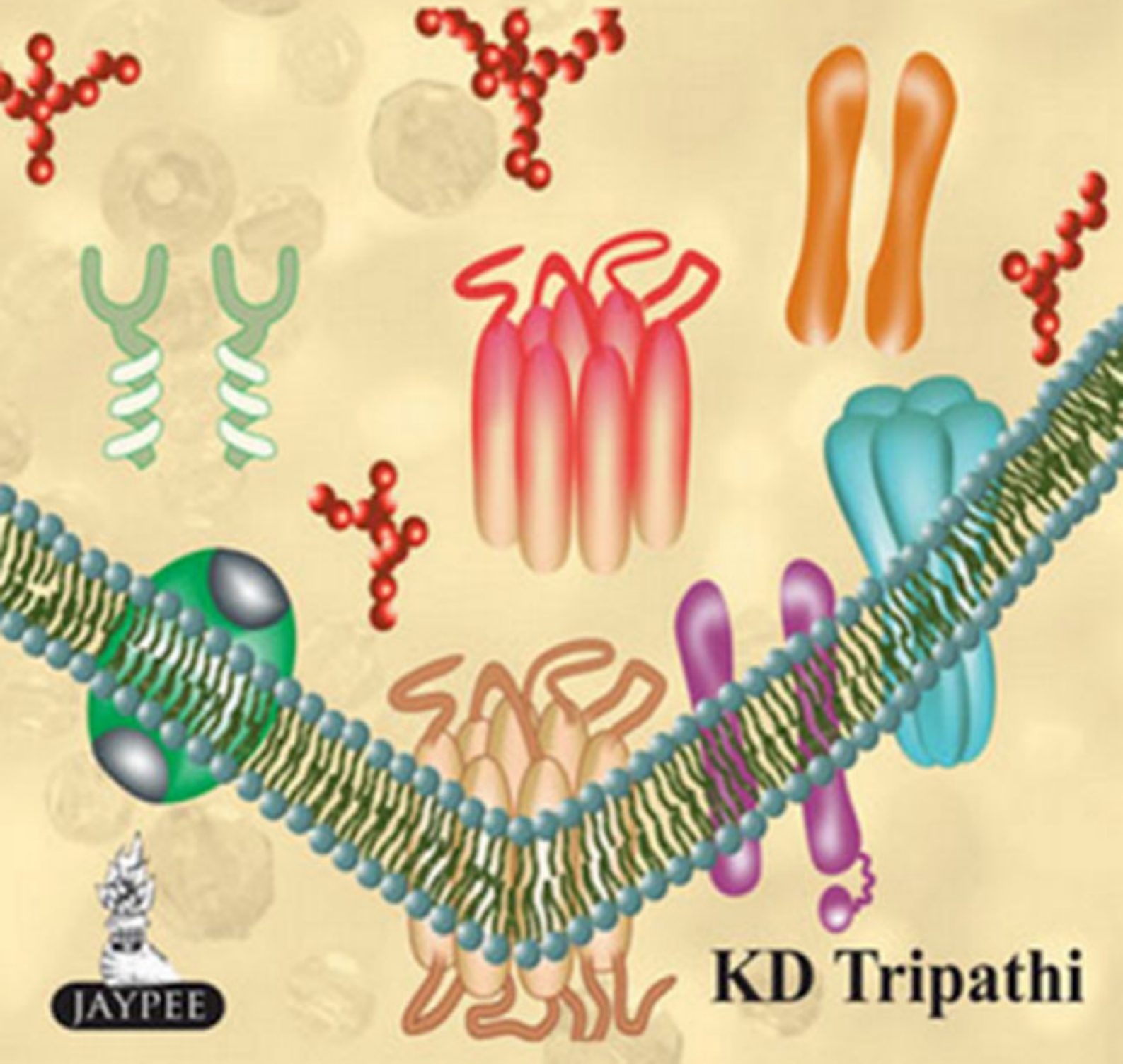
Essentials of MEDICAL PHARMACOLOGY

SEVENTH EDITION



KD Tripathi

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Essentials of
Medical
Pharmacology

Essentials of Medical Pharmacology

Seventh Edition

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Essentials of Medical Pharmacology

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Preface

Medical pharmacology is a unique synthesis of basic pharmacology with clinical pharmacology and pharmacotherapeutics. The subject is highly dynamic. Developments are occurring both in defining molecular targets for drug action and finding targeted drugs, as well as in accruing credible evidence regarding the impact of different treatment modalities on therapeutic outcomes. These efforts have begun to crystallize into evidence based medicine and clear cut therapeutic guidelines. The present edition endeavours to amalgamate the developments with the core content of the subject.

