INTRODUCTION TO PHARMACOLOGY AND THERAPEUTICS
PH620/722

Department of Pharmacology and Toxicology
University Medical Center
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Content

- Preface and Objectives
  - Specific Knowledge Objectives for this course
  - Link to Knowledge Objectives and Drug List compiled by AMSP
- Course Information and Ground Rules
  - Classroom
  - Attendance
  - Course Schedule
  - Clinical Correlations
  - Class Notes
  - Testing
    - (see *Course Documents* on Blackboard for sample test questions)
  - Test Remediation
  - Academic Achievement Policy
  - Quizzes and Homework
  - Grading
  - Professionalism
  - Peer and Self Evaluation
  - Required Text
  - Other Resources
  - Groupwise and Blackboard
  - Faculty and Staff
  - Course Evaluation
- Rice-Holland Award in Pharmacology and Therapeutics

PREFACE and OBJECTIVES

A primary objective of *Introduction to Pharmacology and Therapeutics* is to provide to you, the second year medical student, a core of fundamental information and the general principles underlying the use of pharmacological agents in the practice of medicine. A second objective is to provide the opportunity for you to develop the skills needed to acquire and critically evaluate therapeutically relevant details of an ever increasing number of pharmacological agents, advances in biomedical sciences, and evolving concepts of acceptable medical practice throughout your professional career.

The faculty involved in this course will try to achieve these objectives by familiarizing you with the principles underlying the therapeutic use of pharmacological agents. For the most part, these principles will encompass new information about an ever-increasing body of drugs. They include the basic terminology and methods for quantitative pharmacokinetic determinations and evaluation of drug-receptor interactions. Also, for each drug, and especially for those identified as prototypes for a specific drug class, information will be presented related to mechanisms of action, the major indications for its use, its most frequent or medically significant therapeutic actions, and the most common or medically deleterious adverse effects associated with its use. In some instances, knowledge of chemical structure, pharmaceutical formulation, pharmacokinetics and clinically relevant drug interactions also will be required. In addition, you will be presented with problems or asked to develop a critical question related to pharmacology and therapeutics for which you must provide an appropriate solution through a process that involves development of a strategy for finding appropriate evidence-based information, retrieval of that information from the biomedical literature, evaluation of the experimental or therapeutic data, and compilation of an informed, critical conclusion.

To a large extent, learning the core material will involve memorization. However, for you to fully understand the principles of pharmacology as applicable to the practice of medicine, you must go further: you will have to integrate your knowledge of anatomy, biochemistry, physiology, and pathophysiology with newly acquired information concerning the actions of drugs at the cellular, organ, system and whole-body levels.

return to Content

Specific learning (knowledge) objectives which you must master to successively complete this course include the ability to:

- demonstrate the mathematical and interpretative skills needed to assess quantitative aspects of pharmacodynamic (drug-receptor interactions) and pharmacokinetic (absorption, distribution and elimination) manifestations of selected major or prototypical drugs.
- discriminate among a body of pharmacological agents and substances, based upon the generic drug name, pharmacological classification, primary mechanism of action, major clinical uses and/or most prevalent/clinically significant adverse effects.
- integrate previously acquired knowledge of anatomy, biochemistry, physiology, and pathophysiology with newly acquired information concerning the actions of drugs at the cellular, organ, system and whole-body levels.
- apply cognitive skills needed to evaluate therapeutic scenarios and to select an appropriate pharmacological solution to that situation.
- access, through electronic means, the available biomedical literature relevant to the pharmacological basis of medical practice.

