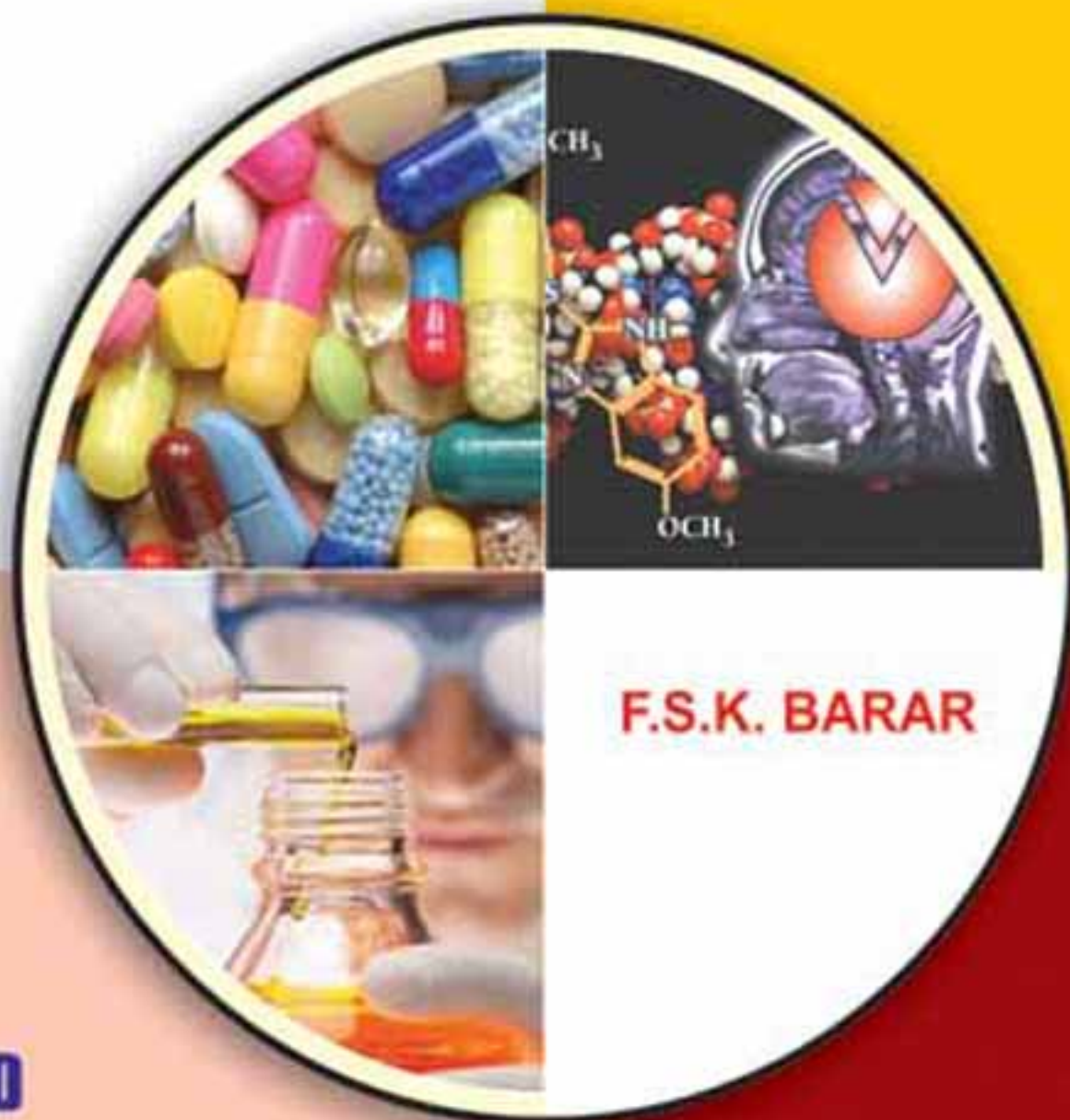


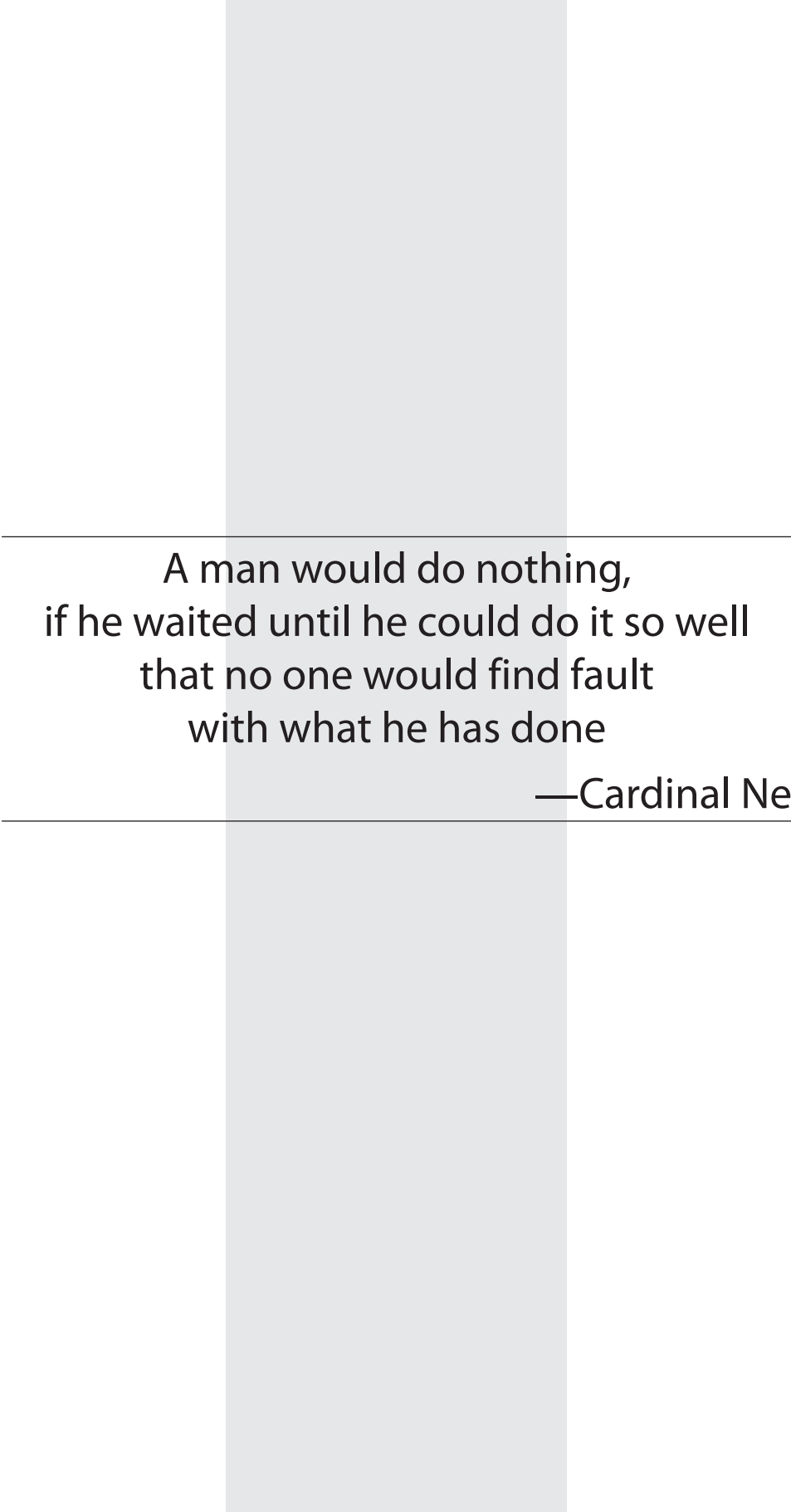
TEXTBOOK OF PHARMACOLOGY

(For Pharmacy Students)



S. CHAND

**TEXTBOOK
OF
PHARMACOLOGY
(For Pharmacy Students)**



A man would do nothing,
if he waited until he could do it so well
that no one would find fault
with what he has done

—Cardinal Newman

TEXTBOOK OF PHARMACOLOGY (For Pharmacy Students)

F.S.K. Barar

M.Sc. (Med), M.D. (Pharmacol.)
Former Senior Professor & Head
Department of Pharmacology

S.M.S. Medical College

Jaipur

&

Former Associate Director (Pharmacy)
Lachoo Memorial College of Science & Technology
Jodhpur



S. CHAND & COMPANY LTD.

(AN ISO 9001: 2008 COMPANY)

RAM NAGAR, NEW DELHI - 110 055



S. CHAND & COMPANY LTD.

(An ISO 9001 : 2008 Company)

Head Office: 7361, RAM NAGAR, NEW DELHI - 110 055

Phone: 23672080-81-82, 9899107446, 9911310888

Fax: 91-11-23677446

Shop at: schandgroup.com; e-mail: info@schandgroup.com

Branches :

