

## **Ph D. in Pharmaceutical Sciences**

### **SUBJECT: PHARMACOLOGY**

Pharmacology deals with study of drugs including their origin, composition, pharmacokinetics and pharmacodynamics. It also includes study of preclinical as well as clinical pharmacology, toxicology, systemic pharmacology, drug discovery, molecular pharmacology and phytopharmacology. The department of Pharmacology provides academic, instrumental and research training to the students in the preclinical and clinical pharmacology, toxicology and molecular pharmacology in order to strengthen the students' professional and scientific knowledge about the subject.

### **Departmental Highlights**

#### **Thrust Areas**

The thrust areas of research being conducted under the Pharmacology Department includes:

- Neuropharmacology and behavioral Pharmacology
- Free radical Pharmacology
- Cardiovascular Pharmacology
- Renal Pharmacology
- Endocrinal Pharmacology
- Toxicology
- Indigenous drug pharmacology
- Pharmacovigilance and ADR monitoring

The details of type of research being conducted in the department are as follows:

- ✚ Development of various animal models for the preclinical screening of drugs with specific emphasis to drugs acting on CNS and reproductive system.
- ✚ Behavioral, hormonal and neurotransmitter pharmacological studies of various indigenous medicinal plants and modern drugs and their interactions.
- ✚ Screening of medicinal plants and allopathic drugs for their pharmacological activity and evaluation of their effects at biochemical, cellular, molecular and genetic level to establish the mechanism of action.
- ✚ Development and evaluation of polyherbal and alloy polyherbal formulations.
- ✚ Pharmacovigilance of various drugs for ADR monitoring and reporting of ADR (In association with AIIMS, Rishikesh,
- ✚ Drug screening studies, toxicological studies and drug food interactions at genetic level, gene polymorphism studies (In association with CDRILucknow, DRDO Delhi, IIM Jammu, Institute of Himalayan Bio resource Technology (CSIR Lab) Himanchal Pradesh etc.)

## **PHARMACOLOGY SYLLABUS FOR SBSU – PET 2021 ENTRANCE EXAM**

### **Unit I**

#### **Experimental pharmacology and toxicology**

Common laboratory animals in pharmacological research, limitations of animal tests, alternatives to animal use, anesthetics used in laboratory animals, euthanasia of experimental animals. CPCSEA guidelines for the care and use of laboratory animals. In vivo and in vitro experimentation, its advantages and disadvantages. Regulatory guidelines for conducting toxicity studies OECD, ICH, ICMR, EPA and Schedule Y. OECD principles of Good laboratory practice (GLP), Pharmacological evaluation of acute, subacute, chronic toxicity and genetic toxicity studies. Justification and purpose of clinical evaluation, clinical evaluation including phase I, II, III and IV studies, ethical and legal aspects of clinical trials, methods of randomization, size, documentation, monitoring and management of clinical trials.

### **Unit II**

#### **Receptor Pharmacology**

Intercellular and intracellular signaling pathways. Drug receptor interaction theories, Receptor occupation and response relationship, spare receptors, silent receptors, orphan receptors, presynaptic and postsynaptic receptors. Receptor subtypes, Classification of receptor family and molecular structure ligand gated ion channels. G-protein coupled receptors, tyrosine kinase receptors and nuclear receptors. Secondary messengers: cyclic AMP, cyclic GMP, calcium ion, inositol 1,4,5-trisphosphate, (IP<sub>3</sub>), NO, and diacylglycerol. Detailed study of cyclic AMP signaling pathway, mitogen-activated protein kinase (MAPK) signaling, Janus kinase (JAK)/signal transducer and activator of transcription (STAT) signaling pathway. Receptor down regulation and upregulation, Pharmacodynamic and pharmacokinetic aspects of chiral drugs, allosteric binding and thermodynamics of drug interactions with the receptors. Dose response relationship and different types of antagonisms. Desensitization and tachyphylaxis.

### **Unit II**

#### **Fundamentals of Pharmacology**

Dosage forms and routes of administration, mechanism of action, combined effect of drugs, factors modifying drug action, tolerance and dependence, Pharmacogenetics, Principles of Basic and Clinical pharmacokinetics, absorption, Distribution, Metabolism and Excretion of drugs, Adverse Drug Reactions, Bioassay of Drugs and Biological Standardization, Discovery and development of new drugs, Bioavailability and bioequivalence studies. Therapeutic Drug Monitoring, Concept of Essential Drugs and Rational Drug use.

## **Pharmacology of Peripheral Nervous System**

Neurohumoral transmission (autonomic and somatic), Parasympathomimetics, Parasympatholytics, Sympathomimetics. Adrenergic receptor and neuron blocking agents, Ganglion stimulants and blocking agents, Neuromuscular blocking Agents, Local anaesthetic Agents.

## **Cardiovascular pharmacology**

Anti-hypertensives, anti-arrhythmics, vasodilators and diuretics, drugs for heart failure and hyperlipidemia. Hematinics, coagulants, anticoagulants, fibrinolytics and anti-platelet.

## **Unit III**

### **Pharmacology of Central Nervous System**

Neurohumoral transmission in the C.N.S., General Anesthetics, Alcohols and disulfiram, Sedatives, Hypnotics, Anti-anxiety agents and Centrally acting muscle relaxants, Psychopharmacological agents (anti-psychotics), anti-maniacs and hallucinogens, Antidepressants, Anti-epileptics drugs, Anti-Parkinsonian drugs, Analgesics, Antipyretics, Narcotic analgesics and antagonists, C.N.S. stimulants. Drugs for neurodegenerative diseases like Parkinsonism, Alzheimers.

Asthma, thyroid disorders, diabetes, Peptic ulcer, Ulcerative colitis, Rheumatic diseases, Gout and Hyperuricemia

## **Unit V**

### **Chemotherapy**

General Principles of Chemotherapy, Bacterial resistance; Sulfonamides and cotrimoxazole, Penicillins, Cephalosporins, Aminoglycosides, Chloramphenicol, Macrolides, Tetracyclines, Quinolones, fluoroquinolones and Miscellaneous antibiotics; Chemotherapy of tuberculosis, leprosy, fungal diseases, viral diseases, HIV and AIDS, urinary tract infections and sexually transmitted diseases, malaria, amoebiasis and other protozoal infections and Anthelmintics. Chemotherapy of malignancy and immunosuppressive agents.