

# **TEXTBOOK OF PHARMACOLOGY**

## **For Diploma in Pharmacy Second Year**

Education Regulation 2020 (New PCI Syllabus)

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First Edition 2022

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Published by

Probecell Press

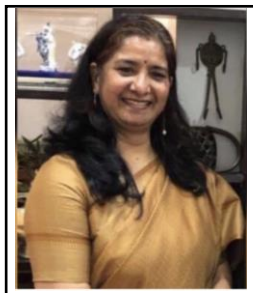
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## Blessings



Pharmacists are vital for the primary health care system all around the world. Diploma in Pharmacy is a program with basic level education about Pharmacy as per Pharmacy Council of India (PCI).

I am delighted to know that Probecell Press has come out with good concept of publishing bilingual books for pharmacy students based on new education regulation 2020 PCI syllabus.

I congratulate the authors and the entire team for their hard work and incorporation of book contents based on new syllabus.

I extend by best wishes to them and I hope that students will be benefited by the efforts put forward by the authors in the books.



**Prof.(Dr.) Swarnlata Saraf**  
**First Lady Vice President, National APTI Central Zone**  
Professor and Director  
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## Message



Pharmacy courses in India are among the most popular courses. The study of pharmacy involves health sciences and pharmacists are the primary health professionals.

A good beginning makes a big difference.

“I’m happy for Probecell Press!” Books based on new

PCI syllabus will be helpful for the students especially belonging to the rural areas.

My best wishes for all your efforts and doing excellence in the pharma profession.... All the best!



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## **Preface**

The textbook of Pharmacology has been written for students of diploma in pharmacy second year students keeping in mind specific requirements of the Pharmacy Council of India (PCI), Education Regulation - 2020. The book is covering the entire syllabus as per new PCI norms including practicals.

This book containing thirteen chapters including general pharmacology, drugs for PNS, eye, CNS, CVS, blood, respiratory system, GIT, and kidney. Chapters also including hormones, autocooids, chemotherapeutics agents, and biologicals. These chapters containing pharmacology of drugs, mechanism of action, adverse effects and uses. Practical and MCQs are also added in this book.

We would like to acknowledge the invaluable contributions provided by the Probecell editorial team. I give great thanks to the graphic designers who were instrumental in preparing much of the artwork for this text. I would also like to acknowledge my colleagues and students for their willingness to serve as test subjects for many of the useful contents in this book. Finally, I would like to thank my teachers and parents for their guidance, support and encouragement throughout the process of completing this book.

30 April 2022  
Bhilai

**Ritika Singh**  
**Vivek Kumar**  
**Shravan Kumar Paswan**  
**Parag Jain**  
**Trilochan Satapathy**

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# CHAPTER -1

## GENERAL PHARMACOLOGY

### Introduction

Pharmacology is a science that deals with drugs. It includes a study of the history, properties physiological effects, mechanism of action, absorption, distribution, metabolism, excretion and uses of a drug.

### Main divisions of Pharmacology:

The subject matter of Pharmacology includes the following main divisions.

1. **Pharmacodynamic** which deals with biochemical and physiological effects of drugs and also their mechanism of action. (What the drug does to the body).
2. **Pharmacokinetics** which deals with the absorption, distribution, metabolism and excretion of drugs: (What the body does to the drug).
3. **Therapeutics**, which is concerned with the use of a drug for curing diseases and relieving their symptoms.
4. **Clinical Pharmacology** which is the scientific study of drugs in man. The efficacy and safety of a drug is studied in patients and healthy volunteers.
5. **Chemotherapy** which deals with the effects of drugs on microorganisms and parasites which occur in a living organism. It also includes the treatment of cancer.
6. **Toxicology** which deals with poisonous effects of drugs, detection of poisoning and its treatment.

