

FLORIDA STATE UNIVERSITY

COLLEGE OF MEDICINE

BIOMEDICAL SCIENCES 6401

GENERAL MEDICAL PHARMACOLOGY

Fall Semester, 2008

Course Director:

Graham A. Patrick, Ph.D.

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Office hours: 2:00-4:00 p.m., Monday through Friday,
at other times by appointment

BMS 6401: GENERAL MEDICAL PHARMACOLOGY

Description:

This introductory course deals with the concepts of pharmacodynamics (e.g., drug-receptor interactions, signaling mechanisms, and dose-effect relationships) and pharmacokinetics (e.g., drug absorption, distribution, metabolism, and elimination). The course emphasizes the biochemical and physiological bases for understanding drug action, and it introduces many major classes of drugs. Groups of drugs which are specifically considered include those acting on the autonomic nervous system, those most prominently affecting the immune system, and antineoplastic, antimicrobial, and antiparasitic compounds.

The course consists of 36 lecture hours, 3 clinical discussion-tutorial sessions, and 3 small group discussion sessions. The examinations for the course will be incorporated into the 3 integrated examinations for the 12 week Fall Semester. In addition, there will be 4 announced quizzes and a brief written critique which will be graded.

Course Coordinator:

Graham A. Patrick, Ph.D., Professor and Faculty Scholar in Pharmacology (e-mail: graham.patrick@med.fsu.edu)

Course Objectives:

The student should exhibit the following knowledge, skills, and behaviors:

Knowledge:

1. Demonstrate knowledge concerning each major drug class discussed in the course, including:
 - a. prototype drug(s),
 - b. mechanism(s) of action,
 - c. important therapeutic actions and applications, and
 - d. important (prevalent or life-threatening) adverse effects;
2. Demonstrate knowledge of the variations in drug response between individual patients, based upon disease, or other innate characteristics;
3. Demonstrate knowledge of the effect of age on pharmacodynamics, pharmacokinetics, and responses to therapy, with an emphasis on geriatric patients;
4. Develop an adequate basis of knowledge in pharmacology on which to build as the student advances through the clinical clerkship rotations;
5. Develop knowledge of drug classes and mechanisms into which additional drugs can be incorporated, compared, and contrasted as new drugs are developed and as the practice of medicine dictates.

Skills:

1. Demonstrate an understanding of the general types and clinical usage of drugs for treating diseases of each organ system;
2. Demonstrate the ability to recognize and understand the physicochemical and physiological factors that affect the absorption, distribution, metabolism, and elimination of drugs, and how these relate to pharmacokinetics;
3. Demonstrate the ability to interpret dose-response relationships for both desired and undesired drug effects;
4. Demonstrate an understanding of drug-receptor interactions and allied molecular phenomena at a basic level;
5. Demonstrate ability to interpret and analyze literature related to drugs.

Attitudes and behaviors:

1. Demonstrate professional behavior during activities in the course by being in attendance, on time, attentive, and a considerate and active participant in discussions.

Integration with COM Goals and Objectives:**Knowledge**

- * Demonstrate the application of the scientific bases of health, disease, and medicine to common and high impact medical conditions in contemporary society.
- * Describe the development, structure and function of the healthy human body and each of its major organ systems at the macroscopic, microscopic, and molecular levels.
- * Recognize and discuss the implications of altered structure and function (pathology and pathophysiology) of the body and its major organ systems that are seen in various diseases and conditions.
- * Identify changes in the structure and function of the human body associated with the aging process and be able to distinguish normal changes associated with aging from those that denote disease.
- * Describe the molecular basis of diseases and maladies and the way in which they affect the body (pathogenesis).
- * Demonstrate the ability to use basic biobehavioral and clinical science principles to analyze and solve problems related to the diagnosis, treatment, and prevention of disease.
- * Demonstrate the ability to employ a comprehensive, multidisciplinary approach to the care of patients that integrates biomedical and psychosocial considerations.

- * Recognize the implications of cultural, social, economic, legal, and historical contexts for patient care.
- * Describe strategies to support life long learning via both print and electronic sources to assist in making diagnostic and treatment decisions (e.g., practice guidelines) and to remain current with advances in medical knowledge and practice (e.g., medical information data bases).