While the primary theme of the book outlined in the preface to the first edition is maintained, the successive editions have become more descriptive and more comprehensive. In preparing this edition, all chapters have been revisited and extensively updated. Latest therapeutic guidelines from authoritative sources like WHO, British National Formulary, National Formulary of India, as well as from eminent professional bodies have been incorporated, especially in areas like hypertension, dyslipidaemias, acute coronary syndromes, surgical prophylaxis, tuberculosis (including MDR-TB), MAC-infection, leprosy, HIV-AIDS, malaria, kala-azar, etc. Recent innovations have been highlighted, notably in antidiabetic drugs, psychopharmacological agents, antiplatelet drugs, treatment of inflammatory bowel disease, drugs affecting renin-angiotensin system, anticoagulants, antiviral (including anti-HIV) drugs, targeted anticancer drugs, etc.

New drugs released in India have been included. Infrequently used drugs and those not available in India are presented briefly in extract type. Important points are summarized in boxes. Use of distinctive headings in a hierarchical order makes the text highly systematic. Representative trade names of drugs with available dosage forms are mentioned. Due emphasis is given to diseases prevalent in India and similar tropical countries, alongwith their current drug therapy.

The most important objective of medical pharmacology is to train medical students in therapeutic decision making according to specific clinical problems in individual patients. A new feature 'problem directed study' has been included at the end of majority of chapters to give an exercise in therapeutic decision making for a realistic clinical scenario. The solutions provided in Appendix-1 explain how rational decisions could be arrived at.

I thank students and other readers of this text for their valuable feedback and suggestions. All credit for existence of this book, especially the present edition, goes to Mr. Jitendar Pal Vij, the untiring Group Chairman and Mr. Ankit Vij (Managing Director) of M/s Jaypee Brothers. Meticulous typesetting by Ms. Sunita Katla and proof reading by Ms. Geeta Srivastava deserves special mention. Credit for improving the illustrations goes to Mr. Manoj Pahuja. The cooperation and editorial management of my wife is acknowledged.

New Delhi
May 2013

KD Tripathi

Extract from Preface to the First Edition

Pharmacology is both a basic and an applied science. It forms the backbone of rational therapeutics. Whereas the medical student and the prescribing physician are primarily concerned with the applied aspects, correct and skilful application of drugs is impossible without a proper understanding of their basic pharmacology. Medical pharmacology, therefore, must include both fundamental background and clinical pharmacological information. Objective and quantitative data on the use of drugs in man, i.e., relationship between plasma concentration and intensity of therapeutic/toxic actions, plasma half lives, relative efficacy of different medications and incidence of adverse effects etc., are being obtained with the aim of optimising drug therapy. The concepts regarding mechanism of action of drugs are changing. In addition, new drugs are being introduced in different countries at an explosive pace. A plethora of information thus appears to be important. However, trying to impart all this to a medical student would be counter-productive.

One of the important aims of this book is to delineate the essential information about drugs. The opening sentence in each chapter defines the class of drugs considered. A 'prototype' approach has been followed by describing the representative drug of a class followed by features by which individual members differ from it. Leading trade names have been included. Clinically relevant drug interactions have been mentioned. Clear-cut guidelines on selection of drugs and their clinical status have been outlined on the basis of current information. Original, simple and self-explanatory illustrations, tables and flow charts have been used with impunity. Selected chemical structures are depicted. Recent developments have been incorporated. However, discretion has been used in including only few of the multitude of new drugs not yet available in India. This is based on their likelihood of being marketed soon. The information and views have been arranged in an orderly sequence of distinct statements.