- AHMEDABAD** : 1st Floor, Heritage, Near Gujarat Vidhyapeeth, Ashram Road, **Ahmedabad** - 380 014, Ph: 27541965, 27542369, ahmedabad@schandgroup.com
- BENGALURU** : No. 6, Ahuja Chambers, 1st Cross, Kumara Krupa Road, **Bengaluru** - 560 001, Ph: 22268048, 22354008, bangalore@schandgroup.com
- BHOPAL** : Bajaj Tower, Plot No. 243, Lala Lajpat Rai Colony, Raisen Road, **Bhopal** - 462 011, Ph: 4274723, bhopal@schandgroup.com
- CHANDIGARH** : S.C.O. 2419-20, First Floor, Sector - 22-C (Near Aroma Hotel), **Chandigarh** -160 022, Ph: 2725443, 2725446, chandigarh@schandgroup.com
- CHENNAI** : 152, Anna Salai, **Chennai** - 600 002, Ph: 28460026, 28460027, chennai@schandgroup.com
- COIMBATORE** : 1790, Trichy Road, LGB Colony, Ramanathapuram, **Coimbatore** -6410045, Ph: 0422-2323620, 4217136 coimbatore@schandgroup.com (**Marketing Office**)
- CUTTACK** : 1st Floor, Bhartiya Tower, Badambadi, **Cuttack** - 753 009, Ph: 2332580; 2332581, cuttack@schandgroup.com
- DEHRADUN** : 1st Floor, 20, New Road, Near Dwarka Store, **Dehradun** - 248 001, Ph: 2711101, 2710861, dehradun@schandgroup.com
- GUWAHATI** : Pan Bazar, **Guwahati** - 781 001, Ph: 2738811, 2735640 guwahati@schandgroup.com
- HYDERABAD** : Padma Plaza, H.No. 3-4-630, Opp. Ratna College, Narayanaguda, **Hyderabad** - 500 029, Ph: 24651135, 24744815, hyderabad@schandgroup.com
- JAIPUR** : 1st Floor, Nand Plaza, Hawa Sadak, Ajmer Road, **Jaipur** - 302 006, Ph: 2219175, 2219176, jaipur@schandgroup.com
- JALANDHAR** : Mai Hiran Gate, **Jalandhar** - 144 008, Ph: 2401630, 5000630, jalandhar@schandgroup.com
- JAMMU** : 67/B, B-Block, Gandhi Nagar, **Jammu** - 180 004, (M) 09878651464 (**Marketing Office**)
- KOCHI** : Kachapilly Square, Mullassery Canal Road, Ernakulam, **Kochi** - 682 011, Ph: 2378207, cochin@schandgroup.com
- KOLKATA** : 285/J, Bipin Bihari Ganguli Street, **Kolkata** - 700 012, Ph: 22367459, 22373914, kolkata@schandgroup.com
- LUCKNOW** : Mahabeer Market, 25 Gwynne Road, Aminabad, **Lucknow** - 226 018, Ph: 2626801, 2284815, lucknow@schandgroup.com
- MUMBAI** : Blackie House, 103/5, Walchand Hirachand Marg, Opp. G.P.O., **Mumbai** - 400 001, Ph: 22690881, 22610885, mumbai@schandgroup.com
- NAGPUR** : Karnal Bag, Model Mill Chowk, Umrer Road, **Nagpur** - 440 032, Ph: 2723901, 2777666 nagpur@schandgroup.com
- PATNA** : 104, Citicentre Ashok, Govind Mitra Road, **Patna** - 800 004, Ph: 2300489, 2302100, patna@schandgroup.com
- PUNE** : 291/1, Ganesh Gayatri Complex, 1st Floor, Somwarpeth, Near Jain Mandir, **Pune** - 411 011, Ph: 64017298, pune@schandgroup.com (**Marketing Office**)
- RAIPUR** : Kailash Residency, Plot No. 4B, Bottle House Road, Shankar Nagar, **Raipur** - 492 007, Ph: 09981200834, raipur@schandgroup.com (**Marketing Office**)
- RANCHI** : Flat No. 104, Sri Draupadi Smriti Apartments, East of Jaipal Singh Stadium, Neel Ratan Street, Upper Bazar, **Ranchi** - 834 001, Ph: 2208761, ranchi@schandgroup.com (**Marketing Office**)
- SILIGURI** : 122, Raja Ram Mohan Roy Road, East Vivekanandapally, P.O., **Siliguri**-734001, Dist., Jalpaiguri, (W.B.) Ph. 0353-2520750 (**Marketing Office**)
- VISAKHAPATNAM** : Plot No. 7, 1st Floor, Allipuram Extension, Opp. Radhakrishna Towers, Seethammadhara North Extn., **Visakhapatnam** - 530 013, (M) 09347580841, visakhapatnam@schandgroup.com (**Marketing Office**)

© 2013, F.S.K. Barar

All rights reserved. No part of this publication may be reproduced or copied in any material form (including photo copying or storing it in any medium in form of graphics, electronic or mechanical means and whether or not transient or incidental to some other use of this publication) without written permission of the copyright owner. Any breach of this will entail legal action and prosecution without further notice.

Jurisdiction : All disputes with respect to this publication shall be subject to the jurisdiction of the Courts, tribunals and forums of New Delhi, India only.