### ROUTES OF DRUG ADMINISTRATION

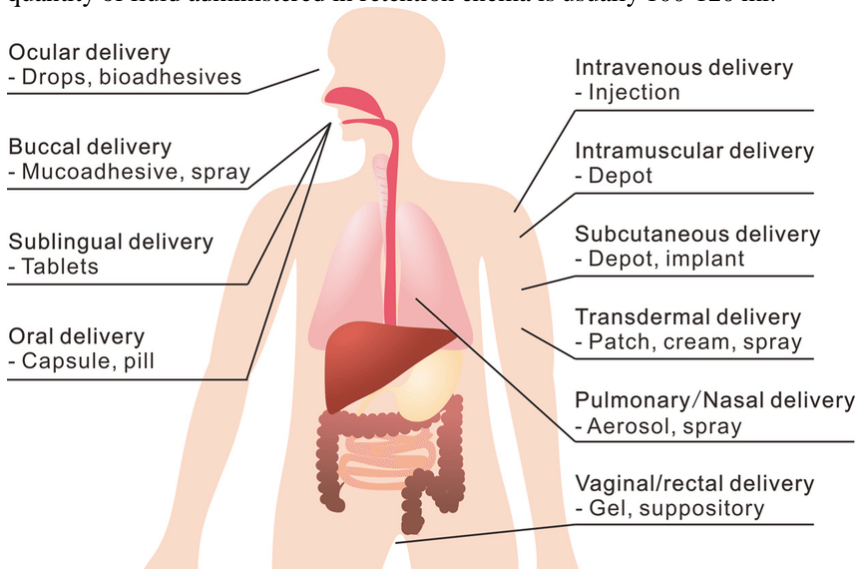
Drugs may be administered by oral, parenteral (injection) route or by topical (local) application.

#### A. Topical route or local application

1. Drugs in the form of powder, paste, lotion drops and ointment can be applied locally for action at the site of application.
2. Solutions are applied on the mucous membranes of rectum, vagina, urethra, conjunctiva and nose.
3. In addition to the above the following are some preparations which are meant for local application
  - a) Bougie for urethra
  - b) Pessary for vagina
  - c) Suppository for vagina and rectum
  - d) Enemata for rectum
  - e) Enemata: Administration of a medicament in a liquid form into the rectum is called enema, enemata are of two types:

**i) Evacuant enema:** e.g., soapy water enema. The aim is to remove the faecal matter and flatus. The water stimulates the rectum by distension while soap acts as a lubricant. The quantity of fluid administered at a time is about 600 ml. The enema is useful in treating selected cases of constipation. It is also administered before surgical operations, delivery and radiological investigation of gastrointestinal tract.

**ii) Retention enema:** The fluid containing the drug is retained in the rectum so that the drug may act systemically after absorption through the mucous membrane, e.g., paraldehyde enema production of basal anaesthesia. The quantity of fluid administered in retention enema is usually 100-120 ml.



**Fig. Various Routes of drug administration**

### **B. Oral or enteral route**

When a drug is given by mouth it can be absorbed.

1. in the oral mucosa.
2. Under the tongue (sublingual route), e.g., nitroglycerine.
3. in the stomach or in the intestine.

#### **The Advantages of the oral route are:**

1. It is a safe, convenient and economical route.
2. Self medication is possible.
3. Withdrawal of the drug is possible.

#### **The Disadvantages of the oral route are:**

1. Onset of drug action is slow.

2. Drugs which are bitter in taste cannot be administered.
3. Drugs producing nausea and vomiting cannot be administered.
4. The drug may be inactivated by gastric enzymes.
5. This route is not possible in an unconscious patient.

**Sublingual route:** In this route the tablet is placed under the tongue and allowed to dissolve in mouth. The advantages of this route are (1) Rapid onset of action (2) Quick termination of action by spitting the tablet and (3) Degradation of the drug in the stomach is avoided. Further the drug enters the systemic circulation, directly, by passing the portal circulation, hence the metabolism of the drug in the liver is avoided. The commonly used drug by this route is nitroglycerine.

### **C. Parenteral Route**

The routes of administration other than oral (enteral) route are termed as parenteral.

#### **The Advantages of the parenteral route are:**

1. Absorption is rapid and quick.
2. Accurate dose of the drug can be given.
3. The drug enters into circulation in an active form.
4. It is useful in emergency.
5. It is useful in case of an unconscious patient.

#### **The Disadvantages of the parenteral route are:**

1. Pain may be produced by injection.
2. Abscess and inflammation at the site of injection.
3. Sterile procedures are required for injections.
4. It is an expensive route.
5. Self medication is not possible.

The commonly used parenteral routes are:

#### **(a) Injections**

1. **Intradermal:** The drug is injected in the layers of skin, e., small-pox vaccine and BCG vaccine. Small quantities can be given and the Injection is painful.
2. **Subcutaneous:** Only Non-irritant substances alone can be injected by this route. The rate of absorption is even and slow and hence the effect is prolonged. Sometimes subcutaneous drug implants are used as 'depot' therapy for prolonged action as in the case of 'steroid' hormones.
3. **Intramuscular route:** The drug is injected deep into the muscle tissue. The rate of absorption is uniform and the onset of action is rapid. The volume of injection should not exceed 10 ml.
4. **Intravenous route:** The drug is directly injected into a vein.