THE FORUM
NEWSLETTER

A Publication of the AAMC: GEA's
Basic Science Education Special Interest Group

Vol. 3, No. 1 Winter, 1993

MESSAGE FROM THE NATIONAL DIRECTOR

Recently in my early morning reading, I came across an interesting human behavioral twist on Newton's Third Law of Motion: "For every positive action, there is a positive reaction." I stopped after that sentence to consider its impact in the context of what we in the BSEF are doing. Our goal is a positive action, to become the major vehicle by which both current and innovative ideas in teaching the sciences fundamental to the practice of medicine are disseminated and shared by faculty throughout the globe. It is the first action of a great ripple effect in medical education, for here we are providing the mechanism to gather and publish current methods in use. We encourage informal dialogue on innovative ideas, through regional and national meetings and conferences, and widely disseminate a newsletter in which to publish preliminary results. Our desire is to stimulate others to adapt ideas to their own disciplines and classes to the ultimate end of inspiring a new generation of physicians able to think critically and enhance their scientific curiosity. This positive reaction will be the outcome of positive actions that each BSEF member can initiate.

Examples abound within this very issue of *THE FORUM*, this time dedicated to the disciplines of Pathology and Pharmacology. They begin with Dr. Gabriel Virella's column on *Clinical Correlations in the Basic Sciences*, authored by Dr. Alphonse Ingenito, coordinator of the Pharmacology POPS Project, and also features the pioneering work of Dr. Thomas Kent in interactive computer-assisted cases in Pathology. Dr. David Nierenberg's contribution to Dr. Thomas Devlin's column, *Innovations in Basic Science Teaching and Learning* draws our attention back to Pharmacology with his methods of integrating this discipline into both the second and fourth year curriculum. Data gathering must become a function of the BSEF, and Dr. Elsa Cohen has submitted our first Reader Response Survey, wherein she asks for your views on the use of autopsies and autopsy materials in basic science education. The results of her inquiry will be shared with us all in the pages of a future issue of *THE FORUM*. The BSEF exists to share, and I ask that you help us do so by returning her tear-out-fax/mail-back response form.

A second tear-out-fax/mail-back response form (ballot) in this issue is provided for BSEF members in the Central Region to elect a new Regional Director. Now that our four regional chapters are functioning independently, it is time to implement an orderly system of leadership change. I believe that this, too, is a positive action, and I invite all Central Region recipients of *THE FORUM* currently on our mailing list, or those wishing to be added, to vote

their choice **BY MARCH 31st**.

This issue also contains a précis of the Fifth Annual BSEF Meeting held in New Orleans last November on the topic *Information Overload: Defining Essential Basic Science Curricular Objectives*. This two-hour session, convened by Dr. Alix Robinson, featured a presentation by Dr. Kathryn Doig and audience discussion of the new curriculum at Michigan State's College of Human Medicine. Dr. Michael Cancro then presented some provocative and innovative views regarding "problem sets" as a means of approaching the essentials.

Many of you have already received a first mailing of the program and registration materials for our June 26-29th conference *New Educational Strategies for the Basic Sciences*, and an additional copy to share with a friend has been enclosed with this issue of our newsletter. This conference has been designed to address new educational strategies in three types of curricula: traditional, case-based, and the rapidly evolving case-based/traditional hybrid. Thus, whatever your educational philosophy or that of your school, there is something to be gained, and I encourage you to join us in Charleston, South Carolina. This will be the first of what I anticipate evolving into Bi-Annual International BSEF Conferences on basic science issues in medical education. These conferences will be unique in that information will be presented *by* actively teaching faculty, *for* actively teaching faculty, and the focus will span information of value to individuals from all six traditional pre-clinical disciplines.

The BSEF is a constantly growing organization of dynamic, positive-thinking individuals, and as 1993 stretches before us, we look forward to an exciting year. The diversity of our thoughts and ideas expands logarithmically as we continue to reach out to medical faculty in Central and South America, and now New Zealand, China, and Africa. By attracting medical faculty from these and other countries of the world, we all will benefit from an understanding of differences and similarities of our ideas, opinions, and educational systems. The training of physicians is of universal concern, and of this one thing I am certain - that in whatever part of the world BSEF members live and work, all share the common desire to have their actions produce the positive reaction of developing a better physician to face the challenges of tomorrow.

CLINICAL CORRELATIONS IN THE BASIC SCIENCES

GUEST EDITOR: Gabriel Virella, M.D., Ph.D.

In this issue of THE FORUM we are publishing two contributions outlining some of the most popular formats for the introduction of clinical correlations in the Basic Sciences. Dr. Ingenito's contribution addresses two important modalities, the "Patient-Oriented Problem Solving" (POPS) exercises and clinical conferences, as used in his pharmacology course. POPS were initially developed by Parker Small and collaborators, at the University of Florida, and the first set was dedicated to the teaching of Immunology. The success of Dr. Small's effort can be best judged by the fact that after almost 20 years from their initial conception, Immunology POPS are used in a large majority of North American medical schools. The Pharmacology POPS are a more recent spin-off, but their success appears to be equally impressive. Clinical conferences have a long tradition in several basic science courses, and it is encouraging to realize that this format continues to be effectively used. Dr. Thomas Kent has contributed an extremely informative summary of his experience with computer-based teaching in Pathology. Dr Kent has an extremely informative summary of his experience with computer-based teaching in Pathology. Dr. Kent has quietly pioneered this area, and while most of us are thinking about using computer-assisted teaching in our courses, he has been practicing this pedagogic approach since 1974. Computer-based teaching is likely to play an increasing role in Medical Education. With the rapid development of programs able to integrate high resolution live and still images, sound, and text, there is an endless world to be explored. At the present time there are good and reasonably sophisticated programs available to be used as adjuncts in the teaching of anatomy, histology, and anatomical pathology. Some areas of physiology and the neurosciences are also be targeted. Review programs have become available for certain areas, and computer-based textbook versions have also been introduced. Computer-based teaching has obviously a significant role to play in Clinical Correlations, as judged by the successful integration of case-based teaching programs in microbiology and pathology in the curricula of several Medical Schools. It is obvious that a variety of programs are already available and in the process of being developed, but it also obvious that information concerning such programs is difficult to come by. We would hope that readers of THE FORUM would volunteer information about programs they have developed or they have used. Periodic publication of such listing could be one of the most beneficial accomplishments for our special interest group.