First Edition 2013

ISBN : 81-219-4080-X

Code : 220 36

PRINTED IN INDIA

By Rajendra Ravindra Printers Pvt. Ltd., 7361, Ram Nagar, New Delhi-110 055
and published by S. Chand & Company Ltd., 7361, Ram Nagar, New Delhi -110 055.

*Dedicated to
My wife, and my children
and
my students*

PREFACE

“Science cannot grow by routine work alone, it cannot even live, because, like a tree if it is not growing it is dying. If routine gets the upper hand science becomes fossilized into formulae and rules. once these become rigid they become fallacious, reflecting the errors and limitations of those who originated them in their once living form”.

— A.D. Ritchie, 1950

Paleopharmacological studies bear evidence to the use of medicinal plants in the treatment of disease even in the pre-historic era. In ancient **Egypt** pharmacological knowledge was recorded in various papyri like the **Ebers Papyrus** of 1550 BC, and the **Edwin Smith Papyrus** of the 16th century BC. **Aesculapius** whose descent was traced by the ancient Greeks directly from Apollo was considered to be the Greek God of Medicine. **Hippocrates** (born about 460 BC), renowned as the “*Father of Medicine*”, was the embodiment of the highest ideals in medical ethics. His famous “*Hippocratic Oath*” continues to be an everlasting memorial to his greatness. He eschewed ‘superstition’ and brought in scientific methods into the domain of healing. The name of **Chang Ching Chung** known as the “Hippocrates of China” occupies a prominent place in the history of Chinese medicine. His famous “*Treatise of Fevers*” dates back to about 170 AD. The greatest name in Roman medicine was **Claudius Galen** (130-c.200). Galen was educated in the Alexandrian School where Anatomy was taught at advanced levels. He worked on the nervous system and settled in Rome in the year 161, and wrote over 200 treatises. In the Middle East **Rhazes** (865-915AD) promoted the use of chemicals in the treatment of disease.

Ancient Indian Medicine was also very advanced comparable to the Greeks. The earliest compilation of medicinal substances was the **Sushruta Samhita**, an Indian Ayurvedic treatise attributed to the great philosopher **Sushruta Muni**, dating back to the 6th century BC. Two ancient preserved texts date back to the 3rd or 4th century AD: the **Charaka Samhita**, attributed to Charaka Muni, the renowned physician of ancient Indian medicine; and the **Sharngadara Samhita** attributed to Sharngadara Muni. These compilations form the foundation of the *Indian Ayurvedic System of medicine*.

Historically, pharmacy as an independent science is relatively young. Its origin dates back to early 19th century. As a discipline pharmacy has always been connected to the practice of medicine. Advances in the Middle East in botany and chemistry led to the development of pharmacy.

Rhazes (850-932 AD), promoted the medicinal uses of chemicals, and **Abulcasis** (936-1013 AD) started preparing medicines by *sublimation* and *distillation*. Later, **Al-Biruni** (973-1050 AD) wrote a valuable book on pharmacology titled *Kitab al-Saydalalah (The Book of Drugs)* detailing properties of drugs, outlining the role of pharmacy, and duties of a pharmacist. **Avicenna** (980-1037 AD), Persian physician and philosopher, was known for his *Canon of Medicine* (describing about 700 preparations, with their mode of action, properties and uses). It was a standard medical textbook used in Europe until the 17th century. In Europe pharmacy developed as a science from the 13th century onwards in the reign of Emperor Fredric II.

In the 1990s *clinical pharmacy* as an important branch of pharmacy came up, which involves pharmacists and pharmacoconomists responsible for optimizing the use of medication to promote health and prevent disease in hospitals, nursing homes and clinics. They work in unison with physicians, and health professionals. Now disease that struck down thousands of suffering humans can now be treated by drugs.

The text has 17 main chapters, followed by 3 appendices, and an index for rapid consultation and revision. Relevant basic information related to the use of drugs has been provided in each chapter. The subject material covers the current syllabus prescribed for pharmacy students. In addition, the “*Newer Drug’s Digest*” provides information on drugs in the process of research and development. Any suggestions from readers are solicited.

Last but not the least, I offer profound thanks to editorial and management team at S. Chand & Company Ltd., New Delhi for their efficient and prompt cooperation towards the printing and publication of this work.

A tribute to Researchers Anonymous

“If you take a prescription to a drugstore today, the chances are overwhelming that the pharmacist will have to use at least one wonder drug to fill it. Yet 90 percent of the prescriptions written by doctors today could not have been filled in 1935, because one or more of the prescribed drugs was then unknown”.

