

3.5 PHARMACOLOGY (THEORY)

75 hours ; 3 hours/week

1. General Pharmacology : Introduction and definitions—Health, Drug, Pharmacology, Pharmacokinetics and Pharmacodynamics, Sources of drugs. Routes of administration of drugs. Absorption of drug and the factors affecting them. Drug distribution, metabolism and excretion. Mechanism of drug action—Drug-Receptor interactions and molecular & biochemical basis of drug action, additive effect, synergism, potentiation. Factors modifying drug effects; Patient related factors & Drug related factors. Classification and mechanism of action of ADR. Dose response relationship, structure activity relationship. Definitions, Basic concepts and mechanisms of Drug-Drug, Drug-Food interactions, classification of Drug-Drug interaction.

15 hours;15-19 marks

2. Pharmacology of drugs acting on Autonomic Nervous System : Introduction — Neurohumoral Transmission. Adrenergic Drugs ; Adrenergic transmission, adrenergic receptors and drugs affecting adrenergic transmission, Classification of drugs and mechanism of action, Pharmacology of adrenaline (a proto type adrenergic drug) and salient features of other adrenergic drugs. Adrenergic Blockers; Classification, pharmacology of phenoxybenzamine (a proto type Alpha blocker), pharmacology of propranolol (a proto type beta blocker), salient features of alpha & beta blockers. Adrenergic neuronal blockers & mechanism of action. Cholinergic Drugs: Cholinergic transmission, cholinergic receptors and drugs affecting cholinergic transmission, Classification of drugs and mechanism of action, Pharmacology of Acetylcholine (a proto type cholinergic drug). Salient features of other cholinergic drugs, including cholinesterase inhibitors and enzyme reactivators. Anti cholinergic Drugs; Pharmacology of atropine (a proto type anti cholinergic drug) and salient features of other anti cholinergic drugs; Ganglionic blockers and stimulants, Neuromuscular blocking agents and drugs used in myasthenia gravis.

19 hours;16-20 marks

3. Pharmacology of Drugs acting on Cardiovascular System: Anti- hypertensives agents: Classification and mechanism of action, Pharmacology of centrally acting drugs (Clonidine and methyldopa), Classification of vasodilators including calcium channel blockers, Pharmacology of drugs affecting Renin Angiotensin system. Anti - anginal drugs; Classification and pharmacology of anti -anginal drugs. Anti-arrhythmic drugs; Classification and mechanism of action, Pharmacology of quinidine (A proto type sodium channel blocker), Salient features of other anti-arrhythmic drugs, Drugs used for therapy of congestive cardiac failure (CCF); Classification and mechanism of action of drugs used for CCF, pharmacology of digoxin, Salient features of other drugs used in CCF. Drugs used in treatment of hyperlipidaemias; Classification and mechanism of action of anti- hyperlipidaemics, Pharmacology of atorvastatin (A proto type of HMG CoA reductase inhibitor), Salient features of other anti- hyperlipidaemic agents.

14 hours; 12-14 marks

4. Pharmacology of Drugs Acting on Renal System (Diuretics) and antidiuretics; Classification and mechanism of action of diuretics, Pharmacology of furosemide, Salient features of other diuretics, Pharmacology of anti-diuretics, Uses and adverse effects of Urine acidifiers and alkalinizers.

3 hours;5-7 marks

5. Pharmacology of Drugs Acting on Blood and Blood forming Agents: Classification and mechanism of action & salient features of coagulants and anti-coagulants, haemopoietics, thrombolytics and antiplatelet agents.

4 hours;5-7 marks

6. Pharmacology of Autocoids & their antagonists: Histamine and antihistaminics, 5-Hydroxytryptamine and its antagonists, Lipid derived autocoids and platelet activating factor. **4 hours;5-7 marks**

7. Pharmacology of Drug Acting on Respiratory Tract: Drugs used in asthma and COPD, mucolytics, expectorants, antitussives, nasal decongestants. **3 hours;2-4 marks**

8. Pharmacology of Hormones and Hormones Antagonists: Thyroid and antithyroid drugs: Classification, mechanism of action and salient features of thyroid and antithyroid drugs, Anti-diabetic drugs, Insulin, Insulin preparations, Oral hypoglycemic agents: Classification, mechanism of action, salient features of oral anti-diabetics including newer agents, Pharmacology of corticosteroids, Pharmacology of sex hormones and oral contraceptives, Pharmacology of oxytocin, other uterine stimulants and relaxants. **13 hours;10-12 marks**

PHARMACOLOGY (PRACTICALS)