Skills

- * Demonstrate the ability to evaluate the patient's medical problems and to formulate accurate hypotheses to serve as the basis for making diagnostic and treatment decisions.
- * Demonstrate the effective use of pharmacotherapeutic agents and other therapeutic modalities, while teaching patients the importance of preventative medicine, health promotion, and wellness.
- * Demonstrate the ability to acquire new information and data and to critically appraise its validity and applicability to one's professional decisions, including the application of information systems technologies for support of clinical decision-making.
- * Demonstrate the ability to organize, record, research, present, critique, and manage clinical information.

Attitudes/Behaviors

- * Demonstrate awareness of the health care needs of aging patients and a willingness to care for the elderly.
- * Demonstrate awareness of the unique health care needs of ethnically diverse populations and communities.

Relationship of course objectives to the "Six Principles" of the Curriculum:

1. The course is student-centered in providing a supportive, respectful environment in which to learn, while requiring that students be active and critical learners.
2. The course provides information that can be applied within a clinical context. Case-based learning and clinical situations are used to present and to reinforce knowledge and analysis.
3. The course is integrated with other courses in the year. Cases and examination questions integrate information from other disciplines, from the prerequisite biomedical sciences, and from clinical situations.
4. The course reinforces professional behavior in the classroom and small group settings. Ethical issues in relation to drug therapy or other drug usage are discussed. Application of biomedical science to patient care, in the form of

- pharmacotherapy, is a major emphasis of the course. Problem solving and critical thinking are promoted by classroom discussions, case discussions, examination questions, and written critique. Lifelong learning skills and management of information are promoted by the requirement for using online and library sources and by the application of information to novel situations.
5. Scholarship is encouraged primarily through an emphasis on the necessity of evidence-based utilization of drug therapy; e.g. evaluation of drug safety and efficacy, appropriateness of off-label usage of drugs, and post-marketing surveillance of drug effects.
 6. Information is included in the course which deals with drug effects in specific populations such as women, geriatric patients, pediatric patients, and patients belonging to specific ethnic groups.

Evaluation of Student Performance and Grading:

Questions pertaining to Pharmacology 6401 will be included in the three integrated examinations in the Fall semester (total of approximately 100 questions). In addition, there will be 4 announced quizzes, including 5 questions each. Each student will also be required to write a critique (1-2 pages, double-spaced, size 12 font) of a print, television, or radio advertisement for a drug product, and the critique will be graded on a 5-point scale (i.e., it will be equivalent to 5 examination questions). The types of questions may include computer-graded formats (multiple choice, matching) and open-ended, short answer questions. The grade which the student will earn is based upon the percentage of all of the questions answered correctly (of a total of approximately 125 possible), according to the following scale:

A = ≥ 90.0 % correct
B+ = 87.0 – 89.9 % correct
B = 80.0 – 86.9 % correct
C+ = 77.0 – 79.9 % correct
C = 70.0 – 76.9 % correct
D = 65.0 – 69.9 % correct
F = < 64.9 % correct.

The following Attendance, Remediation, Honor Code, and ADA policies have been adopted by the Florida State University College of Medicine for all courses:

FSU COM ATTENDANCE POLICY

COM Philosophy

We believe that:

Professionalism is a major component of our medical curriculum. We believe students should conduct themselves appropriately in the various educational activities of the

curriculum. This conduct includes coming to educational activities on-time, using the laptop computers only for course work during the educational activity, and not disrupting the class if late. The faculty should also demonstrate professionalism, by starting and ending all scheduled educational activities on time and providing a course schedule with clearly explained course policies in the course syllabus. Any changes in the schedule should be given to the students in a timely manner.

Students will be accountable and personally responsible for attending all educational activities (small groups, labs, clinical experiences, examinations, lectures, computer sessions, etc.).

Unexcused absences reflect negatively on the goals and objectives of the medical curriculum and demonstrate unprofessional behavior by the respective student.

We owe it to our state legislature and the citizens of the State of Florida to provide a quality educational program that meets the needs of our students in preparing them for the M.D. degree.