— Donald G. Cooley, 1954

F.S.K. Barar

bararfsk@gmail.com

Disclaimer : While the author of this book has made every effort to avoid any mistake or omission and has used his skill, expertise and knowledge to the best of his capacity to provide accurate and updated information. The author and S. Chand do not give any representation or warranty with respect to the accuracy or completeness of the contents of this publication and are selling this publication on the condition and understanding that they shall not be made liable in any manner whatsoever. S.Chand and the author expressly disclaim all and any liability/responsibility to any person, whether a purchaser or reader of this publication or not, in respect of anything and everything forming part of the contents of this publication. S. Chand shall not be responsible for any errors, omissions or damages arising out of the use of the information contained in this publication. Further, the appearance of the personal name, location, place and incidence, if any; in the illustrations used herein is purely coincidental and work of imagination. Thus, the same should in no manner be termed as defamatory to any individual.

CONTENTS

Preface	<i>vii</i>
Abbreviations	<i>xii</i>
1. GENERAL PHARMACOLOGY	1-66
1.1 Scope of Pharmacology	1
1.2 Sources, Nature and Nomenclature of Drugs	4
1.3 Dosage Forms and Routes of Drug Administration	7
1.4 Factors Influencing Dosage and Drug Action	15
1.5 Absorption, Distribution, Metabolism and Excretion of Drugs (Drug Disposition and Pharmacokinetics)	20
1.6 Mechanisms of Drug Action (Pharmacodynamics)	32
1.7 Adverse Drug Reactions and Treatment of Poisoning	40
1.8 Drug Interactions	46
1.9 Biological Assay of Drugs (Bioassay)	53
1.10 Discovery and Development of New drugs	61
1.11 Clinical Pharmacy and General Principles of Drug Therapy	66
2. DRUGS ACTING ON THE CENTRAL NERVOUS SYSTEM	67-167
2.1 General Consideration	67
2.2 Alcohol and Alcoholism	74
2.3 General Anaesthetics	80
2.4 Sedatives-Hypnotics and Anxiolytic Drugs	87
2.5 Antiepileptics	98
2.6 Narcotic Analgesics and Antagonists	107
2.7 Non-Narcotic Analgesics and Antipyretics (Anti-inflammatory Agents, Drugs for Gout, Rheumatoid Arthritis, and Migraine)	119
2.8 Psychopharmacological Agents (Antipsychotics, Antidepressants, Antimanics and Hallucinogens)	137
2.9 Central Nervous System Stimulants	151
2.10 Drug Dependence	155
2.11 Antiparkinsonian Drugs	162
3. DRUGS ACTING ON THE PERIPHERAL NERVOUS SYSTEM	168-227
3.1 General Consideration	168
3.2 Cholinergic Agents (Parasympathomimetics)	174
3.3 Cholinergic Blocking Agents (Parasympatholytics)	184
3.4 Adrenoceptor Stimulants (Sympathomimetics)	190
3.5 Adrenoceptor Blocking Agents (Sympatholytics)	204
3.6 Ganglion Blocking Agents	213
3.7 Skeletal Muscle Relaxants	217

3.8	Local Anaesthetics	223
4.	DRUGS ACTING ON THE CARDIOVASCULAR SYSTEM	228-271
4.1	General Consideration	228
4.2	Antihypertensive Drugs	233
4.3	Cardiac Glycosides	242
4.4	Antiarrhythmic Drugs	249
4.5	Antianginal drugs	258
4.6	Drug Therapy of Shock	267
5.	DRUGS ACTING ON THE HAEMOPOIETIC SYSTEM	272-290
5.1	Haematinics	272
5.2	Anticoagulants and Haemostatic Agents	277
5.3	Fibrinolytic Agents and Antiplatelet Drugs	282
5.4	Hypolipidaemic Agents	285
5.5	Blood and Plasma Volume Expanders	289
6.	DRUGS ACTING ON THE GENITO—URINARY SYSTEM	291-307
6.1	Fluid and Electrolyte Balance	291
6.2	Diuretics	298
6.3	Drugs Acting on the Uterus	305
7.	DRUGS ACTING ON THE ENDOCRINE SYSTEM	308-358
7.1	Hypothalamic and Pituitary Hormones	308
7.2	Thyroid Hormones and Antithyroid Drugs	316
7.3	Parathyroid Hormone, Clacitonin, Vitamin D and Calcium Metabolism	322
7.4	Insulin and Oral Hypoglycaemic Agents	325
7.5	Adrenal Corticosteroids	334
7.6	Female Sex Hormones and Oral Contraceptives	345
7.7	Male Sex Hormones, Anabolic steroids, Male Antifertility Agents and Anti-impotency Drugs	355
8.	THE VITAMINS	359-365
9.	SYSTEMIC ANTI-INFECTIVE AGENTS	366-477
9.1	Development of Chemotherapy	366
9.2	Synthetic Antimicrobials (Sulphonamides, Trimethoprim: Sulphamethoxazole, and Quinolones)	380
9.3	Antibiotics	387
9.4	Chemotherapy of Tuberculosis	412
9.5	Chemotherapy of Malaria	418
9.6	Chemotherapy of Amoebiasis (Amoebicidal Drugs), and Other protozoal Infections	427
9.7	Chemotherapy of Helminthiasis (Anthelmintic Drugs)	432
9.8	Chemotherapy of Leprosy (Antileprotic Drugs)	437
9.9	Chemotherapy of Viral Diseases	440
9.10	Chemotherapy of Malignancy and Immunosuppressive Agents (Cytotoxic Drugs)	445
9.11	Chemotherapy of Urinary Tract Infections (UTI)	464
9.12	Chemotherapy of Sexually Transmitted Diseases (STD)	468
9.13	Chemotherapy of Fungal Diseases (Antifungal Drugs)	471