I hope this manageable volume book would serve to dispel awe towards pharmacology from the minds of medical students and provide a concise and uptodate information source for prescribers who wish to remain informed of the current concepts and developments concerning drugs.

My sincere thanks are due to my colleagues for their valuable comments and suggestions.

New Delhi
1st Jan., 1985

KD Tripathi

List of Abbreviations

Ang-I/II/III	Angiotensin I/II/III
AA	Amino acid
ABC	ATP-binding cassette (transporter)
ABLC	Amphotericin B lipid complex
AB	Antibody
AC	Adenylyl cyclase
ACE	Angiotensin II converting enzyme
ACh	Acetylcholine
AChE	Acetylcholinesterase
ACS	Acute coronary syndromes
ACT	Artemisinin-based combination therapy
ACTH	Adrenocorticotropic hormone
AD	Alzheimer's disease
ADCC	Antibody-dependent cellular cytotoxicity
ADE	Adverse drug event
ADH	Antidiuretic hormone
ADHD	Attention deficit hyperactivity disorder
ADP	Adenosine diphosphate
Adr	Adrenaline
ADR	Adverse drug reaction
ADS	Anti diphtheritic serum
AES	Atrial extrasystole
AF	Atrial fibrillation
AFl	Atrial flutter
AG	Antigen
AGS	Antigasgangrene serum
AHG	Antihaemophilic globulin
AI	Aromatase inhibitor
AIDS	Acquired immunodeficiency syndrome
AIP	Aldosterone induced protein
ALA	Alanine
ALS	Amyotrophic lateral sclerosis
Am	Amikacin
AMA	Antimicrobial agent
AMB	Amphotericin B
amp	Ampoule
AMP	Adenosine mono phosphate
AMPA	α-Aminohydroxy methylisoxazole propionic acid
ANC	Acid neutralizing capacity
ANP	Atrial natriuretic peptide
ANS	Autonomic nervous system
ANUG	Acute necrotizing ulcerative gingivitis
AP	Action potential
AP-1	Activator protein-1
APC	Antigen presenting cell
APD	Action potential duration
aPTT	Activated partial thromboplastin time
AQ	Amodiaquine
AR	Androgen receptor
ARB	Angiotensin receptor blocker
ARC	AIDS related complex
ARS	Anti rabies serum
ARV	Antiretrovirus
AS	Artesunate
5-ASA	5-Amino salicyclic acid
Asc LH	Ascending limb of Loop of Henle
AT-III	Antithrombin III
ATG	Antithymocyte globulin
ATP	Adenosine triphosphate
ATPase	Adenosine triphosphatase
ATPIII	Adult treatment panel III
ATS	Antitetanic serum
AUC	Area under the plasma concentration-time curve
A-V	Atrioventricular
AVP	Arginine vasopressin
AZT	Zidovudine
BAL	British anti lewisite
BAN	British approved name
BB	Borderline leprosy
BBB	Blood-brain barrier
BCG	Bacillus Calmette Guérin
BCNU	Bischloroethyl nitrosourea (Carmustine)
BCRP	Breast cancer resistance protein
BD	Twice daily
β-ARK	β adrenergic receptor kinase
BHC	Benzene hexachloride
BHP	Benign hypertrophy of prostate
BI	Bacillary index
BL	Borderline lepromatous leprosy
BMD	Bone mineral density
BMR	Basal metabolic rate
BNP	Brain nartriuretic peptide
BOL	2-Bromolysergic acid diethylamide
BP	Blood pressure
BPN	Bisphosphonate
BSA	Body surface area
BT	Borderline tuberculoid leprosy
BuChE	Butyryl cholinesterase
BW	Body weight
BZD	Benzodiazepine
C-10	Decamethonium
CA	Catecholamine

