Reference Material

- Basic and Clinical Pharmacology by Katzung, 11th ed., 2009, paperback (required text, new: $65, used: $49)  
  [http://www.library.vcu.edu/](http://www.library.vcu.edu/)

- Goodman & Gilman’s Pharmacological Basis of Therapeutics, 12th ed. 2010 (optional text)  
  (New: $170, Used: )

- Paperback manual ($58, based on 11th ed.)

Pharmacology Syllabus

- Course material approx. 300 pages
- Drug summary tables for available for Pharmacology instructors.  
  - Drug summary tables also available for faculty in other courses  
  - Drug summary tables are not a substitute for syllabus, but list the main points or features  
  - Understanding the drug summary Requires knowledge of syllabus

Additional learning resources

- Micromedex and MD Consult  
  These are drug and patient databases available through the VCU Library web

- Rx List  [www.rxlist.com](http://www.rxlist.com)

- Online Pharmacokinetics training module (Dr. Ritter)

- Online Cardiovascular modules (Dr. Ishac)

Alternate Pharmacology website

- [http://www2.courses.vcu.edu/ptxed/ptx](http://www2.courses.vcu.edu/ptxed/ptx)

- Contains: many practice questions (ANS), faqs, audio review of the cardiovascular system, online PowerPoint presentations, glossary. PDF and other downloads

- [https://ecurriculum.som.vcu.edu/](https://ecurriculum.som.vcu.edu/)
Examinations and Grading

• Final grade is determined by your performance on all pharmacology questions during the year 2011-12

• Pharmacology questions are identified on each exam (Pharmtox). Questions will count as part of your grade in each course (GI, CNS, Renal, etc.,) and then combined to determine your final pharmacology grade.

Exam Results 2010-11

Total pharmacology questions in various courses = 298 (class avg = 86.4)
Total all M-II questions 1420 (class avg = 83.7 – 92.0)
Pharmacology % of total – 21.0%

2010-11: Honors (41) High Pass (70) Pass (84) Marginal (0) Fail (0) Incomplete (3)

Faculty

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Pharmacology Examination

• Exam will be on Friday Aug. 12th in MSB
• Curriculum office will announce time & duration
• It will be a paper exam not electronic
• The test will be multiple choice questions
• It will consist of 100 MCQs, no True/False
• You should bring a calculator; PDAs not allowed
• Contains reference value table (back)
• Most questions in USMLE Step 1 format
• Drug trade names not included nor required

Pharmacology Questions (Pharmtox)

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Cardiovascular & Pharmacokinetics, Pharmacokinetics Reviews (optional)

• Friday Aug. 5th, 12 noon in MSB (optional)
• Dr. Ishac: Review autonomic agents and their effect on the cardiovascular system
  * http://www2.courses.vcu.edu/ptxed/ptx/cv_ans.htm
• Monday Aug. 8th, 12 noon in MSB (optional)
• Dr. Ritter:
  • Review principles of Pharmacokinetics (ADME)
  • Online Pharmacokinetics self-learn module (access through eCurriculum)
Neuromuscular Blocking Agents - TBL
- Dr. Ishac
- Team-based Learning (TBL) session
- Tuesday Aug 9th, 9:40am-11am
- Use of “iClickers”
- Use M-I group assignments
- Complete reading assignment before class
- Individual MCQ (6) test
- Group MCQ test (same 6 questions)
- MCQ question discussion appeal
- General discussion question by group
- Review of material

Human Patient Module Cycle
- 0-5 min: Familiarize with manikin equipment and practice vital sign measurements.
- 5-25 min: Participation in simulation module (one of 10 modules)
- 25-30 min: Short debrief on performance as a health professional team
- 30-60 min: Formal debrief of two groups from different modules. Lead physician and reporter will present group case scenario and together with their team members answer questions and defend their decisions during the simulation module.

Human Simulation Module
- Drs. Ishac, Welch, Robinson & Cumpston
- 10 possible Human Patient Simulation modules
- View online overview (link on Resources page)
- Sign-up online (SRS) by Fri Aug. 5th, 10pm
- North Hospital, 2nd Floor, B218 (staging area)
- Held Mon & Tue Aug 8-9th, 12:30pm-5pm (30 min simulation session followed by 30 min debriefing)
- Team groups of 5-6 for simulation module
- 5 points towards your Pharmacology grade
- Presented with 1 module of 10 for simulation
- Reinforce concepts from class

Human Patient Simulation - Manikin

Human Patient Simulation
- Work in teams of 5-6
- Function as a health professional team
- 1 Lead Physician (patient history, present case, oversee team unity)
- 2-4 Secondary Physicians (perform PE exam ie. BP, HR, RR, O₂, pupil response etc)
- 1 Pharmacist, laboratory specialist
- 1 Reporter (record history, PE exam values, laboratory values, treatments, present case)

Potential Human Simulation Roles
1. Lead physician
2. Secondary physicians
3. Pharmacist
4. Nurse
5. Physical assessor
6. Laboratory specialist
7. Reporter
8. Patient companion
9. Faculty facilitator
Laboratory tests and scans

