

Pharmaceutical Manufacturers Association Foundation, Inc.

1975 Annual Report



Take Ten!

Take Ten! Who with a stint in the military in his or her background can forget the magic of this order to take a ten minute rest? The opportunity to recoup physically, even if ever so slightly, from the chore at hand was one of those small pleasures eagerly awaited.

Take Ten! has a bit of magic in it for those who labor in the PMA Foundation vineyard as well. In 1975, the PMA Foundation celebrated its tenth anniversary. But this has not meant a rest period, for the past year has been one of continued activity, laced throughout with an ongoing assessment of the accomplishments of the Foundation during its first decade. While a pause was taken through a number of surveys to

evaluate the past, this was only long enough to set the PMA Foundation's sights on continuing those efforts which have proved to be useful.

In marking the end of the PMA Foundation's first 10 years, 1975 also witnessed, of course, the start of a new decade of commitment. Various programs are already showing concrete results, with 1975 first of all, establishing the highest level of contributions yet received. Enthusiasm is high among the advisory committees. Thus the achievements and

potential of the Foundation and, most importantly, the interest of the Foundation's supporters, continue in a most tangible way.

The PMA Foundation has flourished in its first ten years and looks forward to the role it will play on behalf of the pharmaceutical industry in support of the biomedical sciences in the future.

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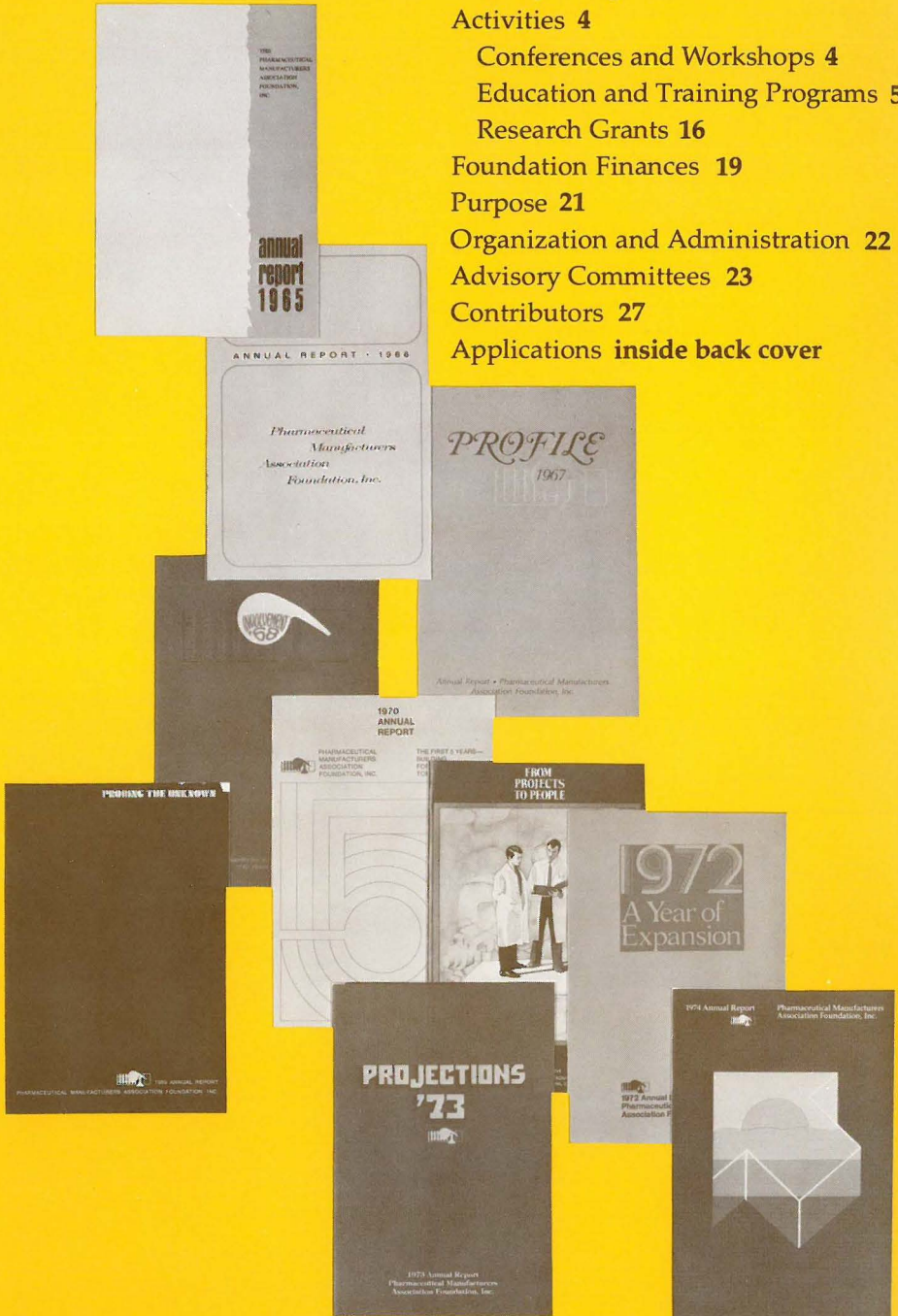
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The Reporting Process

Continuing the successful pattern of the past few years, the Foundation scheduled a meeting with recipients of awards under various postdoctoral educational programs and members of the Foundation's advisory committees on December 1-2, 1975. The meeting provided the opportunity for those attending the Foundation sessions to meet with members of the PMA Board of Directors.