CAB	Combined androgen blockade
CaBP	Calcium binding protein
CAD	Coronary artery disease
CAM	Calmodulin
cAMP	3', 5' Cyclic adenosine monophosphate
cap	Capsule
CAR	Conditioned avoidance response
CAse	Carbonic anhydrase
CAT	Computerized axial tomography
CBF	Cerebral blood flow
CBG	Cortisol binding globulin
CBS	Colloidal bismuth subcitrate
CCB	Calcium channel blocker
CCNU	Chloroethyl cyclohexyl nitrosourea (lomustine)
CCR5	Chemokine coreceptor 5
CD	Collecting duct/Cluster of differentiation
CDC	Complement dependent cytotoxicity
CFTR	Cystic fibrosis transport regulator
cGMP	3', 5' Cyclic guanosine monophosphate
CGRP	Calcitonin gene related peptide
CH	Cholesterol
ChE	Cholinesterase
CHE	Cholesterol ester
Chy	Chylomicron
Chy. rem.	Chylomicron remnants
CHF	Congestive heart failure
CI	Cardiac index
CINV	Chemotherapy induced nausea and vomiting
CL	Clearance
CLcr	Creatinine clearance
Cm	Capreomycin
CMI	Cell mediated immunity
CMV	Cytomegalovirus
CNS	Central nervous system
c.o.	Cardiac output
CoEn-A	Coenzyme-A
COMT	Catechol-O-methyl transferase
COX	Cyclooxygenase
c.p.s.	Cycles per second
CPS	Complex partial seizures
CPZ	Chlorpromazine
CQ	Chloroquine
CRABP	Cellular retinoic acid binding protein
CRBP	Cellular retinol binding protein
CrD	Crohn's disease
CREB	Cyclic AMP response element binding protein
CRF	Corticotropin releasing factor
CS	Cycloserine
CSF	Cerebrospinal fluid
CTL	Cytotoxic T-lymphocytes
CTZ	Chemoreceptor trigger zone
CV	Cardiovascular
CVP	Central venous pressure
CVS	Cardiovascular system
CWD	Cell wall deficient
CYP450	Cytochrome P450
DA	Dopamine
DA-B_{12}	Deoxyadenosyl cobalamin
DAD	Delayed after-depolarization
DAG	Diacyl glycerol
DAM	Diacetyl monoxime
DAMP	Diphenyl acetoxy-N-methyl piperidine methiodide
DAT	Dopamine transporter
dDAVP	Desmopressin
DDS	Diamino diphenyl sulfone (Dapsone)
DDT	Dichloro diphenyl trichloroethane
DEC	Diethyl carbamazine citrate
DHA	Dihydroartemisinin
DHE	Dihydroergotamine
DHFA	Dihydro folic acid
DHFRase	Dihydrofolate reductase
DHP	Dihydropyridine
DHT	Dihydrotestosterone
DI	Diabetes insipidus
DIT	Diiodotyrosine
dl	Decilitre
DLE	Disseminated lupus erythematosus
DMA	Dimethoxy amphetamine
DMARD	Disease modifying antirheumatic drug
DMCM	Dimethoxyethyl-carbomethoxy-β-carboline
DMPA	Depot medroxyprogesterone acetate
DMPP	Dimethyl phenyl piperazinium
DMT	Dimethyl tryptamine/Divalent metal transporter
DNA	Deoxyribose nucleic acid
DOC	Deoxycholate
DOCA	Desoxy corticosterone acetate
DOM	Dimethoxymethyl amphetamine
dopa	Dihydroxyphenyl alanine
DOPAC	3, 4, Dihydroxyphenyl acetic acid
DOSS	Dioctyl sulfosuccinate
DOTS	Directly observed treatment short course
DPD	Dihydropyrimidine dehydrogenase
DPP-4	Dipeptidyl peptidase-4
DPT	Diphtheria-pertussis-tetanus triple antigen
DRC	Dose-response curve
DRI	Direct renin inhibitor
DST	Drug sensitivity testing (for TB)
DT	Distal tubule
DT-DA	Diphtheria-tetanus double antigen
d-TC	d-Tubocurarine
DTIC	Dacarbazine
DTPA	Diethylene triamine pentaacetic acid
DVT	Deep vein thrombosis
DYN	Dynorphin
E	Ethambutol
EACA	Epsilon amino caproic acid
EAD	Early after-depolarization
e.c.f.	Extracellular fluid
ECG	Electrocardiogram
ECT	Electroconvulsive therapy
ED	Erectile dysfunction