CASE ANALYSIS IN PATHOLOGY

Thomas H. Kent M.D.
Professor of Pathology
University of Iowa College of Medicine
Iowa City, Iowa 52242
Phone: (319) 335-8196

The process by which an individual learns a discipline involves learning the basic knowledge of the discipline and practicing application of that knowledge to real situations. Later, one can practice more, refine one's knowledge base, and even add new discoveries to the discipline. In my medical student days, the practice was mostly oriented toward the discipline (e.g., hundreds of microscopic slides to look at in the pathology laboratory), rather than toward application of the discipline to the practice of medicine. I personally believe that it is useful to learn the basics of each of the basic science disciplines, but most medical students will be better motivated by practical applications that are highly related to the practice of medicine. Another aspect of basic science education that frustrated me as a student was the lack of opportunity to use my new knowledge to solve problems and to present orally to faculty and student colleagues.

In 1969-1970 I had an unusual opportunity to guide a major change in our General and Systemic Pathology courses. We decided to allocate the students' efforts roughly as follows: two-thirds toward knowledge acquisition, one-fourth toward practice in using the knowledge, and one-twelfth toward development of a limited number of skills (primarily basic laboratory tests). We decided to use real cases for the practice exercises, using four or more per week over two semesters. Each group of 10 students is assigned a faculty facilitator for the semester. The students prepare the cases, present them, and discuss them. The cases are designed so that the students encounter all of the basic disease processes and many of the common organ-related problems in a clinical setting. Cases may be morphology oriented (microscopic slides available to check out), laboratory diagnosis oriented (data provided with the case history or by computer simulation), or both.

Since 1974 we have been using computer simulations for three of the weekly exercises. These work best for syndromes that have a common clinical presentation buy varying underlying pathophysiologic abnormalities that require laboratory tests and clinical procedures to uncover. Anemia, bleeding, and jaundice are the topics currently in use. From an outline of causes of a syndrome, we select representative diseases and then find patient charts to illustrate them. The authoring program uses a mater file of all laboratory tests and clinical procedures available in our hospital, including normal values (numeric values given to the student vary based on a mean and standard deviation), cost, time for completion, and information about the test that is accessible to the student during the simulation. Fases are created from smaller files that contain only the results of tests for which there are abnormal results. ASCII files with history and physical examination and a case summary complete the database that is then compiled to create a patient simulation.

Patients are easy to create — pick a patient with the desired disease, abstract a complete history and physical, and abstract or anticipate every abnormal test and procedure. The computer program that delivers the simulation acts as a blck box that allows the student access to information sequentially on a day by day basis for as many days as it takes to arrie at a diagnosis and treatment. The mean screen contains an outline of tests and procedures organized as they would be in our hospital (e.g., routine screening, chemistry, gastroenterology, radiology). Feedback includes a summary of the case and a comparison of costs, efficient (low number of unnecessary tests), and completeness (high number of necessary tests). The optimum work-up is determined by faculty consensus.

We use our computer simulations in our Case Analysis setting. Each student has a different patient, which is presented to and analyzed by the group. Once developed, the simulations are very cost effective and have provided thousands of educational experiences. Actually, these experiences cannot be duplicated in our hospital, because with live patients we cannot guarantee each student the opportunity to work up patients with a specific disease, nor

the opportunity to do it without cluing from the house staff and referring physician.

It is difficult to measure the effect of case-related problem solving on the educational process. It seems right to practice using newly acquired knowledge. The amount and type of practice probably is not very important. Unless the faculty really goofs, the students are going to think it is worthwhile — it's fun, it gives relevance, and it gives them a chance to participate for a change. I have tried many times to prove the usefulness of practical exercises. The most useful information has been the happiness data, and specific analysis of computerized patient work-ups, which reveals that some information needed to write up the cases in not readily available to the students. A byproduct of our cases, especially the computer simulations, is the familiarization of the students to the categories of the history and physical examination and to the organization of our laboratories. The discovery method seems to speed the learning of morphology, and this is done with no laboratory instruction other than discussion that goes on in the groups as students describe the projected photographs taken from microscopic sides that they have looked at while working up the case. Another outcome that is difficult to quantify is the ability of our students to present clearly a fresh case and give a creditable evaluation of the morphology and laboratory test results.

Pathology lends itself unusually well to the use of case-related exercises. It is easy to put the student in the role of a clinician who needs results from the pathology laboratory. We have ready access to case material and can select patients on the basis of clinical frequency and illustration of basic pathophysiologic abnormalities. Most of the Pathology faculty are comfortable playing the role of either clinician or pathologist.

THE USE OF CLINICALLY-ORIENTED PROBLEM SOLVING MODALITIES TO ENHANCE LEARNING IN A BASIC PHARMACOLOGY COURSE

Alphonse J. Ingenito, Ph.D.
Professor of Pharmacology
East Carolina University, School of Medicine
Greenville, NC 27858-4354
Phone: (919) 551-2736

Two recent widely-publicized and disseminated reports, the "GREP Report" [1] and the Robert Wood Johnson Foundation Report [2], have focused on the importance of teaching the basic medical sciences in a conceptual framework which forms the rational basis for medical practice. The recommendations included the use of instructive techniques which employ clinically-oriented problem solving approaches; courses which involve conjoint, interdisciplinary teaching between basic science and clinical faculty and student examinations based on questions requiring reasoning and interpretations. The new format for the USMLE (medical licensing examinations), particularly Step 1, aslo places greater emphasis on problem soling approaches using brief clinical vignettes [3]. This provides an additional impetus for basic science departments in Schools of Medicine to utilize such pedagogical approaches. Recent reports in this newsletter have indicated that this approach is already occurring.

The purpose of the present article is to review briefly key elements in the progress and continued success, both in this institution and elsewhere, with two clinically oriented problem solving techniques to enhance the teaching of basic pharmacology in medical and other curricula. The first approach to be discussed is the well-known Patient-Oriented-Problem-Solving (POPS) exercises, sponsored and supported by the Upjohn Company. The first 6 exercises in this series were printed and distributed in 1985. The author currently serves as coordinator for this project, as overseen by the American Medical School Pharmacology (AMSP) chairmen group. The other technique is the use of case conferences in pharmacology, as written by faculty members in Pharmacology and several clinical departments at the East Carolina University School of Medicine, beginning in 1978.