In his welcoming comments, Daniel C. Searle, Chairman of the PMA Foundation Board of Directors, outlined some of the accomplishments of the Foundation during its first decade. The keynote speaker for the general session was Jerry R. Mitchell, M.D., Ph.D., Head, Section on Clinical Pharmacology, Laboratory of Chemical Pharmacology and Senior Clinical Investigator, Hypertension, Endocrine Branch, National Heart and Lung Institute. Dr. Mitchell covered the topic "Drug-Induced Tissue Lesions."

In separate sessions, the clinical pharmacologists and the fellows in pharmacology-morphology developed their own programs. The clinical pharmacology session was jointly moderated by John A. Oates, M.D., Chairman of the Foundation's Clinical Pharmacology Advisory Committee and Professor of Medicine and Pharmacology, School of Medicine, Vanderbilt University; and Leon Goldberg, M.D., Ph.D., Chairman-Elect of the Committee and Chairman, Committee on Clinical Pharmacology, University of Chicago. In this session, guest speaker J. Richard Crout, M.D., Director, Bureau of Drugs, Food and Drug Administration, spoke on the review process from the investigational new drug phase to the approval of a new drug application.

The pharmacology-morphology fellows split their time between discussions of the research efforts of some current fellows and the

thought-provoking comments of Guido Majno, M.D., Professor and Chairman, Department of Pathology, University of Massachusetts, who talked about the implications of ancient medical science for today's scientific efforts and frontiers yet to be fully studied.

The faculty awardees in basic pharmacology met separately for the first time for an informal discussion on a number of topics dealing with the role of pharmacology, the pharmacologist and the relationships to clinical pharmacology.

These yearly meetings continue to provide opportunities to assess how well each program is moving towards its goals. This year's meeting also assessed the ten year impact of the Foundation. Generally, the programs appear to be most effective in identifying qualified individuals who have substantial career goals of continuing along the paths encouraged by the various programs.

Activities

Since its formation in 1965, approximately \$6.2 million has been authorized by the PMA Foundation for a variety of workshops, conferences, research projects and educational programs. Of this amount \$2.0 million has been used to support research and about \$3.8 million to support educational awards. The remaining \$435,000 has provided financial assistance for scientific meetings, along with a small portion for publications.

As in recent years, virtually all of the 1975 grants and awards made have been made within the six programs sponsored by the Foundation. These include two faculty level programs of salary and fringe benefit support, three fellowship programs—two postdoctoral and one at the medical student level—and a program of research starter grants for the beginning investigator who wishes to move into an area of independent research.

Through these programs, the Foundation in 1975 assisted 45 individuals, all of whom were helped at a time crucial in their career development. The Foundation has, in its ten years of existence, provided assistance to 350 individuals through research and educational support programs.

Based on information gathered from some of these 350 individuals, it is clear that the awards have also had a "multiplier effect." A number of faculty awardees have extended the influence of the award by contact with virtually hundreds of medical students. Information from 34 of the 1972 and 1973 research starter grantees indicated that about \$1.6 million of further funding had developed based on the research begun with the Foundation's starter grants.

Conferences and Workshops

Three conferences received support during 1975.

Clinical Trials: A Workshop on Clinical Trials of Drugs was held March 24-25, 1975 at The Medical University of South Carolina, under the direction of Dr. Thomas E. Gaffney, Professor and Chairman, Department of Basic and Clinical Pharmacology, Professor of Medicine, Medical University of South Carolina. The Foundation provided partial support for the meeting through an enabling grant of \$15,250 to the Drug Research Board of the National Research Council. The purpose of the workshop was to identify opportunities to improve the quality of clinical trials by defining the problems involved and suggesting solutions. Its proceedings were published as a supplement to the November, 1975 issue of the journal "Clinical Pharmacology and Therapeutics."

Dermatopharmacology: A Workshop on Dermatopharmacology was held August 16-21, 1975 at Bryce Mountain, Basye, Virginia, under the direction of Dr. Daniel L. Azarnoff, Distinguished Professor of Medicine and Pharmacology, University of Kansas Medical Center and Dr. John J. Voorhees, Professor of Dermatology, University of Michigan. An enabling grant of \$17,325 was provided by the Foundation for partial support to the Drug Research Board, National Research Council. The purpose of the workshop was to discuss in considerable depth a single area of metabolic regulation and pharmacological modulation of inflammation.

Clinical Pharmacology: A series of conferences has been scheduled within the Center for Clinical Pharmacology, University of Chicago, for the early part of 1976 dealing with the sociologic, economic and humanitarian aspects of clinical pharmacology. The Foundation provided an enabling grant of \$3,000 to Dr. Richard L. Landau, Head, Fisher Endocrinology Laboratories, Department of Medicine, University of Chicago, to organize and arrange for various visiting speakers.

Education and Training Programs

To further its objectives in the field of education, the PMA Foundation sponsors three programs in clinical pharmacology, one in the combined field of pharmacology-morphology and one in basic pharmacology. Each program is intended to achieve a specific goal, either for a particular rung in an individual's career ladder or in a particular discipline.

Clinical Pharmacology: The three clinical pharmacology programs provide educational opportunities at the student, fellow and faculty levels. Through the *Faculty Development Awards in Clinical Pharmacology* program, the Foundation makes two-year awards to medical schools for salary and fringe benefit support of full-time junior faculty members. The level of support is variable, in keeping with the salary structure of the applicant university. In 1975, the Foundation established a ceiling of \$30,000 on the amount of its participation in the total salary and fringe benefit to any candidate.