EDRF	Endothelium dependent relaxing factor
EDTA	Ethylene diamine tetraacetic acid
EEG	Electroencephalogram
EGF	Epidermal growth factor
ELAM-1	Endothelial leukocyte adhesion molecule-1
β-END	β-Endorphin
ENS	Enteric nervous system
ENT	Extraneuronal amine transporter
EPAC	cAMP regulated guanine nucleotide exchange factors
EPEC	Enteropathogenic *E. coli*
EPO	Erythropoietin
EPP	End plate potential
EPSP	Excitatory postsynaptic potential
ER	Estrogen receptor
ERP	Effective refractory period
ES	Extrasystole
ESR	Erythrocyte sedimentation rate
ETEC	Enterotoxigenic *E. coli*
Eto	Ethionamide
FA	Folic acid
FAD	Flavin adenine dinucleotide
5-FC	5-Flucytosine
FDC	Fixed dose combination
FDT	Fixed duration therapy (of leprosy)
FEV_1	Forced expiratory volume in 1 second
FFA	Free fatty acid
FKBP	FK 506 (tacrolimus) binding protein
FLAP	Five-lipoxygenase activating protein
FMN	Favin mononucleotide
FP	Ferroportin
FQ	Fluoroquinolone
FRase	Folate reductase
FSH	Follicle stimulating hormone
5-FU	5-Fluorouracil
G	Genetic
GABA	Gamma amino butyric acid
GAT	GABA-transporter
GC	Guanylyl cyclase
GCP	Good clinical practice
G-CSF	Granulocyte colony stimulating factor
GDP	Guanosine diphosphate
GERD	Gastroesophageal reflux disease
g.f.	Glomerular filtration
g.f.r.	Glomerular filtration rate
GH	Growth hormone
GHRH	Growth hormone releasing hormone
GHRIH	Growth hormone release inhibitory hormone
GIP	Gastric inhibitory peptide/Glucose-dependent insulinotropic polypeptide
g.i.t.	Gastrointestinal tract
GITS	Gastrointestinal therapeutic system
Glc	Glucocorticoid
GLP	Glucagon-like peptide
GLUT	Glucose transporter
GM-CSF	Granulocyte macrophage colony stimulating factor
GnRH	Gonadotropin releasing hormone
GPCR	G-protein coupled receptor
G-6-PD	Glucose-6-phosphate dehydrogenase
GPI	Globus pallidus interna
GST	Glutathione-S-transferase
GTCS	Generalised tonic-clonic seizures
GTN	Glyceryl trinitrate
GTP	Guanosine triphosphate
H	Isoniazid (Isonicotinic acid hydrazide)
HAART	Highly active antiretroviral therapy
Hb	Haemoglobin
HBV	Hepatitis B virus
HCG	Human chorionic gonadotropin
HDCV	Human diploid cell vaccine
HDL	High density lipoprotein
5-HIAA	5-Hydroxyindole acetic acid
HES	Hydroxyethyl starch
HETE	Hydroxyeicosa tetraenoic acid
HIV	Human immunodeficiency virus
HLA	Human leucocyte antigen
HMG-CoA	Hydroxymethyl glutaryl coenzyme A
HMW	High molecular weight
HPA axis	Hypothalamo-pituitary-adrenal axis
HPETE	Hydroperoxy eicosatetraenoic acid
hr	Hour
HR	Heart rate
HRIG	Human rabies immuneglobulin
HRT	Hormone replacement therapy
5-HT	5-Hydroxytryptamine
5-HTP	5-Hydroxytryptophan
HVA	Homovanillic acid
I	Indeterminate leprosy
IAP	Islet amyloid polypeptide
IBD	Inflammatory bowel disease
IBS	Irritable bowel syndrome
ICAM-1	Intracellular adhesion molecule-1
ICSH	Interstitial cell stimulating hormone
i.d.	Intradermal (injection)
IDL	Intermediate density lipoprotein
IFN	Interferon
IG	Immuneglobulin
IGF	Insulin-like growth factor
IL	Interleukin
ILEU	Isoleucine
i.m.	Intramuscular
INH	Isonicotinic acid hydrazide
INR	International normalized ratio
i.o.t.	Intraocular tension
IP_3	Inositol trisphosphate
IP_4	Inositol tetrakisphosphate
IPSP	Inhibitory postsynaptic potential
IPV	Inactivated poliomyelitis vaccine