10. LOCAL ANTI-INFECTIVE AGENTS	478-486
11. AUTACOIDS	487-500
11.1 Histamine and Antihistamines	487
11.2 Serotonin and Serotonin Antagonists	494
11.3 Prostaglandins and Other Eicosanoids (Thromboxanes, Leukotrienes, & Related Compounds	497
11.4 The Kinins	500
12. DRUGS ACTING ON THE GASTROINTESTINAL SYSTEM	501-513
13. DRUGS ACTING ON THE RESPIRATORY SYSTEM	514-522
14. HEAVY METALS AND CHELATING AGENTS	523-526
15. VACCINES AND ANTISERA	527-532
16. DIAGNOSTIC AGENTS, HYPERBARIC OXYGEN AND ENZYMES IN THERAPY	533-538
17. NEWER DRUG'S DIGEST	539-549
APPENDICES	550-556
I Weights and Measures	550
II Prescription Writing and drug Compendia	553
III References for General Reading	556
INDEX	557-571

ABBREVIATIONS

ACh	Acetylcholine	IM	Intramuscular
AChE	Acetylcholinesterase	IV	Intravenous
ACTH	Adrenocorticotrophic hormone, Corticotrophin	l	Litre
ADH	Antidiuretic hormone	LH	Luteinizing hormone
ADP	Adenosine diphosphate	log	Logarithm
AIDS	Acquired Immunodeficiency Syndrome	LSD	Lysergic acid diethylamide
ANS	Autonomic nervous system	M	Molar
ATP	Adenosine triphosphate	MAO	Monoamine oxidase
AV	Atrioventricular	MAOI	Monoamine oxidase inhibitor
BP	Blood pressure	mcg	Microgram
c-AMP	Cyclic adenosine 3', 5' monophosphate	mg	Milligram
ChE	Cholinesterase	MIC	Minimal inhibitory concentration
CNS	Central nervous system	min	Minute
CoA	Coenzyme A	mol	Mole (gram molecular weight)
COMT	Catechol-O-methyltransferase	mRNA	messenger ribonucleic acid
CSF	Cerebrospinal fluid	Na	Noradrenaline
CtZ	Chemoreceptor trigger zone	NADP	Nicotinamide adenine dinucleotide phosphate
CVP	Central venous pressure	NADPH	Nicotinamide adenine dinucleotide phosphate (reduced)
DNA	Deoxyribonucleic acid	ng	Nanogram
DOPA	Dihydroxyphenylalanine	PABA	Para-aminobenzoic acid
ECF	Extracellular fluid	PG	Prostaglandin
ECG	Electrocardiogram	pH	Negative log of hydrogen ion concentration
ECT	Electroconvulsive therapy	pKa	Negative log of dissociation constant
EEG	Electroencephalogram	P450	Cytochrome with maximum absorption at wavelength 450 nm.
FFA	Free fatty acid	RNA	Ribonucleic acid
FSH	Follicle stimulating hormone	SA	Sinoatrial
g	Gram	SC	Subcutaneous
GABA	Gamma-aminobutyric acid	SRS-A	Slow reacting substance of anaphylaxis
GFR	Glomerular filtration rate	t _{1/2}	Half life
GH	Growth hormone	THC	Tetrahydrocannabinol
c-GMP	Cyclic guanosine 3', 5' monophosphate	tRNA	Transfer RNA
G-6-PD	Glucose-6-phosphate dehydrogenase	TSH	Thyroid stimulating hormone, Thyrotrophin
GTP	Guanosine triphosphate	v/v	Volume per unit volume
HCG	Human chorionic gonadotrophin	WHO	World Health Organisation
HMG	Human menopausal gonadotrophin	w/v	Weight per unit volume
5-HT	5-Hydroxytryptamine	w/w	Weight per unit Weight
HVA	Homovanillic acid		
Hz	Hertz (1 Hertz is 1 cycle per second)		
Ig	Immunoglobulin		

1

GENERAL PHARMACOLOGY

1.1 SCOPE OF PHARMACOLOGY

Definitions

Pharmacology, Pharmacognosy,
Pharmacy, Pharmacokinetics,
Pharmacodynamics, Pharmacotherapeutics,
Therapeutics, Toxicology,
Pharmacogenetics, Clinical Pharmacology

Historical Development
Drug Information Sources
The Pharmacopoeias, etc.