Mastery of these objectives will provide a fundamental knowledge of pharmacology as well as the reasoning skills needed to readily evaluate and assimilate therapeutically relevant details of new pharmacological agents and evolving concepts of therapeutics into your practice of medicine throughout your professional career.

return to Content

The information concerning general classes of drugs and specific drugs within each class which is presented in this course is recognized by the biomedical community as appropriate for students at your stage of professional development. The format and content of this course follow closely the national standard as defined by groups such as the American Society of Pharmacology and Experimental Therapeutics, popular medical textbooks, and UMC clinical faculty. Knowledge Objectives and an Essential Drug List for a basic course in medical pharmacology compiled by the Association of Medical School Pharmacology can be viewed at http://www.aspet.org/AMSPC/Knowledge_Objectives/default.asp

A concerted effort is made to integrate basic science facts with clinically relevant aspects of pharmacology through the use of case reports, clinical vignettes and presentation of clinical correlations. These aspects of the course offer a preview of what will be required of you to successfully bridge the gap between understanding the mechanistic aspects of pharmacology (as well as other basic sciences courses) to the rational and successful application of pharmacological intervention in the treatment of disease.

The core content for this course is defined operationally as the agents that are detailed in the required textbooks; presently the tenth edition of *Basic and Clinical Pharmacology*, B. G. Katzung, Ed., McGraw-Hill, 2007.

Your mastery of the material in this course will be assessed through your performance on internal examinations, assignments given as a part of this course, and the National Board of Medical Examiners subject examination in pharmacology. Furthermore, your ability to integrate pharmacology with other basic science content will be assessed by your performance on the United States Medical Licensure Examination, Step 1.

return to Content

COURSE INFORMATION and GROUND RULES

CLASSROOM

The primary lecture hall for pharmacology is R354, i.e., the upper amphitheater. For small group discussions, class will convene initially in one of the lecture hall in the Classroom Wing (CW), and then each group will meet in its designated small group room. Please refer to the pharmacology schedule for specific room assignments. Formal examinations will be in the upper amphitheater, R354.

return to Content

ATTENDANCE

It is the expectation of the Pharmacology faculty that you will attend class. Although it is the policy of the University of Mississippi School of Medicine that a student is NOT required to attend classes in which student evaluation of the content is not directly based on active student participation, that policy is intended to provide some flexibility during extenuating circumstances. The attendance policy should not be taken as an open invitation to miss class.

Lectures and other activities should be viewed as opportunities for learning. In the least, attendance allows you to hear the content and gauge its relative importance. More importantly,

attendance offers ‘face-to-face’ time between you and the faculty. You are encouraged to use that time to your advantage. Actively engage the faculty by asking questions. Participate by responding to questions presented to the class. Be actively, rather than passively, involved by taking your own notes or jotting down what you think are the major concepts; both can serve later as study guides. Keep in mind that you will achieve the greatest benefit from attending class if you prepare beforehand.

For group activities related to this course, your behavior not only impacts the learning outcomes for you personally but also those for your group and the class as a whole. You owe your peers the courtesy of contributing an honest effort and of participating in all aspects of such activities. In that regard, you will be asked – in fact, will be required – to participate in a Peer and Self Evaluation process for designated group activities in this course. (See PEER AND SELF EVALUATION for additional detail and for consequences of non participation.)

Attendance is required for a limited numbers of hours for which small group discussions are scheduled, and your evaluation will be determined by participation. Credit for these hours will comprise part of your overall evaluation, and it can not be made up at a later time. As noted below (see QUIZZES AND HOMEWORK and GRADING), credit for required attendance, together with other formative evaluations (e.g., participation, quizzes, assignments), will not comprise more than 5% of your final grade.

return to Content

COURSE SCHEDULE

The schedule for *Introduction to Pharmacology and Therapeutics* is, as is the schedule for the entire second year medical curriculum, derived through a concerted effort by all M-2 course directors and key members of the administration. The overall class schedule is such that a change in the scheduling for one course directly impacts all other second year courses. Accordingly, the schedule for *Introduction to Pharmacology and Therapeutics* will not be changed except under the most extenuating circumstances; it will not be changed simply for a matter of convenience.