IRS	Insulin response substrate
ISA	Intrinsic sympathomimetic activity
ISH	Isolated systolic hypertension
IU	International unit
IUCD	Intrauterine contraceptive device
i.v.	Intravenous
JAK	Janus-kinase
Km	Kanamycin
KTZ	Ketoconazole
LA	Local anaesthetic
LCAT	Lecithin cholesterol acyl transferase
LC3-KAT	Long chain 3-ketoacyl-CoA-thiolase
LDL	Low density lipoprotein
LES	Lower esophageal sphincter
leu-ENK	Leucine enkephalin
LH	Luteinizing hormone
liq	Liquid
LL	Lepromatous leprosy
LMW	Low molecular weight
LOX	Lipoxygenase
LSD	Lysergic acid diethylamide
LT	Leukotriene
LVF	Left ventricular failure
MAbs	Monoclonal antibodies
MAC	Minimal alveolar concentration
MAC	*Mycobacterium avium* complex
MAO	Monoamine oxidase
MAP	Muscle action potential
MAPKinase	Mitogen activated protein kinase
max	Maximum
MBC	Minimum bactericidal concentration
MBL	Multibacillary leprosy
MCI	Mild cognitive impairment
MDI	Manic depressive illness
MDMA	Methylene dioxy methamphetamine
MDR	Multidrug resistant
MDT	Multidrug therapy (of leprosy)
met-ENK	Methionine enkephalin
mEq	milliequivalent
methyl B_{12}	Methyl cobalamin
Mf	Microfilariae
MF	Multifactorial
MHC	Major histocompatibility complex
MHT	Methylene dioxy methamphetamine
MI	Myocardial infarction
MIC	Minimal inhibitory concentration
MIF	Migration inhibitory factor
min	Minimum
MIT	Monoiodo tyrosine
MLCK	Myosin light chain kinase
MMF	Mycophenolate mofetil
6-MP	6-Mercaptopurine
MPPT	Methylprednisolone pulse therapy
MPTP	4-methyl-4-phenyltetrahydro pyridine
MQ	Mefloquine
MRP2	Multidrug resistance associated protein-2
MRSA	Methicillin resistant *Staphylococcus aureus*
MSH	Melanocyte stimulating hormone
MT	Methyl transferase
mTOR	Mammalian target of rapamycin
Mtx	Methotrexate
mV	millivolt
MW	Molecular weight
NA	Noradrenaline
NADP	Nicotinamide adenine dinucleotide phosphate
NADPH	Reduced nicotinamide adenine dinucleotide phosphate
NAG	N-acetyl glucosamine
NAM	N-acetyl muramic acid
NANC	Nonadrenergic noncholinergic
NAPA	N-acetyl procainamide
NAPQI	N-acetyl-p-benzoquinoneimine
NaSSA	Noradrenergic and specific serotonergic antidepressant
NAT	N-acetyl transferase
NCEP	National cholesterol education programme
NEE	Norethindrone enanthate
NET	Norepinephrine transporter
NFAT	Nuclear factor of activated T-cell
NFκB	Nuclear factor κB
NIS	Na^+ (sodium)-iodide symporter
NLEP	National leprosy eradication programme
NMDA	N-methyl-D-aspartate
nNOS	Neural nitric oxide synthase
NNRTI	Nonnucleoside reverse transcriptase inhibitor
NPY	Neuropeptide-Y
NR	Nicotinic receptor
N-REM	Non rapid eye movement (sleep)
NRTI	Nucleoside reverse transcriptase inhibitor
NSAID	Nonsteroidal antiinflammatory drug
NSTEMI	Non ST-segment elevation myocardial infarction
NTS	Nucleus tractus solitarius
NVBDCP	National vector borne diseases control programme
NYHA	New York Heart Association
OAT	Organic anion transporter
OATP	Organic anion transporting polypeptide
OC	Oral contraceptive
OCD	Obsessive-compulsive disorder
OCT	Organic cation transporter
OD	Once daily
OPG	Osteoprotegerin
OPV	Oral poliomyelitis vaccine
ORS	Oral rehydration salt (solution)
ORT	Oral rehydration therapy
PABA	Paraamino benzoic acid
PAE	Post antibiotic effect