Details on the writing and use of both the POPS exercises and the case conferences in pharmacology have been published previously [4,5].

There are currently 7 Upjohn-sponsored POPS exercised in print and they are available, free of charge, through the Upjohn Company's Medical Service Liasion representatives in local area. These are as follows:

Complications of Analgesic Therapy by Gourley, D.R.H. and Wooles, W.R.
Drug Overdose Toxicity by Rogers, J.F.
Pharmacokinetics Applied to the Treat of Asthma by Reton, K. W. and Neims, A.H.
Treatment of Essential Hypertension by Burford, H.J. and Williams, P.B.
Drug Use in the Elderly by Singh, G and Bayne, J.R.D.

Several of those listed have been revised once, or even twice since 1985, and others are under consideration for revision. Several new exercises are currently in preparation.

Since 1985, many thousands of the POPS exercises have been used in pharmacology courses by students in Schools of Medicine, Dentistry, Pharmacy and other allied health professions. The exercises are, in general, well like aned accepted as effetive teaching and learning devices y both faculty and students. The basic plan which each exercise follows ia s simulated case, or series of cases, containing a number of problems which are to be worked out by a team of 4 students. Each student has the solution to his (her) assigned part only, and when the group meets to solve the problems, the student possessing the solutions must act as discussion leader to encourage resolution of the problem by the rest of the group. Each part of the solution contributes to the approach to the overall problem. Each exercise requires from 2 to 3 hours of class time and several hours of preparation time, before the group meetings. The use of textbooks, journal articles, and other resources, during the group session is encouraged. Faculty remain immediately available to act as resource persons during the exercise, but do not actively participate in the group discussion.

the preliminary part of each exercise contains clearly state learning objectives, which are used by the students in preparing for the exercise. , the exercises are distributed 3 or 4 days prior to when the groups are scheduled to meet. Each exercise has 10 pre– test and 10 post-test questions which are similar in subject makeup and are congruent to the stated learning objectives and exercise subject contents. Each student is supplied with only part of the pre-test answers and explanations beforehand and the exercise calls for a discussion of the correct pre-test answers and explanations beforehand and the exercise calls for a discussion of the correct pre-test answers before the groups begins conjoint work on the clinical case problems(s). In addition to answers to the individual case problems, feedback on learning is also provided by the post-test, which is taken individually by each student, soon after completing the group session. Post-test answers, which explanations, are supplied only after the post-test is completed.

Whether or not students receive a course grade for their performance on the POPS exercises, or the post-test results, or both, varies with the user institution. In our course, we request that students turn in an answer sheet, identified only by student number, containing both pre and post-test answers This provides us with an estimate as to whether learning has resulted from use of the exercise. Generally, the results are slightly better on the pst-test than on the pre-test, as would be expected. Since our students have already been exposed to the subject material for the POPS exercises via lectures, before the exercises are run, the pre-to post-test differences are not as great as they would be if tests were administered to a pharmacologically naïve student group, e.g., before they had any formal instruction in pharmacology [4]. We do not use the post-test scores as part of our grading process, although some schools do. We do consider it important to collect the pre and post-test answers, not only to provide us with information on the effectiveness of the exercise, but also to act as an incentive for the students to complete the post-test, which is done on their own time. It is of interest in this regard, that Dr. Parker A. Small, originator of the POPS concept in Microbiology/Immunology, and his colleagues at the University of Florida, have devised a unique POPS peer evaluation system [6], in which students evaluate each other based on knowledge and preparedness, how well they were able to teach each other and to interact in group learning, and other attributes. The method was found to facilitate peer interactions during the exercise and to improve student preparedness. This latter issue has sometimes surfaced in some of our student groups here, wherein one or two of the four students was ill-prepared to participate in the exercise. This creates an undue burden on the others, causes considerable resentment and undermines the effectiveness of the ap-

proach. We have not yet found an answer to this problem

Perhaps the peer-evaluation approach offers a solution.

While the POPS exercises have proven to be very successful and widely used, there are, admittedly, some difficulties in their use, there are, admittedly, some difficulties in their use. These include the following: (1) the curricular time required (from 2 to 3 hours per exercise); (2) The requirement for numerous small conference rooms or large rooms with multiple subdivision; (3) the faculty time needed for familiarity with and conduction of the exercises; (4) concepts or information presented in the exercises which may differ somewhat from lecture material; (5) students who may dislike the approach (I.e. "loner learners,") or who do not assume their fair share of the responsibilities. Each user institution may have their own unique solutions to these problems, which we hope to share soon with POPS users. The AMSP/POPS committee will conduct a POPS user survey in the near future which should provide us with much needed information on POPS use.

The second clinical case-oriented problem Solving technique to find wide acceptance in basic pharmacology courses for many years has been the case conference. This has involved a wide variety approaches. A commonly used one involves small group discussions of a written case with presiding faculty being either a single basic pharmacologist, or with the addition of a clinician. Other approaches might involve the presentation of a patient (s) before the entire class. The clinical cases might be either real or simulated, and be based on documented causes from the clinical literature o on those encountered by clinical faculty at teaching institutions. A historical perspective on the use of clinical case conferences for teaching basic pharmacology has been published elsewhere [7]. The Summer, 1992 issue of THE FORUM contains two papers discussing the use of clinical correlations; one in a Microbiology/ Immunology course and the other in a Biochemistry course in the medical curriculum.

since 1978, we have developed approximately 50 clinical case conferences, most based on actual cases of pharmacotherapy. Many were originally written for us by a semi-retired adjunct faculty internist/cardiologist, based on experiences either acquired in his own practice, or that of a colleague. Others were written by members of the faculty of various clinical department here, and still others were written b our own faculty, based on literature reports. The subject areas of pharmacology are varied, corresponding to those currently being covered in the lecture part of an approximately 150 hour medical curriculum course in basic pharmacology. In general, the topics have a disease orientation, e.g., drug treatment of asthma, hypertension or breast cancer, although a few are more generally inclined, e.g. drug interactions or toxicities. In any one year a total of form 14 to 16 case conferences may be schedule, usually on a weekly or bi-weekly basis. Student groups of no more than 8 per faculty preceptor meet for a 50-minute discussion session with one student acting as discussion leader, on a rotating basis. Faculty act only as moderators to keep the discussion moving and focused and to act as an information source, or to provide a different perspective not considered by the students. The conferences are very much a student effort and the working groups are allowed to determine whether the discussions to be a free flowing exchange or to follow a more definitive format of answering a set of supplied questions or questions of their own makeup.