If for some reason you feel that a change in the schedule is necessary, bring your concern to the attention of the pharmacology course directors. Please do not approach faculty in others courses about rearranging a scheduled lecture or examination in *Introduction to Pharmacology and Therapeutics* before conferring with and obtaining approval from the pharmacology course directors.

return to Content

CLINICAL CORRELATIONS

A number of clinical correlations are included in this course to offer a preview of how the basic pharmacology of specific drugs relates to clinical practice. These correlations will be conducted by clinical faculty and will be presented primarily from a clinical perspective. In most instances, a case history will be presented, and you will be called upon to discuss and make decisions related to diagnosis, treatment options and expected outcomes. For you to obtain the most benefit from these correlations, you will need to prepare in advance. Review the pharmacology of the drugs to be discussed as well as any other information you deem necessary to familiarize yourself with the general management of the patients or conditions to be presented. In keeping with the clinical atmosphere, some physicians will conduct the correlation as though it were rounds, singling out an individual and expecting an appropriate response.

return to Content

CLASS NOTES

The Department of Pharmacology & Toxicology takes the position that individual faculty are not obligated to proof class notes. Most, if not all, faculty will do so, however, if asked. It is important that you understand that a review and subsequent approval of such notes by a faculty member (regardless of the means by which such approval is expressed) does not mean that the notes are complete. Approval will indicate only that material as presented in the notes is correct. Faculty might not (and should not be expected to) add to the notes material mentioned during lecture that has been omitted. Collectively, the faculty hope that class notes represent a compilation of lecture and text material rather than a literal transcription of a taped lecture. We also caution against omission from class notes of information provided in handouts, even if it was not specifically emphasized in class. Handouts already reflect a distillation of information compiled from a number of different sources; if the faculty deem the material important enough to include in a handout, you should consider it important enough to include in the materials with which you prepare for an examination.

Although we understand the benefit of receiving class notes, we strongly recommend that you **do not depend upon class notes as your sole source of information** when preparing for an exam. Don't give the responsibility for your performance in this course to the 'note takers' by permitting them to decide what lecture material is or is not important. **Come to class, pay attention and take your own notes**. Read and outline relevant chapters in the textbook.

Class notes will not be taken as evidence as to whether or not a subject was addressed in class. Nor will class notes define the limits of testable material.

return to Content

TESTING

The purpose of testing is to provide a means of evaluating your knowledge of the facts and principles of pharmacology. We will endeavor to write questions that are straight-forward and have an identifiable **BEST** answer. We will also endeavor to write questions that are representative of material that has been emphasized in class or material for which you have been specifically told you will be held responsible.

There will be six (6) tests plus a final examination in this course. Pharmacology questions may be short answer, multiple choice or matching. You might also be asked to interpret clinical, graphical or tabular data. Matching and multiple choice questions may have up to ten selections from which you must select the single **BEST** answer. Examples of pharmacology test questions are provided on Blackboard. Generally, there will be 3-4 questions per hour of content. The contribution of each test to your final grade is directly related to the total number of questions on that examination (e.g., a 100 question exam has twice the weight of a 50 question exam).

On some examinations, there will be short-answer 'bonus' questions for which you must apply your knowledge of pharmacology to a problem or clinical situation, There will be no penalty for not answering these questions, but points obtained on bonus questions will be added to your score on the examination.

As the pharmacology course progresses, you should reasonable expect test questions to become increasingly comprehensive. This will occur partially because the content presented later in the course will build upon content presented earlier. In addition, all pharmacology tests subsequent to test 1 will include some comprehensive questions. A minimum of 10% of the questions on pharmacology tests 2, 4 and 5 will be related to material previously tested; with the remainder being

on ‘new’ material. The comprehensive components of pharmacology test 3 and 6 will be more extensive; with comprehensive questions making up 30-40% of each of those examinations. In that regard, test 3 and 6, respectively, will be comparable to a comprehensive mid-term and final examination. Specific content included as new material on any given exam is indicated on the pharmacology course schedule. You should also expect the questions to become increasingly complex and to integrate material from other first and second year courses.

return to Content

The National Board of Medical Examiners’ Subject Examination in Pharmacology (aka, Pharmacology Shelf Board) will be the final exam, and it, by default, will be comprehensive.