75 hours ; 3 hours/week

1. Regulatory perspectives of animal experiments with special reference to CPCSEA guidelines.
2. Study of laboratory animals and their handling.
3. Study of physiological salt solutions used in experimental pharmacology.
4. Study of laboratory appliances used in experimental pharmacology.
5. Study of use of anesthetics in lab animals. *
6. Study of techniques of euthanasia in lab animals.*
7. To study the routes of administration of drugs.*
8. To study the absorption of glucose/drugs using everted gut sac from rat/chick.*
9. To study the *in vitro* protein binding and displacement of bound drug using egg albumin.*
10. To record the dose response curve of histamine using isolated guinea pig/chick/rat ileum preparation.*
11. Study of agonistic effects of histaminergic drugs using isolated guinea pig /chick/rat ileum preparation. **
12. Study of antihistaminic drugs using isolated guinea pig /chick/rat ileum preparation. **
13. To record the dose response curve of acetylcholine using isolated guinea pig/chick/rat ileum preparation.*
14. Study of potentiating effects of cholinergic drugs using isolated guinea pig /chick/rat ileum preparation. **
15. Study of anticholinergic drugs using isolated guinea pig /chick/rat ileum preparation. **
16. Simulated experiments on effects of drugs on isolated heart of frog.*
17. Simulated experiments on effects of drugs on hypodynamic heart of frog.*
18. Simulated experiments on effects on B.P, HR and RR of dog.*
19. Simulated experiments on effects of mydriatic and miotic drugs on rabbit's eye. *
20. Simulated experiments on effects of local anaesthetic drugs on rabbit's eye. *
21. Simulated experiments on effects of drugs on ciliary motility of frog's esophagus. *

Note: ** Denotes major experiments * Denotes minor experiments

SCHEME OF EXAMINATION

1. Identification	-	10 Marks
2. Synopsis	-	10 Marks
3. Major Experiment	-	25 Marks
4. Minor Experiment	-	15 Marks
5. Viva	-	10 Marks
Total	=	70 Marks

PHARMACOLOGY TEXT BOOKS

1. Tripathi KD, Essentials of Medical Pharmacology, 7th Edition, Jaypee Brothers, 2010.
2. Satoskar R.S., Bhandarkar S.D. and Rege N.N., Pharmacology and Pharmacotherapeutics, 21st Edition, Popular Prakashan Pvt Ltd, 2010.
3. Chaudhary S.K., Quintessence of Medical Pharmacology, 3rd Revised Edition, Central Book Agency Pvt. Ltd., 2010.
4. Sharma H.L. and Sharma K.K., 2nd Edition, Principles of Pharmacology, Paras Medical, 2011.
5. Ghosh M.N., Fundamentals of Experimental Pharmacology, 5th Edition, Hilton & Company, 2011.
6. Kulkarni S.K., Hand book of Experimental Pharmacology, 3rd Edition, Vallabh Prakashan, 2005.
7. Medhi B. and Prakash A., Practical manual of experimental and clinical pharmacology, 1st Edition, Jaypee Brothers, Medical Publishers, 2010.

PHARMACOLOGY REFERENCE BOOKS

1. Brunton L.L., Chabner B.A., and Knollmann B.C., Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Edition, McGraw-Hill Professional, 2010.
2. Katzung B.G., Masters S.B. and Trevor A.J., Basic and Clinical Pharmacology, 12th Edition, McGraw-Hill, 2011.
3. Rang H.P., M.M. Dale, J.M. Ritter., Flower R.J. and Henderson G., Pharmacology, 7th illustrated Edition, Elsevier Science Health Science Division, 2011.
4. Craig C.R. and Stitzel R.E., Modern Pharmacology with Clinical Applications, 6th Edition, Lippincott Williams and Wilkins, 2003.
5. Harvey R.A., Clark M.A., Finkel R, Jose A.R. and Whalen K, 5th Edition, Lippincott's Illustrated Reviews: Pharmacology, Lippincott Williams and Wilkins, 2011.
6. Barar F.S.K., Essentials of Pharmacotherapeutics, 6th Revised Edition, S.Chand & Co. Ltd, 2011.
7. DiPiro J, Talbert R.L., Yee G., Matzke G., Wells B. and Posey L.M., Pharmacotherapy: A Pathophysiologic Approach, 8th Edition, McGraw-Hill Medical, 2011.

LIST OF MINIMUM EQUIPMENT REQUIRED

(For a batch of 20 students)

1. Pharmacology appliances	Sufficient
2. Sherrington's Kymograph Machine	20
3. Sherrington's Drum	20
4. Perspex bath assembly (single unit)	20
5. Aerators	20
6. Dissection trays	20
7. Dissection boards	20
8. Haemostatic arterial forceps	20
9. Hypodermic syringes and needles of size 18, 24, 26G	20
10. Computers	10
11. LCD Projector	01
12. Software package for experiments	01
13. Standard graphs for various drugs	Sufficient
14. Levers	20
15. Cannulae	20