The atmosphere of the conferences is relaxed and conducive to learning, with each student being allowed ample chance to participate. Students relate that they feel comfortable about the way the conferences are conducted [5]. Each student ears a conference grade equivalent to 10% of their course grade. The grade is somewhat subjective, based on the faculty preceptor's perspective of how each student conducted the conference or contributed to the discussion. Some students are very animated during the discussions and others much less so. Many prepare extensively for the session, with readings from their pharmacology text or from clinical medicine texts or literature reports. Some actually come supplied with handouts of their own creation, for their classmates. From our 14-year experience with the case-conferences thus far, there is little doubt that they are great motivators of student learning they are consistently evaluated by each class as among the best features of the course. An unanticipated benefit of the conferences for both faculty and students is that some otherwise marginally-performing students do exceptionally well in the conferences. Thus, they provide an alternative approach to student evaluation in addition to conventional, formalized, predominantly recall-oriented examinations.

As might be expected of a Ph.D.-based pharmacology department faculty, there was some initial reluctance by our faculty to be involved in teaching

clinically oriented materials. The original guidance of the adjunct clinician who wrote many of the initial conferences was a considerable help to us in helping overcome this reluctance. With each new conference introduced, a faculty review session is planned with the clinician author, in which we discuss key elements of the case, ad possible answers to the questions posed. With over 40 current conferences in our files, we have enough to alternative these yearly so as to discourage students from obtaining conferences and problem solutions from their upper-class colleagues.

At the outset we make it clear to the students that our faculty will not attempt to teach clinical medical in the conferences. Rather, the main emphasis is to encourage the students to learn how to apply principles of basic pharmacology to solve problems in clinical medicine. The conferences also serve to introduced the concept of clinical judgment as applied to clinical pharmacology. There is frequently no one best approach, or solution, but various alternatives to be considered. The alternatives are sometimes not well defined and are open to various interpretations as to advantages and disadvantages. This is not unlike situations the clinician is likely to encounter in everyday drug therapy. Second year medical students here have proven themselves to be remarkably adept at dealing with clinically related aspects of the cases, which sometimes require comprehension normally only expected of upper-class tdents or residents. They mange to channel their interest in learning to formulate surprisingly sophisticated solutions to the problems, given their relatively limited clinical knowledge of disease states.

While the presence of clinicians on a basic pharmacology faculty would no doubt facilitate writing and using clinical case conferences in the basic sciences, they are not absolutely essential. Our own faculty have written some excellent conferences and these have been favorably critiqued by clinical faculty in other departments here. We find the key to writing these to be to incorporate as many principles of basic pharmacology as possible into realistic every day clinical problems.

References

1. Physicians for the Twenty-First Century. Report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine; S. Muller, Chairman ("The GPEP Report"), J. Med. Ed. 59: Part 2, Nov. 1984.
2. Commission on Medical Education: The Sciences of Medical Practice. Medical Education in Transition. R.Q. Marston and R. M. Jones, Editors, Princeton, NJ. The Robert Wood Johnson Foundation, July 1992.
3. Swanson, D. B., Case, S.M., Melnick, D.E. and Volle, R. L. Impact of USMLE Step 1 on Teaching and Learning of the Basic Biomedical Sciences. Supplement to "THE FORM", vol,2, no. 1, Winter 1991; reprinted in Academic Medicine, 67: 553-556, (1992).
4. Burford, H. J., Ingenito, A. J. and Williams, P.B. Development and Evaluation of Patient-Oriented Problem-Solving Materials in Pharmacology. Academic Medicine 65: 689-693 (1990).
5. Ingenito, A.J., Noble, B. G. and Wooles, W. R. The Case Conference Approach to Teaching Clinical Pharmacology. J. Clin. Pharmacol. 32: 502-510 (1992)
6. Small, P.A. Jr. and Stevens, C.B. Peer Evaluation and its Use with the POPS System. Pp. 32-34 in Proceedings of the Workshop on the Teaching of Pharmacology to Medical Students. San Diego, CA, Aug. 1991. (Organized by the Association of Medical School Pharmacology).
7. Ingenito, A.J. Lathers, C. M. and Burford, H. J. Instruction in Clinical Pharmacology: Changes in the Wind. J. Clin. Pharmacol. 29: 7-17 (1989)

"The mind does not need filling, like a vessel, but kindling, like a fire."

Plutarch

INNOVATIONS IN BASIC SCIENCE TEACHING AND LEARNING

INTEGRATING BASIC AND CLINICAL SCIENCES: ONE APPROACH INVOLVING BASIC AND CLINICAL PHARMACOLOGY

David W. Nierenberg, M.D.
Chief, Division of Clinical Pharmacology
Dartmouth-Hitchcock Medical Center
Hinman Box 7506, Lebanon, NH 03756
TEL 603-650-7679 FAX 603-650-6841
E-MAIL DAVID.W.NIERENBERG@DARTMOUTH.EDU

Faculty members hear many voices calling for the "integration of basic and clinical science material" throughout the four years of the typical undergraduate medical curriculum. While such voices can be traced to documents such as the GPEP and the ACME-TRI report, it remains confusing for individual faculty members to know what can be done to "make it happen at my own school". In fact, one quickly comes to suspect that there are no easy solutions to this problem, as exemplified by the wide variety of proposals put forward during a recent two-day symposium on this topic (Northeast Section of the GEA, Spring 1992). Solutions will vary from school to school, and from discipline to discipline. Perhaps our experience at Dartmouth in attempting to integrate instruction in basic and clinical pharmacology might prove useful for other faculty members.

