

**DEPARTMENT OF PHARMACOLOGY**  
**FACULTY OF MEDICINE**  
**Syllabus for Ph.D Admissions Test 2022-23 onwards**

**SECTION-B**

**1. General pharmacological principles and Applied sciences**

**2. Toxicology**

Basis of principles of diagnosis and treatment of human poisoning. Clinical feature of common poisoning Antidotes in the management of poisoning. Principles of clinical toxicology. Applied analytical toxicology and toxicovigilance.

**3. Molecular Biology in Pharmacology**

Gene expression, pharmacogenomics, proteomics, techniques involved in studying receptor dynamics. PCR, Northern blot, Southern blot and Western blot. Protein purification. Mono, polyclonal antibodies. Molecular biology in receptor identification. Antisense oligonucleotides, molecular targets of drug action.

**4. Wonder Discoveries in Pharmacology**

Nobel laureates in Pharmacology and their revolutionary discoveries.

**5. Systemic pharmacology, chemotherapy and therapeutics**

Autonomic nervous system

Central nervous system

Autacoids

Drugs affecting kidney function and cardiovascular system

Drugs affecting gastrointestinal and respiratory system

Drugs affecting uterine motility

Chemotherapy of parasite infections

Chemotherapy of microbial diseases

Antineoplastic agents

Immunomodulators

Drugs acting on blood and blood forming organs.

Hormones

Miscellaneous

**6. Experimental pharmacology**

Experimental methodologies involved in the discovery of drugs.

Animal handling and animal care

Drug screening methods involved in the evaluation of anti-ulcer, antidepressant, antianginal, antihypertensive, antiarrhythmic, antidiabetics, anticataract, antiplatelet, anticancer, anti-inflammatory, antidiarrhoeal, antiepileptics, analgesic, antipyretic, antiglaucoma, antihyperlipidemic, antiasthmatic drugs, cough suppressants, antifungal, anthelmintic, antibacterial, antiviral agents, drugs for heart failure, posterior pituitary, adrenal steroid (gluco & mineralo corticoids),

testicular, parathyroid, ovarian, thyroid hormones.

## **7. Instrumentation in Drug analysis**

Qualitative testing, titrimetric analysis. Beer and Lambert's law. Basis and working principle of colorimeter, ultraviolet, atomic absorption spectrometers, fluorescence spectroscopy, NMR and Mass Spectroscopy. Basics of chromatography. Partition, adsorption and ionexchange chromatography, Column chromatography, thin layer chromatography, paper chromatography, immunoabsorbant chromatography, high performance thin layer chromatography. High performance liquid chromatography and Gas chromatography. Radio immunoassay. Processing of biological materials for drug analysis. Calculations drug analysis. Good laboratory practice. Validation of analytical procedure.

## **8. Bioassay**

## **9. Biostatistics**

Calculation of basic statistical parameters (mean, median, mode. Standard deviation standard error etc.) Null hypothesis, parametric and non parametric tests (Student't' test, Wilcoxon, ANOVA etc) Metaanalysis.

## **Clinical Pharmacology :**

### **10. Pharmacokinetics**

Basics of Pharmacokinetics, calculation of pharmacokinetic estimates (C-max , Tmax, Tl/2. AU AUC (0-x) Vd, Ke, Ka etc.) Compartment models used in pharmacokinetics (Oral and intravenous Compartment fitting (one comp & Two comp). Pharmacodynamic/pharmacokinetic (PK/PD) correlation.

### **11. Drug Regulations**

Drug and cosmetics act, drug price control order, application for -investigational new drug (IND), application for New Drug Discovery (NDD) according to Indian control Authority & USFDA guide Conducting bio equivalence studies. Ethical considerations in utilizing human subjects for drug discovery process. Helsinki's declaration. ICH-GCP Guidelines. Ethical guidelines in utilizing animals for experimental purposes.

### **12. Drug development process**

Methods involved in the development of new drugs. Preclinical toxicological studies. Calculation of LD50 & ED50. Acute, subacute and chronic toxicity studies. Irwin profile test, Preclinical pharmacokinetics and dynamic studies. Lipinski's rule for drug like molecule, high throughput screening (invitro and invivo) for pre clinical pharmacokinetic and pharmacodynamic studies.

### **13. Therapeutic drug Monitoring (TDM)**

Basic principles of TDM. Therapeutic index. Through level monitoring and dosage adjustments.

### **14. Clinical Trials**

Types of clinical trials, clinical trial for a new investigational drug in India. Methods

involved in the assessment of drugs in human volunteers and bio-equivalence studies. Key points in drafting protocol for a large scale multicentric drug trial in India.

*Therapeutic audit:* Drug utilisation studies, essential medicine concept, rational prescribing.

*Drug delivery systems:* Sustained release. Enteric coated formulations and liposome etc.

Pharmacovigilance, pharmacoconomics, Pharmacogenetics and drug information.

## **15. Recent advances in therapeutics**