Attendance Policy

Students are expected to attend all scheduled activities. Students are expected to be on time. Being on time is defined as being *ready to start* at the assigned time. If a student has an emergency that prevents her/him from attending a scheduled activity, s/he is to call and notify the Office of Student Affairs (Year 1/2) or the Regional Campus Dean (Year 3/4) and request that they inform the supervisors/professors/clerkship faculty/education director for that activity. If at all possible, the student should also call and at a minimum, leave a message with one of the course/clerkship directors. *It is important that students realize that their absence or tardiness negatively impacts a number of other people.* Attendance, including tardiness, is part of the student's evaluation for professionalism. Negative evaluations may result in decreased grades and in severe cases, referral to the Student Evaluation and Promotion Committee.

Procedure for Notification of Absence

Year 1/2

If the student knows in advance of an upcoming legitimate absence, the "Advance Notification of Absence from Educational Activity(ies)" form should be completed with signatures from the student, the Associate Dean for Student Affairs, the course faculty member and the Course Director. The form will be filed in the Office of Student Affairs. The implications for the absence (e.g., remediation, course grade adjustment, make-up exam, etc.) will be given to the student by the course director and final decisions regarding these actions shall rest with the course director.

If the absence occurs due to an unforeseen emergency, the student should contact the course director and the Associate Dean for Student Affairs immediately to report the

absence including the reason for the absence. The implications for the absence (e.g., remediation, course grade adjustment, make-up exam, etc.) will be given to the student by the course director and final decisions regarding these actions shall rest with the course director.

Remediation Policy for Absences from Examinations, Quizzes, Small Group Sessions, Laboratory Sessions, Clinical Learning Center Sessions, Preceptor visits, and Clerkship Call

The remediation policies for absences from examinations, quizzes, small group sessions, laboratory sessions and clerkship call are:

1. **POLICY ON MISSED EXAMINATIONS:** Students are required to take major in-term and final examinations. According to the curriculum committee a student can only be excused from an examination by a course/education director decision based on the personal situation of the student. The course/education director will determine the time of the exam make-up session. Also, according to the curriculum committee decision and the existence of the FSU-COM honor code, the student will be given the same examination given to the other students.
2. **POLICY ON MISSED QUIZZES:** Students are required to take scheduled and unscheduled quizzes in the courses. A student can only be excused from a quiz by a course director decision based on the personal situation of the student. The student must make arrangements with the course/education director to make up a missed quiz. Also, according to the curriculum committee decision and the existence of the FSU-COM honor code, the student will be given the same quiz given to the other students.
3. **POLICY ON MISSED SMALL GROUP SESSIONS, LABORATORY SESSIONS, CLINICAL LEARNING CENTER SESSIONS, PRECEPTOR VISITS, AND CLERKSHIP CALL:** The student should contact the course director, small group leader or education director for instructions on remediation of the missed session and material covered. Any missed small group must be made up within one week of the student's return to classes. Small group work will be made up by turning in a 1 page description of the material covered in the small group session.

Remediation Policy for Students Who Receive an Unsatisfactory Grade in a Course

Remediation of courses/clerkships will be planned and implemented by a combined decision of the Evaluation and Promotion Committee in collaboration with the course/education director.

Un-excused Absences

It will be the responsibility of the course/education directors to clearly state in their respective course/clerkship syllabi the implications for having an un-excused absence from a scheduled educational or examination activity in a course or clerkship.

For BMS 6401: Unexcused absence from a scheduled examination or quiz may result in a grade of zero (0 %) being assigned for that examination or quiz.

Academic Honor Code:

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://www.fsu.edu/~dof/honorpolicy.htm>).

Students with Disabilities (ADA Statement):

Students with disabilities needing academic accommodations should:

1. Register with the Student Disability Resource Center (SDRC), and provide documentation of their disability.
2. Bring a letter to the Course Director from the SDRC indicating the need for academic accommodations. This should be done within the first week of the course. Specific arrangements should be made with the Course Director 5 working days prior to any examination for which accommodations are being requested.

