
- 8) Given the chemical structure of an antimicrobial agent, know important chemical changes that will predictably alter its properties (i.e., potency, duration of action, stability, etc.)
- 9) Given a representative chemical structure or name of a drug, know its most common or serious adverse or side effects

REQUIRED TEXT: Goodman & Gilman, "The Pharmacological Basis of Therapeutics", 11TH Edition

**Reading
in Text**

1095-1109 **I. General Considerations, Categorization, and
Sensitivity Testing of Antimicrobial Agents**

The following areas will be covered for each outline topic below:

1. General Chemical Structures and Properties of Agents
2. Biochemical Mechanisms of Action for Agents
3. Biochemical Mechanisms Involved in the Development of Microbial Resistance
4. Important Aspects of Absorption, Distribution, Metabolism, and Elimination for Agents
5. Antimicrobial Spectrum of Activity for Agents
6. Important Adverse Effects and Drug Interactions for Agents

Text

II. Antibacterial Agents

- 1111-1118 A. Sulfonamides and TRIMETHOPRIM
- 1119-1122 B. Quinolones, Fluoroquinolones
- 1122-1124 C. METHENAMINE and NITROFURANTOIN
- D. Beta-lactam Antibiotics
 - 1127-1143 1. Penicillins
 - 1151-1152 2. Beta-lactamase inhibitors (CLAVULANIC ACID, SULBACTAM, TAZOBACTAM)
 - 1143-1150 3. Cephalosporins
 - 1150-1151 4. Carbapenems (IMIPENEM, MEROPENEM, ERTAPENEM)
 - 1151 5. Monobactams (AZTREONAM)
- 1193-1199 E. VANCOMYCIN, TEICHOPLANIN, DAPTOMYCIN, POLYMYXIN, BACITRACIN, MUPIROCIN
- 1155-1168, 1193 F. Aminoglycosides, SPECTINOMYCIN
- 1173-1179 G. Tetracyclines, Glycylcyclines (TIGECYCLINE)
- 1182-1187 H. Macrolides (ERYTHROMYCIN, AZITHROMYCIN, CLARITHROMYCIN)
- 1187-1188 I. Ketolides (TELITHROMYCIN)
- 1179-1182 J. CHLORAMPHENICOL
- 1188-1190 K. CLINDAMYCIN
- 1190-1191 L. Streptogramins (QUINUPRISTIN, DALFOPRISTIN)
- 1192-1193 M. Oxazolidinones (LINEZOLID)
- 1057-1060 N. METRONIDAZOLE

III. Anti-mycobacterial Agents

- 1203-1214 A. Drugs for Tuberculosis (ISONIAZID, RIFAMPIN, PYRAZINAMIDE, ETHAMBUTOL)
- 1216-1218 B. Drugs for Mycobacterium Avium Complex Infections

IV. Antifungal Agents

- 1225-1230 A. AMPHOTERICIN B and FLUCYTOSINE
- 1230-1234 B. Azole Antifungals - Imidazoles and Triazoles (KETOCONAZOLE, FLUCONAZOLE, ITRACONAZOLE, VORICONAZOLE, POSACONAZOLE)
- 1235 C. Echinocandins (CASPOFUNGIN, MICAFFUNGIN, ANIDULAFUNGIN)
- 1235-1240 D. Miscellaneous and Topical Antifungal Agents (GRISEOFULVIN, TERBINAFINE, CLOTRIMAZOLE, MICONAZOLE, TOLNAFTATE, NYSTATIN, UNDECYLENIC ACID)

V. Antiviral Agents

- 1243-1245 A. Overview of Viral DNA and RNA Biochemical Processes
- 1247-1248 B. Overview of Biochemical Mechanisms of Action and Resistance Development
- 1246-1256 C. Non-HIV Antiviral Agents (ACYCLOVIR, VALACYCLOVIR, CIDOFOVIR, DOCOSANOL, FAMCICLOVIR, PENCICLOVIR, FOMIVIRSEN, FOSCARNET, GANCICLOVIR, VALGANCICLOVIR, TRIFLURIDINE, VIDARABINE)
- 1256-1260 D. Antiinfluenza Agents (AMANTADINE, RIMANTIDINE, OSELTAMIVIR, ZANAMIVIR)
- 1260-1268 E. Antihepatitis Agents, Other Antiviral Agents, and New Strategies

VI. HIV Antiviral Agents

- 1273-1275 A. Overview of HIV Infection
- 1276-1280 B. History and Principles of HIV Chemotherapy
- 1280-1292 C. Nucleoside Reverse Transcriptase Inhibitors (ABACAVIR, DIDANOSINE, EMTRICITABINE, LAMIVUDINE, STAVUDINE, TENOFOVIR, ZALCITABINE, ZIDOVUDINE)
- 1292-1297 D. Nonnucleoside Reverse Transcriptase Inhibitors (DELAVIRDINE, EFAVIRENZ, NEVIRAPINE)
- 1297-1308 E. HIV Protease Inhibitors (AMPRENAVIR, ATAZANAVIR, DARUNAVIR, FOSAMPRENAVIR, INDINAVIR, LOPINAVIR, NELFINAVIR, RITONAVIR, SAQUINAVIR, TIPRANAVIR)
- 1308-1310 F. Entry Inhibitors (ENFUVIRTIDE) and New Drugs in Development