PAF	Platelet activating factor
PAI-1	Plasminogen activator inhibitor-1
2-PAM	Pralidoxime
PAN	Primary afferent neurone
PAS	Paraamino salicylic acid
PBI	Protein bound iodine
PBPs	Penicillin binding proteins
PBL	Paucibacillary leprosy
PCA	Patient controlled anaesthesia
PCEV	Purified chick embryo cell vaccine (rabies)
PCI	Percutaneous coronary intervention
PCPA	Parachloro phenylalanine
PD	Parkinsons's disease
PDE	Phosphodiesterase
PE	Pulmonary embolism
PEMA	Phenylethyl malonamide
PEP	Postexposure prophylaxis
PF	Purkinje fibre
PFOR	Pyruvate: ferredoxin oxidoreductase
PG	Prostaglandin
PGI_2	Prostacyclin
Pgp	P-glycoprotein
PI	Protease inhibitor
PIG	Phosphatidyl inositol glycan
PIP_2	Phosphatidyl inositol-4,5-bisphosphate
PKA	Protein kinase: cAMP dependent
PKC	Protein kinase C
PL_A	Phospholipase A
PL_C	Phospholipase C
Pl. ph.	Platelet phospholipid
pMDI	pressurized multidose inhaler
PnG	Penicillin G
POMC	Pro-opio melanocortin
PONV	Postoperative nausea and vomiting
PP	Partial pressure
PPA	Phenyl propanolamine
PPARγ	Paroxysome proliferator-activated receptor γ
PPH	Post partum haemorrhage
PPI	Proton pump inhibitor
ppm	Part per million
PPNG	Penicillinase producing *N. gonorrhoeae*
PRA	Plasma renin activity
PRF	Prolactin releasing factor
PRIH	Prolactin release inhibitory hormone
PSVT	Paroxysmal supra-ventricular tachycardia
PT	Proximal tubule
PTCA	Percutaneous transluminal coronary angioplasty
PTH	Parathyroid hormone
PTMA	Phenyl trimethyl ammonium
PTP	Post-tetanic potentiation
PTSD	Post-traumatic stress disorder
PTZ	Pentylenetetrazol
PUV A	Psoralen-Ultraviolet A
PVP	Poly vinyl pyrrolidone
PVRV	Purified verocell rabies vaccine
QID	Four times a day
R	Rifampin (Rifampicin)
RANK	Receptor for activation of nuclear factor κB
RANKL	RANK ligand
RAS	Renin-angiotensin system
RBC	Red blood cells
RBP	Retinol binding protein
RC	Respiratory centre
RE	Reticuloendothelial
REM	Rapid eye movement (sleep)
RGS	Regulator of G-protein synthesis
RIG	Rabies immuneglobulin
RIMA	Reversible inhibitor of MAO-A
rINN	Recommended international nonproprietary name
RMP	Resting membrane potential
RNA	Ribonucleic acid
RNTCP	Revised National Tuberculosis Control Programme
RP	Refractory period
RTF	Resistance transfer factor
RTKs	Receptor tyrosine kinases
RXR	Retinoid X receptor
RyR	Ryanodine receptor
S	Streptomycin
SA	Sinoauricular (node)
SABE	Subacute bacterial endocarditis
s.c.	Subcutaneous
SCC	Short course chemotherapy (of tuberculosis)
SCh	Succinylcholine
SCID	Severe combined immunodeficiency disease
SERCA	Sarcoplasmic-endoplasmic reticular calcium ATPase
SERDs	Selective estrogen receptor down regulators
SERM	Selective estrogen receptor modulator
SERT	Serotonin transporter
SGA	Second generation antihistaminic
SGLT	Sodium-glucose transporter
SHBG	Sex hormone binding globulin
SIADH	Syndrome of inappropriate ADH secretion
s.l.	Sublingual
SLC	Solute carrier
SLE	Systemic lupus erythematosus
SMON	Subacute myelo-optic neuropathy
SNP	Single nucleotide polymorphism
SN-PC	Substantia nigra-pars compacta
SN-PR	Substantia nigra-pars reticularis
SNRI	Serotonin and noradrenaline reuptake inhibitor
s.o.s.	as required
S/P	Sulfonamide + pyrimethamine
SPF	Sun protection factor
SPS	Simple partial seizures
SPRM	Selective progesterone receptor modulator
SR	Sustained release