Recommended or required learning materials:

Required textbook:

Basic and Clinical Pharmacology, 10th Ed. (2006), B.G.Katzung, ed. (Available online at COM Medical Library webpage under "E-Books", then scroll down to "Pharmacology" listing)

Recommended textbook:

Goodman and Gilman's The Pharmacological Basis of Therapeutics, 11th ed. L.L. Brunton et al., eds., 2005. (Available online at COM Medical Library webpage under "E-Books", in the "Pharmacology" listing)

Recommended review books:

Katzung & Trevor's Pharmacology Examination and Board Review, 7th ed., A.J. Trevor et al. eds., 2005. (An extensive review)

USMLE Road Map: Pharmacology, 2nd ed. (2006), B.G. Katzung and A.J. Trevor, eds.
(An abbreviated review)

Required Website (on Medical Library webpage under “Drug Information”)

The Medical Letter on Drugs and Therapeutics (**required**, subject to examination), and
Therapeutic Guidelines (recommended)

Recommended Websites (available through COM Medical Library website):

Facts and Comparisons (available on COM Medical Library website under “Drug Information”)

e-Pocrates (available on COM Medical Library website and on Axim handheld devices)

MD Consult Drug Tab (available on COM Medical Library website under “Drug Information”)

Prescriber’s Letter (available on COM Medical Library website under “Drug Information”)

Faculty and Course Evaluation:

Students will have the opportunity to evaluate each faculty member who teaches a major portion of the course, using a standard evaluation questionnaire. Students will also have the opportunity to evaluate the course at its conclusion. Suggestions and comments concerning the course, its material and conduct, are welcomed and may be made to the Course Director at any time.

Faculty in BMS 6401:

Graham Patrick, Ph.D.	Professor and Course Director, Department of Biomedical Sciences	graham.patrick@med.fsu.edu
Gail Galasko, Ph.D.	Professor Department of Biomedical Sciences	gail.galasko@med.fsu.edu
Susanne Cappendijk, Ph.D.	Assistant Professor Department of Biomedical Sciences	susanne.cappendijk@med.fsu.edu
Ken Brummel-Smith, M.D.	Professor and Chair, Department of Geriatrics	ken.brummel-smith@med.fsu.edu
Phillip Treadwell, Pharm.D.	Clinical Assistant Professor Tallahassee Memorial HealthCare	phillip.treadwell@tmh.org

**BIOMEDICAL SCIENCES 6401
GENERAL MEDICAL PHARMACOLOGY**

**Fall Semester, 2008
Schedule of Sessions**

<u>Date</u>	<u>Day</u>	<u>Time (A.M.)</u>	<u>Topic</u>	<u>Faculty</u>
8/11	Mon.	8:00-8:50	Introduction to the course (Objectives and ground rules of course; introduction to the discipline)	G. Patrick
8/12	Tues.	8:00-8:50	Pharmacokinetics: Drug Absorption and Distribution (Drug passage across membranes; ionization; routes of administration; body compartments)	G. Patrick
8/14	Thur.	10:00-10:50	Pharmacokinetics: Drug Metabolism and Elimination (Hepatic metabolism; renal and other clearance)	G. Patrick
8/14	Thur.	11:00-11:50	Pharmacokinetics: Drug Elimination	G. Patrick
8/18	Mon.	8:00-8:50	Pharmacodynamics: Receptor Theory and Signaling Mechanisms (Receptor types; second messengers)	G. Galasko
8/19	Tues.	10:00-10:50	Pharmacokinetic Principles: Time Course of Drug Action (Zero- and first order kinetics, half-life)	P. Treadwell
8/19	Tues.	11:00-11:50	Pharmacokinetics: Time Course of Drug Action (Drug accumulation, dosing regimens)	P. Treadwell
8/21	Thur.	10:00-10:50	Pharmacodynamics: Dose-Response Relationship (Dose-response curves; agonists and antagonists; potency and efficacy)	G. Galasko
8/25	Mon.	10:00-10:50	Factors Modifying Drug Effects (Effects of size, age, pathophysiology, idiosyncrasy, tolerance, etc.)	G. Galasko