Pharmacology is the study of drugs. Drugs are chemicals that produce therapeutically useful effects. They modify functions of living organisms, and are generally given to **prevent, diagnose, or cure** disease processes. Pharmacology has a wide scope, and derives from various other disciplines like physiology, microbiology, pathology, biochemistry and various clinical specialities.

DEFINITIONS

Pharmacology is defined as the science of drugs. The term is derived from the Greek words *pharmakon*, meaning a drug, and *logos*, meaning a study. Pharmacology has the following major subdivisions:

Pharmacognosy (Greek *gnosis*, knowledge) is the study of the sources of drugs derived from plants and animals, and of the physical and chemical properties of such substances.

Pharmacy is the study of the preparation, compounding and dispensing of medicines. It is the science and art of preparing a drug or drug combination, in a suitable dosage form, fit for administration to the patient. The **pharmacist** is concerned primarily with preparing, compounding and dispensing medicines upon the written order of a licensed medical practitioner.

Pharmacokinetics (Greek *kinesis*, movement) is the study of the fate of drugs in body, right from the time they (drugs) enter the body until they, or their by-products, are eliminated from the body, *i.e.*, the movement of drugs in the body. In short, this includes absorption, distribution, metabolism and excretion of drugs.

Pharmacodynamics (Greek *dynamis*, force) is the experimental study of actions of drugs on the living organism, including their mode or mechanism of action.

Pharmacotherapeutics (Greek *therapeia*, medical treatment) is the treatment of disease by means of drugs. It utilizes information on drugs obtained by pharmacodynamic studies.

Therapeutics (Greek *therapeutike*, medical practice) is the practical branch of medicine dealing with the science and art of the treatment of disease.

Chemotherapy according to the definition proposed by Paul Ehrlich, deals with the use of drugs capable of inhibiting or destroying invading microbes, parasites, or cancer cells; while having minimal effect on healthy living tissues.

Toxicology (Greek *toxikon*, poison) is the science of poisons—their source, chemical composition, action, tests for detection and antidotes. **Clinical toxicology** deals with the detection, diagnosis and treatment of poisoning. **Toxicodynamics** describes the harmful effects that the poison produces on the body. **Toxicokinetics** encompasses the absorption, distribution, biotransformation and elimination of the poison.

Pharmacogenetics is a relatively new field, and deals with the study of genetically determined variations in drugs response.

Clinical pharmacology is the division which deals with the pharmacologic effects of drugs in man. It provides information about the usefulness, potency and toxicity of new drugs in humans.

HISTORICAL DEVELOPMENT

Earliest prescriptions are recorded in a Sumerian tablet of 2100 B.C. describing ointments and medicines containing asafoetida, thyme (source of Thymol), sodium chloride and potassium nitrate. The **Ebers Papyrus** written in 1550 B.C. contains prescriptions of castor oil, opium, colchicum and other drugs. Perhaps, Chinese Medicine was about the earliest, dated at about 2500 B.C. Ephedra or *Ma huang* was used even in those early days. **Ayurveda** or *Indian Medicine* is about equally ancient, and it has given some useful remedies to modern medicine.

Some giants in the history of medicine were *Hippocrates*, *Aristotle*, *Theophrastus*, *Pliny*, *Dioscorides* and *Galen*. **Hippocrates** (460-370 B.C.) is referred to as the “father of medicine”, and many of his writings dealt with anatomy and physiology. The “Hippocratic Oath” of modern day medicine reflects the high esteem with which this Greek physician is regarded. Hippocrates was the first to recognize disease as an abnormal reaction of the body rather than as a visitation from the Gods. **Aristotle** (384-322 B.C.), a student of Plato, is considered to be the most influential Greek Philosopher. He attempted to separate superstition from fact. **Theophrastus** (370-287 B.C.), a student of Aristotle, utilized his teacher’s scientific reasoning, and applied it to the plant kingdom. **Dioscorides**, a Greek physician of the first century B.C. described several plants of medicinal value. Later, **Pliny** (23-70 A.D.) compiled 37 volumes of natural history, which served as reference data for many years. The Hippocratic concept of disease was then lost and did not reappear until the Renaissance (15th Century A.D. marking the transition from the Middle Ages to the modern world). During this dark period the concept of **Galen** (131-201 A.D.) and his dogmatic system of polypharmacy prevailed. Galen, a Greek pharmacist physician, who lived in Rome, described many formulae containing plant and animal drugs. He compiled this knowledge in 20 books. Galen’s name is retained in the term “galenical” pharmacy, which includes preparation of crude vegetable drugs.

