CHAPTER 1

INTRODUCTION TO PHARMACOLOGY

Pharmacology is a Greek word derived from—'Pharmacon' which means a drug and 'Logos' which means science or a study *i.e.*, the science or the study of a drug is called Pharmacology. Once a word science is used, one must try to explore it as widely and as deeply as one can do and ultimately put some question marks in the last. Immediately, the questions that arise are—What is a drug? What does it do? How much is to be administered and which route will be most suitable? How does it act? What happens to it? What will happen if it is taken with other drugs used for the same or any other infliction or administered in a large quantity or taken with food? etc.

Drug (in French-Drogue) is a chemical substance which interacts with the life processes in the body and optimizes or sets right or organizes the deranged or derailed life processes. W.H.O. (1966) defined a drug as "Any substance or product that is used to modify or explore the physiological systems or pathological states for the benefit of the recipient". If the substance alters or derails the optimized state of life process, the substance is called toxic or poison.

PRO-DRUG

A chemical substance that is administered as a precursor of a drug and is converted into an active

therapeutic agent inside the body e.g., levodopa is a pro-drug for dopamine—a neuro transmitter deficient in parkinsonism. Similarly, phenacetin is converted into paracetamol-an active-antipyretic agent.

PROTOTYPE DRUG

A chemical agent of a group used for therapeutic purposes having most of the chemical, pharmacokinetic and pharmaco-therapeutic characteristics of the group e.g. aspirin, morphine, xylocaine.

Once a chemical substance has been found to be effective against some disease or illness, it is necessary to give it some name to communicate the information in scientific world. It is easy to parley in chemical language with a small group of chemists e.g. acetyl salicylic acid, p-acetoamidophenol, aminobenzyl penicillin, which can not be understood by majority. Therefore, international community agreed to give a standard name through WHO to this substance for maintaining uniformity throughout the world. It is called "Official" or "generic" or "non-proprietary" name like aspirin, paracetamol, ampicillin. Again, these nonproprietary names may some times be difficult to remember or pronounce or spell out. Hence, "proprietary" or "trade" or "brand" names may be registered or unregistered like "Ecospirin", Dispirin, Mejoral, Crocin, Calpol, Biocillin, Synthocillin, Roscillin".

It is true that any substance which optimizes the altered or derailed life processes, will also alter *i.e.*, increase or decrease the other optimized life processes. Thus the effects produced by the action on the former one are called therapeutic effects and the effects produced by the action on other processes are called side effects or adverse effects or toxic effects.

"How does it act?" is a very difficult question to answer. Researchers are trying hard to answer this question. Extensive as well as intensive researches are going on to

get answer for each question about a drug. How much (dose), when, how, and in whom it is to be used? Before answering the above questions basic information is required about a drug *i.e.*, how the drug is absorbed, distributed in the body and in the last what happens to the drug *i.e.*, it's metabolism and excretion? In nut shell we can divide pharmacology into two sections :

Pharmacokinetics

Pharmacokinetics is the branch of pharmacology which deals with the movement of the drug in the body once administered *i.e.*, absorption, distribution, metabolism and excretion of a drug. The purpose of pharmacokinetic study is to administer the correct dose of a drug to achieve the maximum therapeutic effects with no or minimal side or toxic effects.

Pharmacodynamics

Pharmacodynamics is the branch of pharmacology which deals with the actions of the drug in the body *i.e.*, what happens to the symptoms and signs of the disease *i.e.*, whether they improve or deteriorate and whether the drug has produced any additional effects *i.e.*, side/adverse/toxic effects, and how can we overcome them? Moreover, how the therapeutic or adverse effects get modified in an individual *i.e.*, paradoxical effect.

PHARMACY

Pharmacy is a place or the science, involving collection, identification, purification, isolation, synthesis, standardization and quality control of medicinal substances. It may be :

(*a*) Manufacturing pharmacy or pharmaceutic or pharmaceutical.

(*b*) Analytical pharmacy related to chemical, physical and biological estimation of drug.

(*c*) Dispensing pharmacy is handled by qualified pharmacist having knowledge of incompatibility/ interaction and responsible for dispensing and compounding of the drug against a prescription from a qualified doctor.

PHARMACOPOEIA

A pharmacopoeia (Greek 'Pharmacon'–a drug or medicine, and 'poeia'–to make) is a legally recognized book of standards for the quality of drug substances and preparations included therein. A national pharmacopoeia contains a list of drugs and formulae for medicinal substances/preparations with description, tests for these substances and the standards to which they must conform. A pharmacopoeia is issued under the authority of the government of a country, e.g., Indian Pharmacopoeia, British Pharmacopoeia (B.P.), United States Pharmacopoeia (U.S.P.). The countries which have not developed their own pharmacopoeias allow the standards laid down by pharmacopoeias of some other countries. An International Pharmacopoeia is published by the World Health Organization with the co-operation of the member countries of the United Nations.