8/26	Tues.	8:00-8:50	Drug Evaluation and Regulation (Drug development, clinical trials, post-marketing surveillance, drug laws)	G. Patrick
8/26	Tues.	9:00-9:50	Pharmacology in Geriatric Patient (Body compartments, metabolic changes, pathophysiology, compliance issues, polypharmacy)	K. Brummel- Smith
8/27	Wed.	8:00-8:50	Placebo Effect; Herbal Products (Placebos, major herbal preparations, regulation of dietary supplements)	G. Patrick
8/27	Wed.	9:00-9:50	Conference: Evaluation of Drug Literature and Advertising (Experimental design, evidence-based evaluation)	G. Patrick/ G. Galasko
9/02	Tues.	10:00-10:50	Conference: Review of General Principles	G. Patrick/ G. Galasko
9/05	Fri.	8:00-12:00	EXAMINATION # 1	
9/08	Mon.	8:00-8:50	Introduction to Autonomic Pharmacology (Anatomy, neurotransmitters, receptor types)	Patrick
*9/09 (*Quiz)	Tues.	10:00-10:50	Autonomics: Cholinergic Pharmacology (Cholinergic stimulants, cholinesterase inhibitors)	Galasko
9/09	Tues.	11:00-11:50	Autonomics: Cholinergic Drugs (Muscarinic blockers, nicotine)	G. Galasko
9/10	Wed.	8:00-8:50	Autonomics: Cholinergic Drugs (Ganglionic and neuromuscular blockers)	G. Galasko
9/11	Thur.	11:00-11:50	Autonomics: Adrenergic Drugs (Adrenergic receptors, catecholamines)	G. Patrick
9/12	Fri.	10:00-10:50	Autonomics: Adrenergic Drugs (Sympathomimetics – alpha and beta agonists)	G. Patrick
9/12	Fri.	11:00-11:50	Adrenergic Drugs (Alpha and beta blockers, drugs acting on sympathetic nerve endings)	G. Patrick

*9/15	Mon.	8:00-9:50	Clinical Case(s) and Review: Autonomic Drugs (SMALL GROUPS - *with Quiz)	Staff
9/16	Tues.	8:00-8:50	Cancer Chemotherapy Principles (Cell cycle, resistance, log kill hypothesis)	G. Patrick
9/16	Tues.	9:00-9:50	Biotherapy of Cancer (Gene therapies, antibodies, growth factors)	G. Patrick
9/19	Fri.	10:00-10:50	Antineoplastic Agents (Antimetabolites, antibiotics)	G. Patrick
9/19	Fri.	11:00-11:50	Antineoplastic Agents (Alkylating agents, microtubule inhibitors)	G. Patrick
9/23	Tues.	10:00-10:50	Immunopharmacology (Immunosuppressive agents)	S. Cappendijk
9/23	Tues.	11:00-11:50	Immunopharmacology (Immunosuppressants, immune stimulants)	S. Cappendijk
*9/26	Fri.	8:00-9:50	Chemotherapeutic Principles (SMALL GROUPS – *with Quiz)	Staff
10/03	Fri.	8:00-12:00	EXAMINATION # 2	
10/06	Mon.	8:00-8:50	Principles of Antimicrobial Therapy	G. Galasko
10/07	Tues.	10:00-10:50	Antimicrobial Agents: Cell Wall Synthesis Inhibitors (Penicillins, cephalosporins, other beta-lactams)	G. Galasko
10/07	Tues.	11:00-11:50	Antimicrobial Agents: Protein Synthesis Inhibitors (Tetracyclines, macrolides, streptogramins, chloramphenicol)	G. Galasko
10/08	Wed.	8:00-8:50	Antimicrobial Agents: Aminoglycosides, Sulfonamides, Fluoroquinolones, etc.	G. Patrick
10/08	Wed.	9:00-9:50	Antimicrobial Agents: Fluoroquinolones, Miscellaneous	G. Patrick
10/10	Fri.	10:00-10:50	Antiviral Agents (Drugs for influenza, herpes infections)	P.Treadwell

10/10	Fri.	11:00-11:50	Antiviral Agents (Drugs for HIV infection)	P.Treadwell
10/17	Fri.	10:00-10:50	Antimicrobial Agents: Antitubercular and related drugs	G. Patrick
10/17	Fri.	11:00-11:50	Antifungal Agents (Systemic and topical; azoles, amphotericin B, flucytosine)	G. Patrick
10/20	Mon.	10:00-10:50	Clinical Cases: Antimicrobial Agents	G. Patrick/ G. Galasko
10/21	Tues.	9:00-9:50	Antiparasitic Agents (Antimalarials, other antiprotozoal agents)	G. Galasko
10/21	Tues.	10:00-10:50	Antiparasitic Agents (Other antiparasitic, anthelmintic agents)	G. Galasko
*10/28	Tues.	8:00-9:50	Clinical Cases: Antimicrobial Agents (SMALL GROUPS – *with Quiz)	Staff
10/31	Fri.	8:00-12:00	EXAMINATION # 3	