With the awards scheduled to begin July 1, 1976, a total of 37 individuals have been supported under this program since 1967. These awards are for a two-year period, with a third year option.

Recipients of the four awards to begin July 1, 1976 are:



Werner A. Bleyer,
M.D.

- **WERNER A. BLEYER, M.D.**, Assistant Professor, Department of Pediatrics, University of Washington School of Medicine. He will attempt to characterize those factors influencing the efficacy and toxicity of intrathecal methotrexate therapy, with the overall objectives to establish pharmacokinetic concepts applicable to intrathecal chemotherapeutic agents in general. He will also direct special attention to the general problems of drug therapy in children, in the hope of establishing a program in pediatric pharmacology.



Robert Boerth, Ph.D.,
M.D.

- **ROBERT BOERTH, PH.D., M.D.**, Assistant Professor, Departments of Pediatrics and Pharmacology, Vanderbilt University School of Medicine. Dr. Boerth's efforts will be largely in the area of research in developmental cardiovascular pharmacology. He will be studying the postnatal development of myocardial contractile function and the contractile responses of the newborn heart to adrenergic and other cardioactive drugs. In addition, he will collaborate with other investigators of the Specialized Center of Research in Hypertension of Vanderbilt University to define the effects of antihypertensive medications in young hypertensive patients.

Dr. Boerth will also participate in the teaching programs for medical students and housestaff of the Departments of Pediatrics and Pharmacology.



Curt R. Freed, M.D.

- **CURT R. FREED, M.D.**, Assistant Professor, Departments of Pharmacology and Medicine, University of Colorado Medical Center. The major portion of Dr. Freed's efforts will be directed to an investigation of the role of catecholamine metabolism on blood pressure control. Using a GLC-mass spectrometric assay developed for following the kinetics of catecholamines in small regions of rat brain, he will apply the technique to the study of the effects of the anti-Parkinsonian drug L-Dopa and the anti-hypertensive drug alpha-methyldopa on regional brain catecholamine metabolism. These tissue metabolite observations will be related to concurrent blood pressure changes in the animals.

Dr. Freed will give a series of lectures on psychoactive drugs for the medical student pharmacology course. Teaching responsibilities will extend also to lectures on pharmacokinetics.



James J. Lipsky, M.D.

- **JAMES J. LIPSKY, M.D.**, Instructor in Medicine, Department of Medicine, Division of Clinical Pharmacology, The Johns Hopkins University School of Medicine. Dr. Lipsky will direct his efforts into a study of the immunosuppressive properties of chloramphenicol. The effects of chloramphenicol will be examined in both tissue culture and an animal model of the immune response.

An attempt is being made to identify a possible active metabolite of chloramphenicol which may have cytotoxic properties. If identified, the relationship of this metabolite to immunosuppression as well as the bone marrow toxicities of chloramphenicol will be studied.

Dr. Lipsky will also participate in a clinical study of drug regimens used in sepsis of unknown etiology. A study will be made to compare the efficacy and safety of gentamicin or tobramycin with methicillin or chephalothin in the treatment of sepsis.

Other individuals continued to be actively supported under this program in 1975. These include those whose awards concluded in June, those entered into the second or third year, and those whose initial year began in July.

Those individuals whose awards began in July, 1975 are:

- NORBERTO T. DE GUZMAN, M.D., Assistant Professor of Pharmacology and Medicine, University of Miami School of Medicine.
- PERRY V. HALUSHKA, Ph.D., M.D., Assistant Professor of Pharmacology and Medicine, Medical University of South Carolina.

Those individuals who entered the second year of their award in July 1975 are:

- TERRENCE F. BLASCHKE, M.D., Assistant Professor of Medicine, Stanford University School of Medicine.
- ROBERT L. CAPIZZI, M.D., Associate Professor of Medicine and Pharmacology, Yale University School of Medicine.
- ELSA-GRACE V. GIARDINA, M.D., Assistant Professor of Medicine, College of Physicians and Surgeons, Columbia University.
- RALPH E. KAUFFMAN, M.D., Assistant Professor in Pediatrics and Pharmacology, University of Kansas Medical Center.

Those individuals whose awards ended in June, 1975 are:

- ROBERT J. ROBERTS, Ph.D., M.D., Associate Professor, Pharmacology and Pediatrics, University of Iowa College of Medicine.
- THOMAS F. ROLEWICZ, M.D., Ph.D., Assistant Professor of Pharmacology and Pediatrics, University of Minnesota Medical School.

- AUGUST M. WATANABE, M.D., Associate Professor of Medicine and Pharmacology, Indiana University School of Medicine.
- RICHARD M. WEINSHILBOUM, M.D., Assistant Professor, Pharmacology and Internal Medicine, Mayo Medical School.



Geographical distribution of Foundation awards under its "Faculty Development Awards in Clinical Pharmacology" program, 1967-1976

- One
- More than one

The second program in clinical pharmacology provides *Fellowships for Careers in Clinical Pharmacology*. This award offers clinicians an opportunity for intensive study in any of the basic sciences that fall within the general field of pharmacology. The program is open to physicians, dentists and veterinarians who are well into their clinical training and wish to pursue careers in clinical pharmacology. With the year or two of support offered by this fellowship program, depending on the particulars of the undertaking, the individual can pursue full time the basic pharmacologic sciences needed to complement his clinical skills.

The first awards under this program were made in 1973. Since that time, seven fellowships have been awarded.