For each hour of clinical correlation, you will be asked 1- 2 questions in which you must perform one or more clinical tasks; e.g., make a diagnosis, recommend the next clinical test or prescribe treatment. These decisions will be based on what is presented in both the basic pharmacology lectures and the clinical correlation. Materials presented in clinical correlations *per se* will not be tested cumulatively.

You can not assume that questions will merely reflect the factual content of the lectures, and for all intents and purposes, the content of the required textbook [the tenth edition of *Basic and Clinical Pharmacology*, B. G. Katzung, Ed., McGraw-Hill, 2007] **defines the limits of testable material for this course.** Lectures are intended to highlight information relative to a particular drug or class of drugs, ideally emphasizing what the lecturer perceives to be most important. Realistically, however, given the time restraints, the ever increasing number of drugs and the burgeoning amount of information related to various drug classes, the lecturer may feel that everything presented in class (or provided in a handout) is important…the lecture representing a succinct compilation of current knowledge of that drug or drug class. Moreover, you should realize that everything that is important about a drug or drug class can not (and will not) be presented within the context of a 50 minute lecture. Even if the lecture is restricted to ‘general concepts’, understanding of those concepts and their integration across different areas of pharmacology and across different disciplines requires detailed knowledge of the systems affected and the mechanisms by which a drug acts. **The learning of those details and integration of the underlying concepts is ultimately your responsibility.**

return to Content

You should approach each question as though there is a **SINGLE BEST** answer among the selections provided. All questions are reviewed by the faculty, and questions identified as inappropriate, misleading or otherwise invalid are removed prior to the examination. If you still have concerns about the format or content of a question, you are urged to make a note on your copy of the examination and to express those concerns to a proctor at the end of the testing period. You should also relay your concerns to the liaison committee (see EVALUATION below) and, if you wish, to the course directors. You are free to discuss your concerns with the appropriate faculty member as well. But, decisions concerning additional credit, alternate answers or validity of questions will be made only after the course directors have conferred with the appropriate faculty member and the liaison committee.

All students are encouraged to review pharmacology questions missed on examinations and to clarify the reasoning for the correct answers.

If you are excused or otherwise absent from a test, it is your responsibility to contact a course director as soon as possible to arrange a make-up test. Medical students must bring a written excuse

from Dr. Arceneaux; graduate students, a written excuse from their Department Chairman. **The format and composition of the make-up examination will be determined by the course directors and the faculty involved.**

It is your responsibility to bring #2 soft lead pencils to each test.

return to Content

Effective 22 September, 1998, the Executive Faculty approved the addition of the following statement to the Academic Regulations in the School of Medicine: "For all examinations and subject national board examinations, students will only receive credit for answers that are properly recorded in the appropriate space on the answer sheet." This decision precludes correction of an answer sheet after an examination because of an error in transcribing your answers. During an examination, take special care to correctly transcribe your answers from the exam booklet to the answer sheet.

TEST REMEDIATION

Students who fail (i.e., score below 70%) on a pharmacology test have the opportunity to remediate their grade. The maximal grade that can be obtained through remediation is 70%, and only material not tested on a previous examination can be remediated.

A failing grade on a successfully remediated non-comprehensive exam will be replaced with a 70. The final grade on a successfully remediated exam consisting of both non-comprehensive and comprehensive questions will be determined by the proportion of questions on “new” and “old” material. The final comprehensive examination, the Pharmacology Subject Examination, homework and quizzes can not be remediated.