Dartmouth Medical School has a "traditional" four-year curriculum, including a required course in basic pharmacology given in the fall of the second year. This course has gradually been reduced to its current allocation of about 84 hours of instruction. In 1984, we introduced a required course in clinical pharmacology, given in the early spring of the fourth year. My efforts to "integrate" instruction in basic and clinical pharmacology have focused on three issues: introducing simple clinical material into the basic pharmacology course to enhance learning; rationally coordinating material that appears in both courses; and grounding the clinical pharmacology course firmly in the basic sciences of pharmacology and pathophysiology.

Our first challenge was to make the standard second-year lecture course less dry, and more interesting to second-year students craving some "clinical relevance". We wrote several brief clinical problems foreach of our major lecture topics (1). These clinical problems or cases were sufficiently simple so that second year students could understand the medical portion of each case. For example, clinical scenarios dealing with headache, cystitis, or chest pain were developed, all subjects that students have had direct or indirect experience with in their own health problems or those of their close relatives. In order to "solve" each clinical problem, the students must recall the material they learned in basic pharmacology leactures or reading, and apply or extend that material to the clinical scenario. Principles of drug action and drug use are stressed, not dosing or other aspects that become important during the third year. These clinical problems have been liked by the students because they help to make the basic science material more "interesting" and more "clinical relevant". We have not formally evaluated their use to try to document improved learning or performance, although these problems have been used in different years as required exercises for the whole class, or elective exercises for a portion of the class. One interesting difficulty we have encountered with this approach is the fact that some of my colleagues in basic pharmacology feel that providing such cases "dilutes the rigor" of a traditional basic science lecture course. In addition, while some basic science faculty felt comfortable leading small-group discussion of the this material, others did not, fearing that even this elementary clinical material was beyond the "comfort zone" of a basic scientist. Helping faculty with the material (using the answers in the books itself, plus an introductory orientation session) relieved the anxiety of some faculty members, but others remained uncomfortable with the material.

Our second goal was to coordinate our in-

struction in the pharmacology material offered in the second– and fourth-year courses. This provided quite easy to achieve, since I serve on the course planning committee for the second-year course, and I am the course director for the fourth-year course. This curricular flexibility has allowed us to "cover" material in different ways. Some material (e.g.. Receptor theory) is formally "covered" only in the second year; some material (e.g. effects of renal dysfunction on drug pharmacokinetics and pharmacodynamics) is "covered" only during the fourth year; Despite this benefit of having pharmacology instruction offered twice during the medical school (84 hours in year two, and 66 hours in year four), some basic science faculty continue to believe that "real instruction" in pharmacology occurs only in the second year, and they don't perceive the instruction that occurs in the fourth year as part of an integrated curriculum of basic and clinical pharmacology.

Finally, we have developed a fourth-year course in the principles of clinical pharmacology, and their application for form the basis of rational therapeutics. We have described this course in some details (2), and have based in on "core" material in the form of necessary facts, skills, and attitudes that we would like all our student to learn. EW have done a fair amount of work to try to understand the impact of this course, which was first introduced in 1984. Our data have revealed that our students find the course extremely valuable as senor students, and in retrospect as interns; and their performance on post-test questions increased dramatically compared to their performance on similar pretest material; than their performance on clinical pharmacology-related questions on National Board Exams (Part II) has increased dramatically since the course was begun (and is now better than their performance on other subject areas on those exams); and that students feel their knowledge in this area is usually better than the knowledge of their fellow interns (2). Based on these observations, we proposed that toehr schools might want to consider adding required senior courses in clinical pharmacology, to complement their required second-year courses in basic pharmacology (3).

Most recently, four national scientific societies sharing an interest in pharmacology instruction have formulated a consensus on a core curriculum for clinical pharmacology instruction, and how this could supplement teaching in basic pharmacology (4). This consensus developed by representatives from four independent societies was heartening to all of us, and made an even stronger case for faculty at individual schools to work towards implementing such courses (5). Most recently, with new texts available to help faculty members develop new courses, implementing such courses in clinical pharmacology, based firmly on underlying principles of basic pharmacology, should be even less traumatic for committed faculty (6).

In summary, the issue of trying to integrate material from basic and clinical sciences is a difficult one, and will like require different approaches for different subjects at different schools. We have had considerable success with a model at Dartmouth for instruction in pharmacology that involves introducing clinically relevant material into the basic course during the second year, basing a fourth-year "clinical" course on the basic sciences of pharmacology and pathophysiology, and working hard to coordinate the teaching in both courses. Implementation of this plan has met some resistance from both basic science faculty and clinicians. I believe, however, that such a model should be extrapolatable to many other basic sciences such as immunology, microbiology, or biochemistry, for example (7). In a 'traditional' curriculum, introducing elementary clinical material into the first two years does appear to make basic science material more interesting for the student, and returning to basic science topics during the fourth year helps to reinforce the scientific underpinnings of the clinical disciplines. If such models are to be useful, however, both students and faculty will have to work on rejecting the concept that the first two years of medical school are barely related to the last two years. students and faculty will need to embrace the philosophy that basic sciences and clinical disciplines are truly so deeply intertwined and interdependent that each can be learned better if integrated with the other in a appropriate fashion.

References

1. Nierenberg, D.W. and Smith, R.P.: Clinical Problems in Basic Pharmacology. St. Louis, CV Mosby Company, 1989.
2. Nierenberg, D.W. and Stukel, T.A.: The effects of a required fourth-year clinical pharmacology a course on student attitudes and subsequent performance. Clin. Pharmacol. Ther. 1986; 40: 488-93
3. Nierenberg, D.W.: Commentary: clinical pharmacology instruction for all medical stu-

dents. Clin. Pharmacol. Ther. 1986; 40: 483-7.
4. Nierenberg, D.W., and the Council for Medical Student Education in Clinical Pharmacology and Therapeutics. A core curriculum for medical students in clinical pharmacology and therapeutics. Clin. Pharmacol. Ther. 1990; 48: 606-610.
5. Nierenberg, D.W.: Consensus for a core curriculum in clinical pharmacology for medical students. Clin. Pharmacol. Ther. 1990; 48: 603-5.
6. Melmon, K.L., Morrelli, H.F., Hoffman, B.B., Nierenberg, D.W.: Clinical Pharmacology: Basic Principles in Therapeutics, 3rd Ed. New York, McGraw-Hill, Inc., 1992.
7. Nierenberg, D.W.: Teaching clinical pharmacology: a process of lifelong learning. J Clin. Pharmacol. 1993, in press.