The recipient of the one fellowship beginning July 1, 1976 is:

- WILLIAM P. ARNOLD, M.D., Research Associate, Division of Clinical Pharmacology, University of Virginia School of Medicine. Dr. Arnold will spend 70% to 80% of his time in basic investigations on the effects of several agents (including catecholamines, cholinesters, prostaglandins, methylxanthines and others) on cyclic AMP and cyclic GMP metabolism in pulmonary structures. He will spend the remaining 20% to 30% attending conferences, research seminars, basic science courses and teaching rounds in the Departments of Anesthesiology, Medicine and Pharmacology.



William P. Arnold,
M.D.

The individual whose fellowship began July, 1975 is:

- DOUGLAS N. WEISMANN, M.D., Fellow, Pediatric Clinical Pharmacology Program, College of Medicine, University of Iowa.

**Those who began their second year of their fellowships
July, 1975 are:**

- DAVID M. KORNHAUSER, M.D., Research Associate, Department of Pharmacology, Vanderbilt University, School of Medicine.
 - JAMES J. LIPSKY, M.D., Fellow in Clinical Pharmacology, Departments of Internal Medicine and Pharmacology, The Johns Hopkins University School of Medicine.
 - THOM J. ZIMMERMAN, M.D., Research Fellow in Ophthalmology and Pharmacology, University of Florida, College of Medicine.
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Geographical distribution of
Foundation "Fellowships for
Careers in Clinical
Pharmacology" program,
1973-1976

● One

The third program in clinical pharmacology is the *Medical Student Research Fellowships in Pharmacology-Clinical Pharmacology*. This program, which began in 1974, provides students an opportunity to spend one year full-time in an investigative project in pharmacology-clinical pharmacology. To meet the full-time requirement of the program, the student must interrupt his formal medical training, but he must also intend to continue his schooling at the conclusion of the fellowship. It is hoped that by having students become involved extensively in investigative projects at a point when career choices are still relatively flexible, that they will opt for research careers in clinical pharmacology. Ten awards have been made since 1974.

The PMA Foundation has had a medical student support program since 1968. The earlier program offered three month traineeships to enable students to become acquainted with the techniques used in clinical pharmacology.

The six students who received fellowships which began July 1, 1975 are:

- JONATHAN A. COHN, Rockefeller University, has finished two and one half years of medical school and third year clinical clerkship in medicine. His principal supervisor during the fellowship is Attallah Kappas, M.D., Physician-in-Chief, Rockefeller Institute. During the year, Mr. Cohn is examining in more detail the results of earlier experiments he performed which indicate that the brain contains: (1) a microsomal cytochrome which is probably cytochrome P-450; (2) microsomal NADPH cytochrome-c-reductase; and (3) benzopyrene hydroxylase activity which is increased following pretreatment with intraperitoneal 3-methylcholanthrene. His current investigation will: (1) optimize conditions for the determination of each of these three parameters of microsomal mixed function oxidase activity in the brain; (2) evaluate the inducibility of brain microsomes using these three parameters following exposure of rats to 3-methylcholanthrene, phenobarbital or DDT; and (3) examine the tissue distribution of brain benzopyrene hydroxylase activity *in situ*.
- DANIEL K. DAY, University of Iowa, has completed his third year of medical school. His principal supervisor during the fellowship is Robert J. Roberts, M.D., Ph.D., Associate Professor, Pharmacology and Pediatrics. The objective of Mr. Day's research is to expand and clarify the mechanism by which prednisone interferes with salicylate disposition. This study will examine, in detail, the disposition of salicylate and its metabolites in the presence and absence of prednisone utilizing, as far as possible, the actual clinical dosage program.
- JAMES M. HORTON, Duke University, has completed two years of medical school. His principal supervisor during the fellowship is Robert B. Gunn, M.D., Associate Professor of Pharmacological and Physiological Sciences, University of Chicago. Mr. Horton shifted his activities to the University of Chicago when Dr. Gunn moved to that University. The overall objective of Mr. Horton's research is to understand the mechanism by which diuretic agents modify the anion receptors and anion transport across cell membranes. Because of difficulties in measuring ion transport across renal tubule cells and the difficulty in purifying membrane proteins from renal tubule cells, this project will seek valuable information concerning the modification of anion receptor sites by pharmacological agents using human red blood cell as an experimental system. This information will be valuable not only for the design of experiments and the subsequent evaluation of these drugs on their usual target organ, the kidney, in the case of diuretics, but also as a simple and reliable assay system for the development and screening of new and better diuretic agents.

- WADE H. MARTIN, University of Kansas, has completed his second year in medical school. His principal supervisor during the fellowship is Daniel L. Azarnoff, M.D., Distinguished Professor of Medicine and Pharmacology. Mr. Martin's project has two objectives. The first involves attempts to determine the mechanism and sequence of certain steps in the cholesterol biosynthetic pathway; one of the most poorly understood of these steps is the double bond migration in the sterol ring and its relationship to subsequent and preceding steps.

The second objective of the project is to determine the specificity of enzymes such as the 24, 25 reductase, not only regarding binding of compounds alien to the cholesterol biosynthetic pathway, but also regarding substrates in the biosynthetic pathway itself.

- ALLEN L. NEESE, University of Vermont, has completed two years of basic science requirements and the required Clinical Core. His principal supervisor during the fellowships is Lester F. Soyka, M.D., Professor of Pharmacology and Pediatrics. Mr. Neese's project involves an examination of periodic breathing and apnea, common in premature infants with an incidence of 30-45 percent. The consequences of hypoxia secondary to apnea are unknown but it is postulated to be an important cause of CNS damage.