Paracelsus (1493-1541 A.D.), an outstanding leader of the Renaissance, reintroduced free thought and critical enquiry. He attacked the Galenic system of polypharmacy, and introduced the use of simple chemicals for treating disease. He introduced mercurials in the treatment of syphilis. During his time the first official pharmacopoeia was printed.

Experimental medicine and therapeutics had to wait long for the advances in physiology, which during the decade (1850-1860) became an experimental science. **Virchow**, the German physiologist in 1855 propounded the concept of “all cells from cells”. Later, with advances in the knowledge of the physiology of circulation, central nervous system, the hormones and enzymes in the body, the study of pharmacology and therapeutics was stabilized. *In fact, pharmacology originated as a branch of physiology.* The application of scientific method to studies

on drugs was generated in France by **Francois Megendie** (1783-1855), and was expanded by **Claude Bernard** (1813-1878), who came to be known as the “father of experimental medicine”. The name of **Oswald Schmiedeberg** (1838-1921) is associated with the development of experimental pharmacology in Germany, and **John Jacob Abel** (1857-1938) played a similar role in the United States of America. In India **Sir Ram Nath Chopra** (1882-1973) was responsible for the development of pharmacology as a well defined discipline. He was the Founder Director of the Drug Research Laboratory which is now known as the Regional Research Laboratory of the Council of Scientific and Industrial Research (CSIR), located at Jammu-Tawi. Sir Chopra has been widely acclaimed as the Father of Indian Pharmacology, because of his investigations on Indian indigenous drugs. The growth of pharmacology was further stimulated by the development of synthetic organic chemistry, which has provided many new therapeutic agents.

THE PHARMACOPOEIAS

The term *pharmacopoeia* is derived from the Greek words *pharmakon*, meaning “drug”, and *poiein*, meaning “make”. The term was first used in 1580 for a book of drug standards in Bergame, Italy. The pharmacopoeias are a class of drug compendia, and its main body contains monographs on drugs and ancillary substances. A pharmacopoeia is periodically revised and kept up-to-date. The **National Formulary** is a smaller and much more handy book containing formulations of therapeutic value. Drugs and substances which are included in the current edition of a pharmacopoeia are designated as *official*.

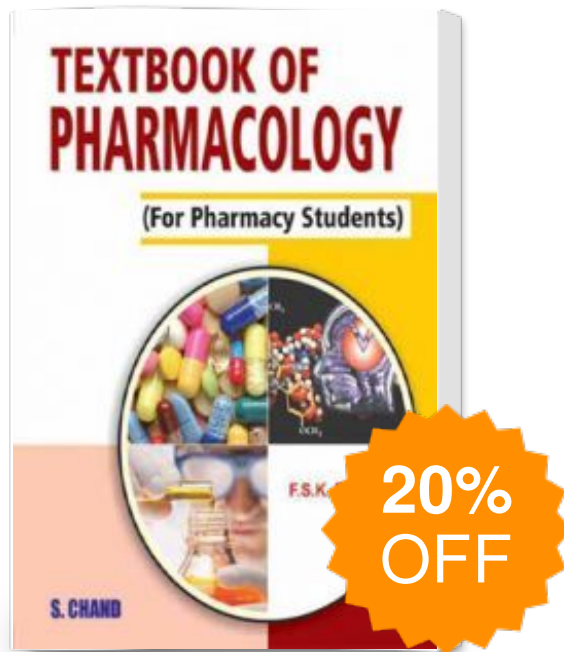
In England the first **British Pharmacopoeia** (BP) was published in 1864. In the USA Dr. Lyman Spalding planned a national pharmacopoeia, and in the year 1820 the first **United States Pharmacopoeia** (USP) was published. The **European Pharmacopoeia** (Vol. I, 1969; Vol. II, 1971) was published by the Public Health Committee and the European Pharmacopoeia Commission.

The **International Pharmacopoeia** is published by the World Health Organization (WHO). It is published in many languages (English, French, Russian, Spanish). This pharmacopoeia is meant for use and adoption all over the world. Some of the drug compendia are detailed below:

India

1. *Pharmacopoeia of India* (The Indian Pharmacopoeia), Sixth Edition, Two Volumes. Government of India, Ministry of Health & Family Welfare, New Delhi, 2010.
2. *National Formulary of India* (NFI), 4th Edition, Formulated by the Indian Pharmacopoeia Commission (IPC), New Delhi, 2010.
3. *Monthly Index of Medical Specialities, MIMS, INDIA*, Editor, Gulhati, C.M. (published every month).
4. *Drugs Bulletin*, Editor, P. Pandhi, Department of

Textbook Of Pharmacology



Publisher : SChand Publications ISBN : 9788121940801

Author : F.S.K. Barar

Type the URL : <http://www.kopykitab.com/product/17743>



Get this eBook