For remediation, the student must, for each question missed, submit in writing a rationale for the (incorrect) answer chosen as well as a brief justification of the correct answer within the context of the question. Information that you provide in your responses must by correct, and you may use what ever evidence-based resources you would like. **All questions missed by any given student must be addressed**. For example, remediation from 65% to 70% on a 100-question examination requires that all 35 questions missed be addressed; responding to only 5 of those questions is unsatisfactory. To successfully remediate an examination, the student must score 90% or better*, as determined by the faculty and course directors, on the written responses. If the student fails to do so, the original grade stands. There will be no opportunity for a second remediation of the same test. Written responses will be due one week after receipt of grades on a given examination, and they should be submitted to either a course director or the Pharmacology Office. Responses should be typed, and they may be submitted electronically.

***Please take note that simple submission of remediation for a failed test does NOT guarantee a passing grade.** There must be clear evidence of an effort on your part to understand the content or concept addressed in the question; in the absence of such evidence, you will fail the remediation and your grade will stand. You are encouraged to speak with the course directors as well as specific faculty whose questions you are remediating to get some idea of their expectations.

Remediation is intended to be an individual effort. Although you are not forbidden to work with another who missed the same question, it is unlikely that you missed a question for the same reason or necessarily had the same incorrect answer. Your responses should reflect that individuality. Also a cautionary note; be sure you agree with how someone else addresses questions you both might have missed, because you share the consequences of any incorrect or misleading responses. Examples of

what the pharmacology faculty generally deem appropriate and inappropriate remediation are depicted on Blackboard.

Successful remediation of a test score to 70% does not preclude a student who fails one or more examinations in pharmacology from participation in the School of Medicine's Academic Achievement Program. Please see the reference to the Academic Achievement Policy below.

Students who score 70% or better on an examination can not use this mechanism to improve their grade.

return to Content

ACADEMIC ACHIEVEMENT POLICY

A student who (prior to remediation) fails a pharmacology test or who would otherwise have an average below 70% in this course will be considered for mandatory participation in an Academic Achievement Program as stipulated by the School of Medicine's Academic Achievement Policy. That policy can be viewed on Blackboard at the M2 Curriculum site. Participation in the program is intended to aide you in the identification and development of skills needed to succeed in this course as well as the rest of your medical training.

QUIZZES AND HOMEWORK

Faculty members may assign work to be completed outside of regularly scheduled hours for this course; often, these assignments will be indicated on the schedule, and hours of formal lecture will be reduced to compensate for time needed for completion of the assignments. Faculty may, at their discretion, also give unannounced quizzes as a means of formative evaluation, providing them and you with an assessment of your familiarity with material previously covered or to be covered in class. Scores on graded assignments and quizzes will be compiled throughout the course. Your performance on these exercises – on the basis of points obtained over total possible points – will be tallied into your overall test grade (See Grading below).

return to Content

GRADING

Your performance (points correct/total points) on Tests 1-6, assignments and formative evaluations (e.g., quizzes, presentations, required attendance) will determine 80% of your final grade. The weight of individual tests is proportional to the number of questions. Your score on the National Board of Medical Examiners Pharmacology Subject Examination will comprise the remaining 20%.

Your final grade will be calculated using the following equation, with all grades expressed as a percentage.

$$\text{Final Grade} = (\text{[Tests + Assignments + Formative Evaluations]} \div \text{Total Points})(0.8) + (\text{Final})(0.2)$$

*Note that the contribution of formative evaluations plus assignments to your final grade will not exceed 5%.

return to Content

PROFESSIONALISM

The pharmacology faculty anticipate that you will conduct yourselves in a mature and professional manner and that inappropriate behavior during activities related to this course will not be an issue.

Please take note that incidences of unprofessional behavior during class as well as during interactions with faculty or staff can be documented and become a permanent part of your student record. In the least, your behavior affects the perception that your peers and other with whom you interact have of you. Documentation of consistent inappropriate behavior can affect the Dean's letter and your acceptance into a residency program. At the worst, unprofessional behavior such as cheating during an examination can be grounds for failure of this or any other course and dismissal from medical school.