SRS-A	Slow reacting substance of anaphylaxis
SSG	Sodium stibogluconate
SSI	Surgical site infection
SSRIs	Selective serotonin reuptake inhibitors
STAT	Signal transducer and activator of transcription
STEMI	ST-segment elevation myocardial infarction
StK	Streptokinase
SU	Sulfonylurea
SULT	Sulfotransferase
SUR	Sulfonyl urea receptor
susp	Suspension
SWD	Shift work disorder
SWS	Slow wave sleep
syr	Syrup
t½	Half life
T_3	Triiodothyronine
T_4	Thyroxine
tab	Tablet
TAB	Typhoid, paratyphoid A and B vaccine
TB	Tubercle bacilli
TBG	Thyroxine binding globulin
TCII	Transcobalamin II
TCAs	Tricyclic antidepressants
$TCID_{50}$	Tissue culture infectious dose 50%
TDM	Therapeutic drug monitoring
TDS	Three times a day
Tf	Transferrin
TG	Triglyceride
6-TG	6-Thioguanine
TGF-β	Transforming growth factor β
THC	Tetrahydrocannabinol
THFA	Tetrahydro folic acid
Thz	Thiacetazone
Thio TEPA	Triethylene thiophosphoramide
THR	Threonine
TIAs	Transient ischaemic attacks
TNF-α	Tumour necrosis factor α
TOD	Target organ damage
TOF	Train of four
t-PA	Tissue plasminogen activator
TPMT	Thiopurine methyl transferase
t.p.r.	Total peripheral resistance
TR	Thyroid hormone receptor
TRE	Thyroid hormone response element
TRH	Thyrotropin releasing hormone
TSH	Thyroid stimulating hormone
TT	Tuberculoid leprosy
TTS	Transdermal therapeutic system
TX	Thromboxane
U	Unit
UA	Unstable angina
UDP	Uridine diphosphate
UFH	Unfractionated heparin
UGDP	University group diabetic programme
UGT	UDP-glucuronosyl transferase
USAN	United States adopted name
UT	Urea transporter
UTI	Urinary tract infection
v	Volt
V	Volume of distribution
VAL	Valine
VDR	Vit D receptor
VES	Ventricular extrasystole
VF	Ventricular fibrillation
VIP	Vasoactive intestinal peptide
Vit	Vitamin
VKOR	Vitamin K epoxide reductase
VL	Visceral leishmaniasis
VLDL	Very low density lipoprotein
VMA	Vanillyl mandelic acid
VMAT	Vesicular monoamine transporter
VRE	Vancomycin resistant enterococci
VRSA	Vancomycin resistant *Staphylococcus aureus*
VRUT	Vasopressin regulated urea transporter
VT	Ventricular tachycardia
vWF	von Willebrand factor
WBC	White blood cells
WCVs	Water channel containing vesicles
WHO	World Health Organization
WPW	Wolff-Parkinson-White syndrome
XDR-TB	Extensively drug resistant-TB
Z	Pyrazinamide
ZE (syndrome)	Zollinger-Ellison (syndrome)