Caffeine (1, 3, 7-trimethylxanthine) and theophylline (1, 3-dimethylxanthine) are CNS stimulants and bronchodilators. The central stimulatory effect of caffeine is greater than that of theophylline, while the reverse is true of their bronchodilating effects. The study will determine the safety and efficacy of these drugs and assess their roles in neonatal medicine. The pharmacokinetics of both drugs will be studied in the relatively immature rat neonate vs. the relatively mature guinea pig neonate to define the therapeutic serum levels and half lives. Measurements of efficacy and serum levels will be done in human infants.

- ALAN J. RAVITZ, Michigan State University, a second year medical student. His principal supervisors during the fellowship are Dr. J. Meites, Professor of Physiology and Dr. K. E. Moore, Professor of Pharmacology. Mr. Ravitz is examining the functional relationships between brain catecholamines and the anterior pituitary. He is examining effects of drugs that alter catecholaminergic transmission processes on the blood levels of anterior pituitary hormones. The immediate supervisor of this project, Dr. Moore, has examined the behavioral and biochemical actions of drugs that alter the dynamics of brain catecholamines and he believes that these same drugs can be utilized in a judicious manner to investigate brain catecholamine-anterior pituitary relationships. The experiments will be carried out in rats.

The four students whose fellowships ended June, 1975 are:

- DARRELL R. ABERNETHY, University of Kansas Medical School. His principal supervisor during the fellowship was Dr. Daniel L. Azarnoff, Distinguished Professor of Medicine and Pharmacology.
- ALAN S. HOLLISTER, University of North Carolina School of Medicine. His principal supervisor during the fellowship was Dr. George R. Breese, Associate Professor of Psychiatry and Pharmacology.
- RONALD J. LONG, Indiana University School of Medicine. Dr. Roger P. Maickel, Professor of Pharmacology, was his principal supervisor during the fellowship.
- THOMAS W. SADLER, University of Virginia School of Medicine. His principal supervisor during the fellowship was Dr. D. Kochhar, Associate Professor of Anatomy.



Geographical distribution of Foundation "Medical Student Research Fellowships in Pharmacology-Clinical Pharmacology" program, 1974-1975

● One
○ More than one

Basic Pharmacology—The purpose of the *Faculty Development Awards in Pharmacology* is to strengthen basic pharmacology by helping maintain existing academic capability and, ultimately, to expand this capability by enlarging the faculty base. To accomplish these goals, support is provided to full-time junior faculty members committed to careers in pharmacology who give promise of outstanding accomplishments.

The first awards, which are for a two-year period, were made in 1973. They provide salary and fringe benefits at levels which are expected to be consistent within the applicant university. The total number of awards made to date is eleven.

Those who received awards beginning July 1, 1976 are:

- SUE DUCKLES, Ph.D., Assistant Professor in Residence, Department of Pharmacology, University of California School of Medicine (Los Angeles). Dr. Duckles will investigate two major aspects of the cerebral circulation using a variety of *in vitro* techniques. A rigorous analysis of the sympathetic neuromuscular



Sue Duckles, Ph.D.

apparatus of large cerebral blood vessels in various brain regions will be conducted. The nature of cerebral vasoplasm and possible therapeutic interventions will be investigated using *in vitro* techniques to elucidate the role of injury in this condition. Cellular processes such as smooth muscle necrosis, endothelial contraction, release of vasoconstrictor substances and prolonged smooth muscle contraction will be examined using several different models of vasospasm and techniques from a variety of disciplines.

- GARRETT J. GROSS, Ph.D., Assistant Professor, Department of Pharmacology, Medical College of Wisconsin. Dr. Gross will study the effects of nitroglycerin, propranolol, methoxamine and two other coronary vasodilators, i.e., isosorbide dinitrate and sodium nitroprusside, on regional myocardial blood flow and tissue oxygen tension (pO_2) in the intact dog heart with and without a flow-limiting proximal coronary stenosis of the left anterior descendens artery. These experiments should lend insight into mechanisms responsible for the efficacy of nitrates and propranolol in the treatment of angina pectoris.



Garrett J. Gross, Ph.D.

- DANIEL A. KOECHEL, Ph.D., Assistant Professor, Department of Pharmacology and Therapeutics, Medical College of Ohio. Dr. Koechel's research involves the direct application of basic chemistry to the delineation of various pharmacological phenomena. Many chemical substances, most of which are currently available drugs, possess the ability to alkylate tissue proteins or nucleic acids via a SN-2 reaction or a Michael-type addition reaction. In some cases these alkylation reactions result in beneficial pharmacological effects and in other cases detrimental effects. Emphasis will be placed on delineating the role that alkylation of renal tissue by drugs plays in elicitation of a diuresis or drug-induced nephrotoxicity.



Daniel A. Koechel, Ph.D.

Those who began their award in July, 1975 are:

- CLAIRE M. LATHERS, Ph.D., Instructor, Department of Pharmacology, Medical College of Pennsylvania.
- CARL L. JOHNSON, Ph.D., Assistant Professor, Mount Sinai School of Medicine.

Those who entered the second year of their award in July, 1975 are:

- ING KANG HO, Ph.D., Associate Professor, Departments of Pharmacology and Toxicology, University of Mississippi.
- MICHAEL G. MAWHINNEY, Ph.D., Associate Professor of Urology and Pharmacology, West Virginia University School of Medicine.
- SAMUEL J. STRADA, Ph.D., Associate Professor, Department of Pharmacology, University of Texas Medical School (Houston).