Pharmacotherapy – Drug Toolbox

Bethanechol neostigmine physostigmine
Atropine benzotropine pralidoxime (2-PAM)
Phentolamine propranolol metoprolol
Epinephrine norepinephrine clonidine
Diphenhydramine dopamine haloperidol
Labetalol fenoldopam phenoxybenzamine
Succinylcholine rocuronium acamprosate
Bupropion buspirone diazepam
Disulfiram flumazenil
Hydroxyzine lorazepam
Methadone morphone
N-acetyl cysteine naltrexone
Naltrexone thiamine
Varenacline normal saline

Tips for Drug Learning

• Learn agents by drug classes
  ie. beta-blockers, Ca++-blockers etc

• Key points:
  - Clinical application
  - Mechanism of action
  - Drug of choice (DOC)
    ie. epinephrine (anaphylaxis)
  - Prototype drugs, most common agents
    ie. propranolol, atenolol, metoprolol
  - Important drug/drug interactions
    ie. MAO inhibitors & tyramine rich food
  - Adverse drug reactions
    ie. beta-blockers – asthma, Raynaud’s D.
  - Do not focus on dosage, know high/low Rx

Typical / Ideal Step 1 Exam Question

A 42-old woman who is a biochemist is brought to the emergency department because of a 1-hour history of severe abdominal cramps, nausea, vomiting, sweating, and difficulty breathing due to bronchospasm and congestion. On physical examination her pulse is 45/min, BP is 85/50 mm Hg and she exhibits generalized muscle weakness. Laboratory studies show no abnormalities. Exposure to which of the following is most likely?

A. atropine
B. bethanechol
C. botulinum toxin
D. isofluorophate
E. phentolamine

Typical / Ideal Exam Question Type F 1d

A 52-old man who is biochemist undergoes a right total hip replacement. During the procedure, the patient experiences a flaccid muscle paralysis and a decrease in blood pressure following the administration of the neuromuscular blocking drug. Which of the following is most likely administered in this patient?

A. atracurium
B. mivacurium
C. pancuronium
D. rocuronium
E. succinylcholine
F. tubocurarine

Typical / Ideal Exam Question Type F 1e

A 52-old man undergoes a right total hip replacement. During the procedure, the patient experiences a flaccid muscle paralysis and a decrease in blood pressure following the administration of the neuromuscular blocking drug. At the end of the operation, a drug is administered to reverse the muscle paralysis. This drug was most likely which of the following?

A. atropine
B. dantrolene
C. neostigmine
D. pancuronium
E. physostigmine
F. succinylcholine
Drug Extensions I

- Beta-blockers: propranolol, atenolol
- Alpha1-blockers: prazosin, terazosin
- ACE inhibitors: lisinopril, captopril
- A-II blockers (ARBs): valsartan, losartan
- NMJ blockers: rocuronium, atracurium
- Ca Channel blockers: nifedipine, nicardipine
- HMG CoA reductase inhibitors (statins): simvastatin, atorvastatin

Drug Extensions II

- Thrombolytics: streptokinase, reteplase
- Corticosteroids: dexamethasone, prednisone
- Protein pump inhibitors: omeprazole, lan소prazole
- H2-blockers: cimetidine, ranitidine
- Benzodiazepines: diazepam, lorazepam

Drug Extensions III – Antibiotics/Antifungal Agents

- Antifungals: miconazole, itraconazole
- Aminoglycosides: gentamicin, streptomycin
- Macrolides: erythromycin, azithromycin
- Fluroquinolones: ciprofloxacin (2), levofloxacin (3)
- Tetracyclines: doxycycline, oxytetracycline
- Cephalosporins: cefaclor (2), cefdinir (3)
- Penicillins: penicillin G, penicillin V

Main Cytochrome P450 Enzymes

- Inhibitors: Caffeine, tizanidine, theophylline
- Inducers: Alcohol, isoniazid
- Substrates: Acenocacinophen

Toxicity I

- Lead: Vomiting, nausea, diarrhea, gingival bluish line, weakness, anemia, abdominal pain
- Arsenic: Vomiting, neuropathy, anemia, ataxia, hyperpigmentation
- Iron: Vomiting with blood, anemia, dark stools, bleeding gums
- Mercury: Vomiting, abdominal pain, hyperpigmentation
- Carbon monoxide: Vomiting, nausea, diarrhea, gingival bluish line, weakness, anemia, ab. pain
- Cyanide: Muscle weakness, hypotension, high anion gap, metabolic acidosis, dysrhythmias, coma

Toxicity II

- Organo-phosphate: Sudden death, muscle weakness, hypertension, salivation, sweating, miosis, lachrymation
- Bitch and meat: Dry mouth, blurred vision, mydriasis, tachycardia, flushing, delirium, convulsions, urinary retention, constipation, confusion
- Nitrites: Headache, dizziness, chest pain, tachycardia, hypotension, methemoglobinemia
- Methanol: Nausea, vomiting, perforation, blurred vision, ataxia
- Ethylene glyc: Slurred speech, nausea, vomiting, confusion, uncoordinated, lethargy, restless tremor, anion gap, acidosis, osmolar gap
- Warfarin: Ecchymoses, easy bruising, hemorrhage, anemia, dark stools, bleeding gums
- Amiodarone: Diffuse cracks, wheezing, pulmonary fibrosis, HR prolongation, QT wide, QRS, hypothyroidism, cardiac depression, photosensitivity, bluish skin