You can review the UMC School of Medicine Policy on Professional Behavior at the M2 curriculum site on Blackboard. You should also note that as of this academic year, the School of Medicine has adopted a student-derived policy on Professional Appearance that can also be reviewed at the M2 curriculum site.

return to Content

PEER AND SELF EVALUATIONS

There will be two occasions when you will be asked to complete an on-line Peer and Self Evaluation. One will be at the end of the Fall quarter in relation to the small group pharmacokinetic and pharmacodynamic activity; the other, at the end of the Winter quarter in relation to the small group cardiovascular and ACLS assignments. You will be given a window of several weeks for completion of each of these evaluations, and completion of both is REQUIRED for a grade in this course. Also, information from these evaluations will become a permanent part of a professionalism portfolio that will be maintained throughout your medical training. Evaluations by your peers can affect your grade in the related activity, and as noted above, consistent exception activity – good or bad – can have consequences on your professional development well beyond this course.

return to Content

REQUIRED TEXTS

The **required** textbooks for this course is the 10th edition of *Basic and Clinical Pharmacology*, B. G. Katzung, Editor, MCGRAW-HILL, 2007.

OTHER RESOURCES

Additional resources include, but are not limited to:

The *UMC Hospital Formulary*, 1999-2000; It can be consulted for proprietary names of drugs discussed in class which are used at this institution.

Pharmacology Examination & Board Review, 6th Edition, B. C. Kantzung and A. J. Trevor, Editors, Appleton & Lange, Norwalk, Connecticut, 2002; It is complimentary to the required text edited by Katzung.

Lippincott's Illustrated Reviews: Pharmacology, R. A. Harvey and P.C. Champe, Editors, J.B. Lippincott Company, Philadelphia, PA, 1992.

Mosby's *Ace the Boards, Pharmacology*, S. J. Enna, M. A. Gordon and T.L. Pazdernik, Editors, Mosby, St. Louis, MI, 1996.

Computer (internet) resources include:

UpToDate and MD Consult. These online databases are available through the UMC Rowland Medical Library which can be selected from the UMC home page (http://www.umc.edu) or the library web page (http://library.umsmed.edu).

Drug Information/FDA. (http://www.fda.gov)

Doctors' Guide to the Internet. (http://www.pslgroup.com) - requires Flash 5

American Medical Association (Search Tools). (http://www.ama-assn.org)

return to Content

A number of Pharmacology Departments at other universities offer web-based instructional material which can be accessed through the home page of the appropriate institution or department. This material should mirror that presented in this course but might be organized in a manner that better compliments your learning style. In that case, please use these sites to your advantage. Also, please advise the course directors of formats you find particularly useful and which could improve this course.

These alternative sources of information are intended only to provide additional tools to facilitate your learning of pharmacology. They are not intended to supersede information given during lecture or in the primary text for this course. It is important that you realize that no textbook or other form of communication is absolutely free of error and that differences in materials between sources will undoubtedly be found. These differences may reflect a simple typographical error, a misstatement of fact, a difference in opinion or a difference in interpretation of data, but they invariably result in information that is incorrect, misleading and confusing. As you take advantage of these and other resources, please bring any discrepancy with information presented in the primary text or during lecture to the attention of the appropriate faculty member or the course directors for clarification. **Such discrepancies should be clarified before an examination, and it is your responsibility to do so.** In any event, the appropriate faculty member, in consultation with the course directors, will be the final authority in clarifying any discrepancies that may arise.

return to Content

GROUPWISE and BLACKBOARD

Information relevant to this course can be obtained through Blackboard (http://elearning.umsmed.edu) within the UMC intranet at the 'Introduction to Pharmacology & Therapeutics' site under 'Course Information'. Drug lists, powerpoint slides and other handouts can be found by accessing 'Course Documents', whereas assignments can be accessed under 'Assignments'. General announcements will be made prior to class, through Groupwise and/or through Blackboard.

