

PHARMACOLOGY TODAY

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Pharmacology is the science that deals with drugs of all kinds. It is a basic medical science in its own right. It has risen to major rank among the group of scientific disciplines which come within the scope of experimental medicine. It borrows freely from and contributes generously to the subject matter and techniques of many medical disciplines, clinical as well as preclinical. The subject is rapidly expanding and rapidly changing, for example in the subdivisions pharmacodynamics, biochemical pharmacology, psychoneuropharmacology, pharmacotherapy, and pharmacogenetics. Progress in pharmacology has been so stupendous in recent years that it has suggested a 'drug explosion'.

Advances in pharmacology have taken place over a wide field. Information on the many and varied types of drugs, and details about their actions, uses, and dangers, are scattered throughout a large range of experimental and clinical journals, reviews, and monographs. To keep abreast of the main streams of advancement and changes in our knowledge is a full-time occupation. At the academic level a wide knowledge is required, not only for the teaching of undergraduate and postgraduate students, but also for the frequent requests for the latest information by interns, practitioners, and pharmacists, and in regard to medico-legal problems.

PHARMACOLOGY AND ITS RELATION TO PHYSIOLOGY

As long ago as 1911 the editor of the *Journal of Physiology*, J. N. Langley, refused a paper by Henry H. Dale for the reason that pharmacology was encroaching unduly on his space. In 1932 J. A. Gunn stated that it had become less possible for one individual to be both a physiologist and a pharmacologist.

Physiology is the study of the life of the normal organism, but pharmacology is the study of the reaction of the organism (and of microorganisms) to drugs. The primary aims are so different that the two sciences must be regarded as separate disciplines. The worker in pharmacology must have a competent knowledge of physiology, but it is difficult for individuals to keep reasonably abreast of developments in both these fields.

PHARMACOLOGY AND ITS RELATION TO THERAPEUTICS

Pharmacology is not synonymous with therapeutics. The

subject is taught in the medical curriculum in order to provide a scientific basis for the practice and study of therapeutics. A thorough knowledge of pharmacology is necessary in order to be able to assess the value of drugs independently. Students must be taught how to think about drugs so that they are better prepared to withstand the flood of unsubstantiated claims that are often made for new drugs.

No person can teach both pharmacology and therapeutics adequately. No one man can teach adequately the whole of therapeutics including psychotherapy, physiotherapy, dietetics, fluid and electrolyte therapy, and drug therapy. No one man for that matter can teach drug therapy, since he would not be competent to teach 'applied pharmacology' in all the various departments of the hospital, for example, in anaesthetics, dermatology, psychiatry, ophthalmology, obstetrics and gynaecology. Proper comprehensive and systematic teaching about drugs cannot be done at the bedside. Moreover there are drugs used in tropical diseases and in many other diseases which are infrequently seen in local hospitals. There are substances of toxicological importance that need to be considered, for example insecticides, mushrooms, snake-poison, poisonous gases, etc. and other aspects of pharmacology that do not come within the scope of drug therapy. It is clear that only limited aspects of a limited number of therapeutic agents can be dealt with at the bedside.

PHARMACOLOGICAL CONGRESSES

At the international level it had been considered necessary for many years that pharmacologists discuss their problems separately, and to this end the First International Pharmacological Congress was held in Stockholm in 1961. There were 1,493 active members present at this meeting, representing 46 countries. All the proceedings were conducted in English. Eight symposia were held: (1) On drugs and membranes, (2) Pharmacological control of the release of hormones, (3) Modern concepts in relationship between structure and biological activity, (4) Methods for the study of pharmacological effects at cellular and subcellular levels, (5) New aspects of cardiac glycosides, (6) Pharmacological analysis of central nervous action, (7) Metabolic factors controlling the duration of drug action, and (8) Effects of drugs on the synthesis and

mobilization of lipids. A special symposium was held on bradykinin and vasodilator polypeptides. In addition to the symposia there were 600 research papers on a great variety of problems. It may be mentioned here that in the Karolinska Institute (The Royal Medical School), in Stockholm, the pharmacology department has a total staff of 70 persons, including Professor Uvnas, 2 Associate Professors, 2 Assistant Professors, and 14 doctors doing research work. There are at least four other well-staffed pharmacology departments in Sweden.

The Second International Pharmacological Congress was held this year in Prague, chiefly in the Purkinje Institute, but also in other parts of the historic Charles University. Again, the proceedings were conducted almost entirely in English by the 2,000 scientists attending from 51 countries. The symposia on this occasion were concerned with: (1) Pharmacology of conditioning, learning, and retention, (2) Biochemical and neurophysiological correlation of centrally-acting drugs, (3) Pharmacology of cholinergic and adrenergic transmission, (4) Drugs and enzymes, (5) Pharmacology of cardiac function, (6) Pharmacology of smooth muscle, (7) Pharmacology of oriental plants, (8) Evaluation of new drugs in man, (9) Recent advances in the pharmacology of toxins, and (10) Oxytocin, vasopressin, and their structural analogues. There was a special symposium on respiration. The short communications on a variety of topics were approximately 1,000 in number.

These brief notes on the subjects discussed at the International Meetings give some insight into the interests of modern pharmacology. The full details of all proceedings are available in several volumes published by Pergamon Press. Incidentally, there are 9 pharmaceutical institutes in medical schools in Czechoslovakia (6 of them new).

PHARMACOLOGICAL INSTITUTIONS OVERSEAS

The pharmacology departments which I visited in recent years are larger than ours, have full independent status, and are excellently equipped with apparatus and skilled manpower. In many places new buildings have been constructed (Oxford; London, Royal College of Surgeons; Geneva; Rome; Utrecht; Jerusalem). In Oxford Professor Paton has a new three-storey building in place of the old

for his own research laboratories, as well as a section for biochemical pharmacology (Dr. H. Blaschko), a section for pharmacological chemistry, a large student laboratory and in addition to much other equipment, an electron microscope. For a class of approximately 60 students he has 4 teachers, augmented for the practical work by 4 postgraduate research scholars and the technical staff. The same sort of pattern obtains in other places mentioned. At the Royal College of Surgeons (Institute for Basic Medical Sciences) Professor Born and Dr. J. Vane, aided by Dr. W. Thompson, have a fine department with excellent facilities, electronic equipment, and a large television set for observing animal behaviour in an adjoining sound-proof room. Pharmacology is an important subject for anaesthetists who, together with surgeons studying for the Primary Examinations of the Royal College of Surgeons, receive approximately 30 lectures delivered by 8 different lecturers. In England and Wales the number of chairs of pharmacology increased from 3 to 7 during 1930-1940, whereas today there are at least 20.

It need hardly be added that the major pharmaceutical organizations, for example in Basle (Switzerland) and in certain centres in and around London, have magnificently equipped laboratories for fundamental research, apart from their large departments in which there is routine manufacture of marketed products.

Here in South Africa much remains to be done to improve our own pharmacology departments. We have 5 medical schools at none of which the facilities are fully adequate or comparable with the departments overseas. A single department overseas has at least as many teaching personnel as all our 5 medical schools put together, and their students are fewer in number. Our staff-student ratio is also inadequate. The top posts should be such as to offer an incentive to applicants and incumbents. We could well emulate the institutions overseas whose main advantage over us is their full and appropriate complement of teaching, research, and laboratory personnel, and their modern equipment.

My thanks are due to the University of Cape Town for enabling me to attend the Pharmacological Congresses and to visit a large number of institutions, including those mentioned, during the course of my study leave.