Those who ended their award in June, 1975 are:

- KENNETH L. DRETCHEN, Ph.D., Assistant Professor, Department of Pharmacology, Georgetown University School of Medicine and Dentistry.
 - ROBERT I. GLAZER, Ph.D., Assistant Professor of Pharmacology, Emory University, Woodruff Medical Center.
 - THEODORE A. SLOTKIN, Ph.D., Associate Professor of Pharmacology, Duke University Medical Center.
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Geographical distribution of Foundation "Faculty Development Awards in Pharmacology" program, 1973-1976

● One

Pharmacology-Morphology—The aim of the program of *Fellowship Awards in Pharmacology-Morphology* is to advance understanding of drug action through the discovery of specifically related cellular and tissue changes; and, concurrently, to uncover associations between normal and abnormal function in particular tissues and cellular structure.

The awards are for two years each. The level of support is variable and is aimed at keeping within the existing stipend levels for similarly trained individuals within the applicant university. Since 1968 when the first fellowships were offered, 31 awards have been made.

The program requires that a candidate be qualified primarily either in a morphologic specialty or in pharmacology. However, training to be achieved under the fellowship in the complementary discipline need not be formal. The candidate's program should result in a familiarity with a new disciplinary approach by using his primary discipline as a medium for acquiring the second.

The recipients of fellowships which began in July, 1975 are:

- CLARA F. ASNES, Ph.D., Fellow, Department of Biological Sciences, University of California (Santa Barbara). Dr. Asnes' area of research is the control of microtubule assembly during the eucaryotic cell cycle, and the recording of changes in drug binding properties of tubulin and the polymerization characteristics of tubulin obtained at various stages of the cell



Clara F. Asnes, Ph.D.

cycle. These studies involve the use of pharmacological and biochemical techniques, as well as electron microscopy. In addition, she plans to investigate the possible presence of natural regulators of microtubule polymerization (either inhibitors or promoters) at various phases of the cell cycle. The purpose of these studies is to define the parameters controlling microtubule polymerization and depolymerization, with the long term goal of understanding how the mitotic spindle as well as other microtubules function.

- **RAYMOND J. DINGLEDINE, Ph.D.**, Addiction Research Foundation, Palo Alto, California. Dr. Dingleidine is using his fellowship at the Medical Research Center at Cambridge University where he is studying an effect of morphine on nerve cells in the cat prepyriform cortex. Emphasis is on identifying the neurons upon which morphine acts, establishing what synaptic events are modified by morphine, and studying the pharmacology of neurotransmission at that synapse. He is receiving training in electrophysiologic recording and stimulating techniques, the use of multibarreled electrodes for iotopheresis, and histochemical, autoradiographic, and fluorescence procedures for localization of the monoamine neurotransmitters in cells and nerve terminals.



Raymond J.
Dingleidine, Ph.D.

- **JOHN W. MILLS, Ph.D.**, Assistant Biologist, Laboratory of Biophysics, Massachusetts General Hospital. Dr. Mills is applying techniques of electrophysiology, biochemistry, thermodynamics and electron microscopy in the correlation of structure and function in drug-mediated responses of transporting epithelia.



John W. Mills, Ph.D.

- **R. WILLIAM SOLLER, Ph.D.**, Instructor in Pharmacology, Department of Pharmacology, University of Pennsylvania. Dr. Soller is studying the effects of thyroxine on the structural and functional characteristics of spinal motoneurons of the frog using both histological and electrophysiological techniques. In addition, Dr. Soller is learning the techniques of intracellular recording for the study of hormone-induced alterations in the electrical properties of spinal motoneurons and of intracellular dye injection for the light microscopic identification of these neurons. Correlation of the histological and electrophysiological data with known biochemical effects of thyroxine on other tissues will provide insight into the problem of how thyroid hormone affects nervous tissue.



R. William Soller,
Ph.D.

Those individuals who entered the second year of their fellowships in July, 1975 are:

- **JOHN I. CLARK, Ph.D.**, Postdoctoral Fellow, Department of Anatomy, Harvard Medical School.
- **JANET D. SMITH, Ph.D.**, Assistant Professor of Anatomy, Medical College of Pennsylvania.

Those individuals whose fellowships concluded in June, 1975 are:

- STEVEN B. MIZEL, Ph.D., Postdoctoral Fellow, Department of Biochemistry, Colorado State University, Fort Collins, during the first 15 months of the award. Dr. Mizel finished the fellowship at The Weizmann Institute of Science in Israel.
- NANCY J. RUSSELL, Ph.D., Research Associate, Department of Pharmacology, University of Oregon Medical School.
- NORMAN R. WEST, Ph.D., Postdoctoral Fellow in Anatomy, Washington University School of Medicine.



Geographical distribution of Foundation "Fellowship Awards in Pharmacology-Morphology", 1968-1975

- One
- More than one

Research Grants

An important aspect of the PMA Foundation efforts has been the support of fundamental research in drug toxicology. Between 1966 and the end of 1971, 26 research grants of relatively large amounts for two to five years were awarded, principally to established investigators to either extend existing research or to provide "seed" monies to follow a promising lead. In 1971 a change in emphasis within the Foundation's programs shifted the bulk of the funds into educational support programs, and, therefore, less into research. The Foundation does, however, continue to accept requests for support and suggestions for pertinent research projects, since it is important that the potential for helping that particularly promising effort within the interests of the Foundation be maintained.



Geographical distribution of Foundation general research grants, 1966-1975

- One
- More than one
- ⊙ Outside U. S.