ANNOUNCEMENT

CALL FOR NOMINATIONS
EDITOR of *THE FORUM* NEWSLETTER

This individual will replace our current Editor, Dr. John J. Curry, nd be charged with maintaining and expanding the standards of quality he has set. Responsibilities include sequencing and formatting of all contributions to THE FORUM submitted by Associate Editors, National and Regional Directors. Nominees should be facile in the use of WordPerfect 5.1, and be willing to commit for a minimum of two years (four issues). If you would be interested in serving in this capacity, please contact Roger Koment, Phone: (605) 677-5174, FAX (605) 677-5125, Email: UKRW02@SDNET.

DEAD TEACHERS:
Exploring Uses of Autopsies in Basic Science Medical Education

Elsa B. Cohen, M.D.
Associate Professor of Pathology
Medical College of Wisconsin
Department of Pathology Box 152
8700 West Wisconsin Avenue
Milwaukee, WI 53226 U.S.A.

TEL: (414) 257-6211 FAX: (414) 257-7815

Medical students almost always respond enthusiastically to attending autopsies, participating in the dissection, and helping work through the abnormal physiology involved in understanding clinical-pathological correlations. They enjoy seeing the anatomy of an unembalmed cadaver, and looking at histologic slides to confirm, refute or elucidate the clinical hypotheses made at the time of the gross dissection.

Despite the currently-low autopsy rate [1] this seems to be a good time to reexamine the role of autopsies in medical education in general, and basic science education in particular. There is intense interest in case-based learning, and an autopsy is a case-based experience. The autopsy affords a situation in which material from all of the basic science disciplines comes into play. Further, technological advances in capturing and manipulating images and

combining them with electronically-stored patient information offer exciting flexible alternatives to the classical specimen museum and paper records.

At the Medical College of Wisconsin, we have started this year to encourage every student to attend an autopsy and present the findings to colleagues in a small-group setting. We are in the process of evaluating this exercise. A number of interesting questions have arisen in the few months we have been doing this. For example, should this experience play a major role in carrying course content, or should it be viewed primarily as a way of enriching the students' experience in the course? As with other case-based instruction, if one relies only on case material which comes through a clinical service by chance, important topics may be missed, and yet "canned" experiences rarely have the immediacy of actual patient contracts, and therefore are more easily forgotten. What should the role of the resident-prosector be in this exercise? Should the students be required to write up the autopsy findings in a formal manner? If they do, who will read and evaluate the written work? Should they present the gross and the microscopic findings to their follow students, and if so, in how much detail? Should they be graded, and if so, how? What are effective ways to build up a library of autopsy cases? Can the autopsy material readily be used in an interdisciplinary fashion?

A number of departments of pathology have been having students attend autopsies during the basic science course in pathology, usually during the second year of medical school. This spring, I had an opportunity to visit several of them and to discuss with both the pathology faculty and residents what their experience has been. I found, not surprisingly, that they had many of the same problems and questions. It was stimulating to begin sharing ideas on this timely subject, and it seems to me that it would be helpful to a number of us to do this in a more formal fashion through the AAMC: GEA's Basic Science Education Special Interest Group.

I would be pleased to coordinate efforts to collect and disseminate information regarding the use of autopsy material in medical education. Please consider sharing your course, departmental, or institutional goals, your current experiences, and your ideas for the future of this teaching resource. I look forward to hearing from you by phone, fax, or mail.

1.Hill, R.B., Anderson, R.E. The Autopsy - Medical Practice and Public Policy. Boston: Butterworth, 1988, p41. This reference also presents a number of interesting perspectives on the uses of autopsy in medical education.

========== **RESPONSE FORM** ==========

_____ I would like to know more about the use of autopsy material in medical education.
_____ Below are some brief notes on our experiences and where we plan to go with this technique.

NAME _____

ADDRESS _____

_____

_____

PHONE _____

FAX _____

PLEASE RETURN TO:

Elsa B. Cohen, M.D.
Associate Professor
Medical College of Wisconsin
Department of Pathology Box 152
8700 West Wisconsin Ave
Milwaukee, WI 53226 U.S.A
Phone: (414) 257-6211
FAX: (414) 257-7815

ANNOUNCEMENT

ELECTION of CENTRAL REGIONAL DIRECTOR

John Curry and Jim Swierkosz, being asked to serve as a BSEF Central Region Nominating Committee, now present for your consideration their choice of two candidates (from those nominated at the Fifth Annual Meeting of the BSEF in New Orleans, November 11, 1992) for the position of BSEF Central Regional Director. Both these candidates have a demonstrated interest in the BSEF and a willingness to provide leadership in the regional chapter. A BSEF Regional Director:

*Organizes and directs all regional BSEF programs
*Chairs the annual regional BSEF chapter meeting
*Generates the Annual Report to the AAMC:GEA Executive Committee
*Represents the BSEF at regional GEA functions
*Advises the National Director in all matters
*Substitutes for the National Director if requested
*Encourages recruitment of additional regional BSEF members
*Designs and conducts regional projects in basic science education as well as those in conjunction with the BSEF National Director

All BSEF members (individuals on our mailing list, or those who wish to be on our mailing list) within the Central Region of North America are invited to vote for the candidate of their choice by returning the enclosed choice. The Central Region encompasses all medical schools in the states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin; and the Canadian Provinces of Manitoba, Ontario, and Saskatchewan. A statement from each candidate may be found on the following page.

BSEF BALLOT
For BSEF CENTRAL REGIONAL DIRECTOR

Vote for one

_____ Chandra Banerjee, M.D., Ph.D.
Professor of Physiology
Southern Illinois University

_____ Murray Saffran, Ph.D.
Professor of Biochemistry
Assistant Dean for Medical Education
Medical College of Ohio

NAME _____

ADDRESS _____
_____
_____

PHONE _____
FAX _____
_____
_____

Please return this ballot to:

James Swierkosz, Ph..D.
Department of Microbiology

St. Louis University
School of Medicine
1402 South Grand Blvd
St. Louis, MO 63104
Fax: (314) 773-3403

CANDIDATES FOR BSEF
CENTRAL REGIONAL DIRECTOR

CHANDRA BANERJEE, M.D., Ph.D.

