Admission to Ph.D. programme in Pharmacology

Syllabus for Paper II

(As per Board of Studies held on 13th July, 2009)

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. Antisepses 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, anti-platelet, anticancer, anti-inflammatory, antidiarrhoeal, antiepiletics, analgesic, antipyretic, antiglaucoma, antihyperlipidemic, antiasthmatic drugs, cough suppressants, antifungal, anthelmentic, 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 Pharmacokinetcs, calculation of pharmacokinetic estimates (C-max , Tmax, T1/2. 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 phamacokinetic and phamacodynamic studies.

13. Therapeutic drug Monitoring (TDM)

Basic principled 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, pharmacoeconomics, Pharmacgenetics and drug information.

15. Recent advances in therapeutics

26.9.18

Chairman
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