For you information, the syllabus and schedule for pharmacology as well as all other second year courses are also available at the M2 Curriculum Web Site, as is the M2 weekly class schedule.

return to Content

FACULTY AND STAFF

Each member of the faculty of the Department of Pharmacology & Toxicology is committed to helping you learn pharmacology. Each of us has a true 'open door' policy. We encourage you to take full advantage of this policy and the attitude reflected by it. Please do not hesitate to ask us to clarify material for you during or after lectures. If you choose to come by our office, it may save you time and trouble if you call and make an appointment. We may not be immediately available because of other obligations.

The office and phone numbers of faculty and staff participating in Pharmacology 620 are

Pharmacology Office (R419)

Ms. Pam Banks (R422) 984-1600
Ms. Stella Smith (G330) 984-1635

Course Directors

Dr. Robert Kramer (G328) 984-1604
Dr. Susan Wellman (R412) 984-1631

Other Faculty

Dr. Rodney Baker (G323) 984-1620
Dr. Bruce Couch (G330-1) 984-1611
Dr. Robert Cox (E002) 984-5572
Dr. Roy Duhe (R406) 984-1625
Dr. Honey East (L605) 984-5660
Dr. Jerry Farley (G325-1) 984-1630
Dr. Robert L. Galli (E049) 984-5570
Dr. R. Darryl Hamilton(L508) 984-5590
Dr. John Kermode (R413) 984-1627
Dr. Jeffrey Love (G327) 984-1621
Dr. Mark Meeks (L510) 984-5610
Dr. Tangeng Ma (R425) 984-1698
Dr. Charles Moore (HS) 984-2253
Dr. Ian Paul (G114) 984-5883
Dr. Soundar Regunathan (G128) 864-5741
Dr. Philip Rhodes (C424) 984-2425
Dr. Rob Rockhold (U173) 984-2810
Dr. Donald Sittman (G225) 984-1848
Dr. Stanley Smith (N401) 815-1268
Dr. Edwin Swiatlo (VA) 662-319-1146

Note that extensions dialed on campus are preceded by 4 (984 extensions) or 5 (815 extensions).

E = Emergency Room
G = Guyton Building
HS = Heart Station
L = Clinical Sciences
M = Medicine/Rheumatology
R = Research Wing
U = Learning Resource Center
VA = Veterans' Administration Hospital

Faculty can be contacted by phone at the numbers listed above or by e-mail through Groupwise.

return to Content

COURSE EVALUATION

The School of Medicine and the faculty involved in this course rely on the input of the student body in the evaluation of our teaching program. To obtain an on-going assessment of *Introduction to Pharmacology and Therapeutics*, the following measurements will be taken.

(1) A liaison committee will be formed at the beginning of the course which will include the class president (or a designee), and four or five other students selected by the class. That committee will confer regularly with the course directors to discuss issues related to course content, faculty presentation, evaluation and student participation. A formal exit interview will be held between the liaison committee and the course directors upon completion of the course.

A major role of the liaison committee will be to relay concerns about particular test questions to the course directors and to participate in the final resolution of those issues. It is the responsibility of each student to submit concerns to a member of the liaison committee. The committee has the responsibility to then compile the issues raised by the class and *submit them in writing to the course*

directors prior to a formal meeting and discussion. Just as importantly, the committee also has the responsibility to subsequently relay appropriate information back to the class.

(2) A review of comments and concerns expressed on the School of Medicine Curriculum Evaluation web page accessed through the UMC intranet.

(3) An evaluation by the Evers Society at the end of the course.

A valid assessment of *Introduction to Pharmacology and Therapeutics* can be obtained ONLY if all students participating in the course also participate in the evaluation process. Each of you is encouraged to give us your honest perception of the course. **Thoughtful, constructive comments and suggestions for improvement are welcome and will be appreciated.**

return to Content

RICE-HOLLAND AWARD

The Rice-Holland Award in Pharmacology and Therapeutics is bestowed by the Department of Pharmacology and Toxicology to a student who has displayed exemplary performance in pharmacology and in basic or clinical research. An application for the Award can be obtained on the course Blackboard site under ‘Course Documents’. Applications can be submitted at any time.