Professor of Physiology
Southern Illinois University

I have been teaching physiology in the basic medical sciences at different medical schools in this country for over 30 years. During the first half of my teaching career I also taught clinical sciences. I have also spent significant part of my academic career in research and service. I have received the "Best Teacher Award" from medical students on several occasions and in 1989 I received the highest teaching award from my present institution (SIU) the "Master Teaching Award".

If I am elected by the Central Region BSEF as their Regional Director, I shall try to implement continuation of the activities started by my predecessor. I shall discuss with my predecessor and the governing body about the strengths and weaknesses of the previous programs and will modify my activities. I shall try to strengthen the liaison between our group and the Dean's group for implementation of our program. I will maintain and try to emphasize our various SIG activities. I shall explore the possibility of enhancing more "Think Tank Sessions" dedicated to the resolution of specific topics, e.g. curriculum modifications, vertical teaching methods during the entire medical school, interrelationship of the basic science-clinical science faculty, teaching and learning evaluation methods, faculty reward system, etc.

MURRAY SAFFRAN, Ph.D.

Professor of Biochemistry & Molecular Biology
Assistant Dean for Medical Education
Medical College of Ohio

Twenty-six of the 142 titles in my bibliography deal with medical education are based on 30 years' teaching biochemistry in medical schools and on my experience as the first Senior Fellow in Evaluation at the NBME.

The AAMC ACME-TRI Report lists the many attempts to reform undergraduate medical education and blames their failure on the low status of education in medical schools. How can the Central Region BSEF improve the status?

* We must lobby for changes in the reward system in our schools for incentives to improve education.
* We must strengthen our voice by recruiting our colleagues as activists in medical education and as participants in BSEF activities.
* We can attract the attention and support of our administrations by making education more cost-effective and goal oriented. We can cut out extraneous curricular material and emphasize that the end product of medical education is a physician. We must change student evaluation systems to replace short-term recall of facts by testing the ability to obtain and use knowledge.
* We must forge closer educational partnerships among the traditional pre-clinical and clinical disciplines to understand their educational goals to create the best learning environments for our students.

PROCEEDINGS of the FIFTH ANNUAL MEETING of the BASIC SCIENCE EDUCATION FORUM

Roger Koment, Ph.D., BSEF Director, welcomed the 41 participants at the fifth national BSEF meeting at the New Orleans Hilton on Wednesday, November 11, 1992. He reported on current membership, BSEF activities at regional meetings, plans to begin electing new Regional Directors on a rotating basis, and information concerning our first independent BSEF Conference, on the topic *New Educational Strategies for the Basic Sciences*, scheduled for June 26-29, 1993, in Charleston, South Carolina.

Alix Robinson, Ph.D., BSEF Northeast Regional Director, convened a panel on *Information Overload: Defining Essential Basic Science Curricular Objectives*. She began the presentation by reviewing some of the figures from the information explosion, noting that an estimated two million articles are published in the biomedical literature each year. How do teachers of basic science disciplines deal with this data and arrive at core concepts and information for medical students? Curricular objectives should make the faculty lead students to knowledge and skills; objectives should assure that teachers in multi-lecturer courses are all working toward the same goals; objectives allow design of examinations that test whether students achieve the course goals. Many medical educators believe that basic scientists and clinicians should work together to arrive at core objectives. The two speakers on the panel then presented their views as to how medical educators could reach consensus about core objectives.

Kathryn Doig, Ph.D., Director of the Preclinical Curriculum of the College of Human Medicine at Michigan State University, talked about "Implementing a New Curriculum: Opportunity for a Focus on Fundamentals". She described the new curriculum introduced at MSU in 1991. The reexamination of all aspects of the curriculum provided an opportunity to refocus basic science instruction on fundamental concepts and principles. In Block I, the first year, the fundamental concepts of the basic sciences are presented; the instruction is discipline-based and conducted in a large-class mode. Integrative Clinical Correlations, Clinical Skills, and Mentor Groups are included in Block I. Block II in the second year presents advanced biological, behavioral, and social concepts in a problem-based format using small group instruction. To determine content, basic science faculty committees were assigned practicing clinicians for input. They were asked to consider the content necessary to understand concepts not only in the same course, but in those taught concurrently and subsequently. Meetings of the faculty were encouraged within and across semesters. All of these efforts were variably successful. Dr. Doig reported that even thoughtful and willing faculty find it difficult to pare basic science content to what is needed to practice medicine; in part because no one can tell them what that is. More effective means of getting clinician input is needed as well as additional faculty development on methods of instruction and evaluation appropriate for basic science concepts and principles. A course review process was developed that uses peer review of course content with oversight by the Curriculum Committee to improve the process and better challenge faculty to examine the rationale for what they teach.

Michael Cancro, Ph.D., Associate Dean for Curriculum at the University of Pennsylvania School of Medicine, spoke about "Puzzling over Essentials". He asked if essentials might best be intuitively inferred through problem sets, rather than didactically presented as lists. He argued that the purpose of defining essentials is to insure a framework within which to approach new problems, and that using problems to circumscribe these essentials avoids two stumbling blocks inherent to list-making; first, the "core" of essentials requisite for effective problem-solving differs among students, and simple listings cannot address this issue. Second, consensus about what belongs in a list is hard to achieve, although general agreement on a satisfactory level of problem-solving is more readily achieved. Additional questions raised by this approach were discussed, including who should be involved in generating such problem sets, the logistics of their generation, and whether they might be defined at levels beyond individuals schools. Dr. Cancro distributed an illustrative example of this approach used in their Biochemistry course, which has adopted this general approach.

Both presentations generated spirited discussion with the audience about core objectives,

problem-based learning, integration of basic and clinical sciences, curriculum reform, and communication between basic scientists and clinicians.

Following the formal program, the group divided according to regional affiliation to meet with their Regional Directors. John Curry, Ph.D. and Jim Swierkosz, Ph.D. agreed to serve as a Nominating Committee as a first step in electing a replacement for Roger Koment, the current Central Regional Director. The combined Southern and Central Regions suggested several names of Central Region individuals for consideration by this Nominating Committee. Northeast Region members discussed program options for the upcoming Northeast BSEF spring 1993 meeting in Quebec. Bill Galey, Ph.D., Western Regional Director, shared his thoughts with members on promoting regional spring chapter meetings at the Western GEA Annual Conference in Asilomar. It was decided that the Western BSEF will try to organize an informal session at that meeting.