Research Starter Grants

As part of the change of emphasis in 1971 which sought to direct monies more toward the development of the individual, a program of Research Starter Grants was initiated. These grants are intended to provide financial support for beginning investigators. The program offers a \$5,000 a year for two years, with the second year contingent upon a continuing need for the funds. The research areas of interest within this program are in the fields of pharmacology, clinical pharmacology and drug toxicology. The program allows for approximately 20 research grants each year. The first awards were made in 1972. A total of 118 research starter grants have been made, including the 27 awards beginning January 1, 1976.

The recipients of the grants beginning January, 1976 are:

DANIEL ACOSTA, JR., Ph.D., University of Texas College of Pharmacy (Austin)	VICTOR H. MORGENROTH, III, Ph.D., Georgetown University School of Medicine and Dentistry
WILLIAM T. BECK, Ph.D., University of Southern California School of Pharmacy	NORBERT R. MYSLINSKI, Ph.D., University of Maryland School of Dentistry
NEVILLE BROOKES, Ph.D., University of Maryland School of Medicine	ROGER A. NICOLL, M.D., University of California School of Medicine (San Francisco)
WILLIAM CACINI, Ph.D., University of Cincinnati College of Pharmacy	RAYMOND M. QUOCK, Ph.D., University of the Pacific School of Pharmacy
WILLIAM B. CAMPBELL, Ph.D., The Medical College of Wisconsin	JAMES M. ROBERTS, M.D., University of California School of Medicine (San Francisco)
BARRY M. CHAPNICK, Ph.D., Tulane University School of Medicine	DANNY DAH-YING SHEN, Ph.D., University of Kansas Medical Center
THOMAS E. DONNELLY, JR., Ph.D., University of Nebraska College of Medicine	CLARK W. SMITH, Ph.D., University of Illinois College of Medicine
RICHARD H. FERTEL, Ph.D., The Ohio State University College of Medicine	ODD S. STEINSLAND, Ph.D., University of Texas Medical School (Galveston)
PATRICIA GALLAGHER, Ph.D., University of Texas Medical School (Galveston)	DONALD H. WATERS, Ph.D., State University of New York School of Pharmacy (Buffalo)
VERNON R. GRUND, Ph.D., State University of New York School of Pharmacy (Buffalo)	FRANCIS M. WELD, M.D., Columbia University College of Physicians and Surgeons
BETH HOSKINS, Ph.D., University of Mississippi School of Medicine	PAUL V. WOOLLEY, III, M.D., Georgetown University School of Medicine
GARY L. JONES, Ph.D., University of Utah College of Medicine	MICHAEL A. ZEMAITIS, Ph.D., University of Pittsburgh School of Pharmacy
ALAN G. MALLINGER, M.D., University of Pittsburgh School of Medicine	RICHARD E. ZIGMOND, Ph.D., Harvard Medical School
MARY A. MARRAZZI, Ph.D., Wayne State University School of Medicine	

Review of the need of the 25 research starter grantees whose awards began January 1, 1975 for a second year of the awards resulted in 13 of them having their awards continued. These are:

STEVEN I. BASKIN, Ph.D.,
Medical College of Pennsylvania

LARRY A. BRUCE, Ph.D.,
University of Texas Southwestern
Medical School (Dallas)

SHARON K. CHAPMAN, Ph.D.,
University of Florida
School of Medicine

BAHJAT A. FARAJ, Ph.D.,
Emory University
School of Medicine

SUSHIL K. GOMER, Ph.D.,
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Geographical distribution of
Foundation awards under
the "Research Starter
Grants" program, 1972-1976

● One
○ More than one

Foundation Finances

The total income of the Foundation in 1975 was \$905,254. Of this amount \$830,930 came from contributions. The balance of \$74,324 came from investments and refunds of unexpended balances from grants.

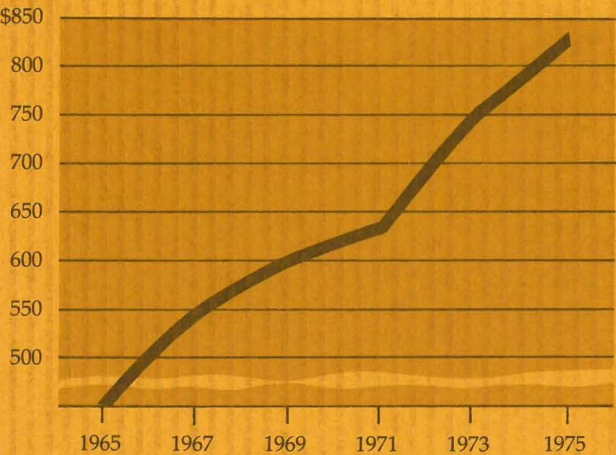
Contributions were received from approximately three out of every four PMA Member Firms. Contributions were also received during 1975 from individuals and other groups in the health field.

Grants, Foundation-sponsored programs and other expenses for 1975 amount to \$797,713. Of this amount \$680,195 represented expenditures for grants and Foundation-sponsored programs. There was a fund balance of \$1,226,675 as of December 31, 1975. This figure, however, does not reflect the tentatively authorized, undisbursed funds for some of the grants and programs described earlier. The Foundation reports these amounts as expenditures when the funds are distributed. As of December 31, 1975, the contingency liability for 1976 is approximately \$619,000.

Financial Report. The Foundation's financial position as of December 31, 1975 has been audited by the accounting firm of Ernst & Ernst. Copies of this statement will be supplied upon request.