BASIC SCIENCE EDUCATION … In The Literature

The terms relevance and irrelevance are extremely difficult to define, since they are relative. They depend largely on the knowledge available at a given time and on the orientation of the individual educator …

During our education and professional careers, students and educators will never know what is relevant and what is irrelevant. Relevant facts may disappear and irrelevant facts may emerge as relevant as new information becomes available. The switching of the relevant to the irrelevant and vice versa in the light of scientific advances affects the magnitude of relationships between facts learned in medical school and their implications in practice …. [1]

1 Vogel, W.H., Ph.D. Relevance of "Irrelevant" Facts in Medical Education: The Value of Basic Science Teaching for Later Medical Practice. Academic Medicine Vol. 68: February Supplement. pp. 27-28, 1993.

ANNOUNCEMENT

SIXTH ANNUAL MEETING OF THE BSEF

NOVEMBER, 1993 WASHINGTON, D.C.

The Sixth Annual Meeting of the Basic Science Education Forum will be held in Washington, D.C. during the Annual AAMC Conference scheduled for November 5-11, 1993. Continuing in our tradition of selecting topics related to the four Current BSEF Projects (See next page), our theme for this meeting will address Topic #3: Problem-Based Learning: Defining the Role of Basic Scientists in Optimizing Basic Science Content With a PBL Program. If you have interest in working on any aspect of this program, please contact Bill Galey at (505) 277-0620.

1993 SPRING REGIONAL GEA MEETINGS

NORTHEAST

Quebec City, PQ April 16-18, 1993
Thinking, Learning, and Problem Solving in Medical Students and Residents
Organizers: Laval University, Georges Bordage, M.D., Ph.D.
For details on BSEF activity phone: Alix Robinson, Ph.D.
(315) 464-5870

CENTRAL

Rochester, MN April 29-May 2, 1993
Making it Happen!
Organizers: Robert Winter, M.D. and Margret Lie, M.D.
For details on BSEF activity phone: Roger Koment, Ph.D.
(605) 677-5174

SOUTHERN

Miami, FL April 21-24, 1993
The Resident as Teacher, The Resident as Learner
Organizers: Joan Friedland, M.D. and Pat Caralis, M.D.
For details on BSEF activity phone: Richard Hyde, Ph.D.
(405) 271-2133

WESTERN

Asilomar, CA April 25-28, 1993
How Medical Schools Handle Change in Medical Education
(Tentative)
Organizers: University of Colorado, Nancy Nelson, M.D.
For details on BSEF activity phone: William Galey, Ph.D.
(505) 277-0620

CURRENT BSEF PROJECTS

Four topics have been defined which the BSEF is addressing in various ways, each one being coordinated by a Regional Director. If you have interests, opinions and/or wish to work with others toward the resolution of one or more of the following, please contact the designated individual. Our long-term goal is to create workable solutions to these problems.

TOPIC 1

Integration of the Curriculum: Defining the Role of Basic Scientists in the Clinical Educational Setting and Clinicians in the Basic Science Educational Setting.

contact: Richard Hyde, Ph.D.

TOPIC 2

Information Overload: Defining Essential Curricular Objectives.

contact: Alix Robinson, Ph.D.

TOPIC 3

Problem Based Learning: Defining the Role of Basic Scientists in Optimizing Basic Science Content within a PBL Program.

contact: Bill Galey, Ph.D.

TOPIC 4

Defining Evaluation Standards: Criteria and Consistency.

contact: Roger Koment, Ph.D.

BASIC SCIENCE EDUCATION FORUM

AN ORGANIZATION OF BASIC SCIENCE FACULTY

NATIONAL DIRECTOR
Roger Koment, Ph.D. Univ of South Dakota, Vermillion
(605) 677-5174 UKRWØ2@SDNET

NORTHEAST REGIONAL DIRECTOR
Alix Robinson, Ph.D. SUNY Health Science Center, Syracuse
(315) 464-5870 ROBINSOA@SNYSYRV1

SOUTHERN REGIONAL DIRECTOR
Richard Hyde, Ph.D. Univ of Oklahoma, Oklahoma City
(405) 271-2133

CENTRAL REGIONAL DIRECTOR
Roger Koment, Ph.D. Univ of South Dakota, Vermillion
(605) 677-5174 UKRWØ2@SDNET

WESTERN REGIONAL DIRECTOR
William Galey, Ph.D. Univ of New Mexico, Albuquerque
(505) 277-0620 BGALEY@UNMB

CHAIR, ELECTRONIC NETWORKING COMMITTEE
James Swierkosz, Ph.D. St Louis University, St. Louis
(314) 577-8433 SWIERKOSZJE@SLUVCA.SLU.EDU

CHAIR, INSTRUCTOR SUPPORT COMMITTEE

EDITOR, *THE FORUM* BSEF NEWSLETTER
John Curry, Ph.D. Ohio State University, Columbus
(614) 292-9000

ASSOCIATE EDITOR,
INNOVATIONS IN BASIC SCIENCE TEACHING
Thomas Devlin, Ph.D. Hahnemann University
(215) 762-7947 DEVLINT@HAL.HAHNEMANN.EDU

GUEST EDITOR,
CLINICAL CORRELATION IN THE BASIC SCIENCES
Gabriel Virella, M.D., Ph.D. Medical Univ of South Carolina
(803) 792-4339 GABE_VIRELLA@MACGATE.MUSC.EDU

Our Purposes:

- To come together as a Global Community, through computer telecommunications, annual meetings and conferences, and our newsletter THE FORUM to discuss issues in medical education of common concern to all basic science faculty
- To share current techniques and innovative ideas for teaching the sciences fundamental to the practice of medicine
- To speak for reasoned progress in the development of self-directed, lifelong learning skills
- To address, and where possible, formulate consensus on issues in medical education which have direct impact on the basic sciences and basic science faculty
- To work toward resolving issues through interactions with appropriate organizations which can influence change in the academic medical community