Financial statements have been issued to contributors quarterly during 1975. These reports are prepared by Washington, D. C. accounting firm of Buchanan & Company.

PMA Foundation
Contribution Income
1965-1975 (Thousands)



Statement of Income and Expenditures
For the year ended December 31, 1975

Income

Contributions—Note a.....	\$ 830,930
Income from Investments	60,591
Miscellaneous Income.....	13,733
TOTAL INCOME.....	\$ 905,254

Expenditures

Grants—Note b

Clinical Pharmacology Faculty Awards.....	\$ 204,537
Clinical Pharmacology Fellowship Program	46,375
Basic Pharmacology Faculty Awards.....	113,208
Medical Student Research Fellowships.....	30,000
Pharmacology-Morphology Fellowships	68,500
Research Starter Grants	185,000
National Academy of Sciences	32,575
	\$ 680,195
Administrative expenses	117,519
Loss on Sale of Stock.....	5,247
TOTAL EXPENDITURES.....	\$ 802,961
Excess of income over expenditures	\$ 102,293
Fund balance at January 1, 1975	\$1,124,382
Fund balance at December 31, 1975.....	\$1,226,675

Note a—The Foundation received contributions of \$136,200 prior to December 31, 1975 which the Foundation considered applicable to 1976 and, therefore, are not recorded as income in 1975.

Note b—In addition to the amounts shown, the Foundation has committed itself, subject to annual review, to make certain grants. At December 31, 1975 the amounts still to be disbursed with respect to these grants during 1976 amount to approximately \$619,000.

Purpose

The PMA Foundation was established to promote the betterment of public health through scientific and medical research, with particular reference to the study and development of the science of therapeutics. In achieving this goal, The Foundation plans and initiates scientific and medical research activities, collects and disseminates the results of these activities, and provides financial support and aid to individuals or institutions whose purposes are scientific, educational or charitable.

Certain guidelines have been developed to promote the wise and proper use of the limited resources available. The areas of interest agreed to initially, and which still govern the distribution of funds, are support of fundamental research in drug toxicology, and the support of programs of research and training for personnel in clinical pharmacology and drug evaluation.

Throughout the year, programs have been supported and developed which provide the means of achieving the goals of the Foundation. Many worthwhile proposals have been submitted. It has been necessary to limit support to those which hold the highest promise of advancing the purposes of the Foundation.

Those areas not supported within the existing guidelines are:

(1) Research on specific drugs. This exclusion is not meant to preclude support of projects which, of necessity, use a number of drugs to establish a methodology or screening program of potential general applicability. It does exclude those efforts primarily aimed at learning more about specific drugs or classes of drugs.

(2) Funds for construction. The Foundation is not unmindful of the needs and the tremendous pressures for private funds for construction projects. However, it is believed that the scientific community can be better served by channeling the Foundation's available resources into other areas.

(3) Funds for travel.

(4) Funds to cover entertainment costs.

In 1971, the Board of Directors authorized a major shift in program emphasis. While Foundation support of research continues, such support is to be primarily available in a redirected fashion such as the Research Starter Grants program discussed on page 17.

In line with this change of emphasis, the Foundation is expanding support within its current educational programs as outlined in the Education and Training Programs Section on page 5. **While meetings have never received a large portion of the support dollar, only in very exceptional circumstances will meetings receive support in the future.**

Organization and Administration

The PMA Foundation operates through its officers and four advisory committees. The Chairman of the Board is Daniel C. Searle, Chairman of the Executive Committee and Chief Executive Officer, G. D. Searle & Co., C. Joseph Stetler is President, Thomas E. Hanrahan is Executive Director and I. C. Winter, M.D., Ph.D. serves as staff consultant. In July, 1975 Mr. Searle was reelected Chairman of the Board. Clarke Wescoe, M.D., Chairman of the Board, Sterling Drug Inc., was elected Vice Chairman and Donald van Roden, President, Smith Kline & French Laboratories was reelected Secretary, Treasurer.

In reaching decisions on the most worthwhile activities for support, the Board of Directors has had the advice of extremely knowledgeable individuals serving on four advisory committees.

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¹ Resigned July, 1975

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Vice President, Medical Affairs
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Chicago, Illinois



Harold F. Hailman,
M.D., Ph.D.

¹ Appointed Chairman, January, 1976

² New Member, April, 1975

³ New Member, December, 1975

⁴ Resigned April, 1975

⁵ Resigned December, 1975

⁶ Resigned July, 1975

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Chicago, Illinois

⁷ Appointed Chairman, December, 1975

⁸ Resigned May, 1975

⁹ New Member, December, 1975

¹⁰ New Member, August, 1975

¹¹ Resigned December, 1975

¹² Resigned July, 1975

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Don W. Fawcett, M.D.

¹³ New Member, December, 1975

¹⁴ Member until December, 1975

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¹⁵ Resigned May, 1975

¹⁶ Resigned June, 1975 (Died July 3, 1975)

¹⁷ New Member, August, 1975

Contributors

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Applications

The Foundation accepts requests for support and suggestions for pertinent research projects from qualified institutions and individuals. However, in 1971 the Foundation underwent a major shift in program direction, now emphasizing education and training support.

To expedite the handling of requests for research support, it is suggested that a brief one or two page letter be directed to the Foundation, outlining the intended project and an estimate of the funds involved. After review of this more informal request by members of the Scientific Advisory Committee to determine the degree of likelihood of the project falling within Foundation guidelines, a decision can be made as to whether a formal proposal is warranted.

Letters should be addressed to:

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**Pharmaceutical Manufacturers
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