

Pharmacology

Second
Edition

Practical Notebook Course Code ER20-21P

for **Second Year Diploma in Pharmacy**

As per ER-20 more attention is to be given on attainment of required competency to acquire expertise on medications so that after successful completion of the concerned program the student is able to provide an expert opinion on medications to health care professionals on safe and effective use of drugs.

Under ER-20, guidelines of practical pharmacology clearly mention that the animals shall not be used for doing or demonstrating the experiments listed in syllabus. So the concept of experimental pharmacology would be clear by using software programs like Ex-Pharm or any other software advised by the concerned subject teachers.

ER-20 provides pre-clinical experiments both *in vivo* which includes study of effects of anaesthetic, mydriatic and miotic, analgesic and pyrogen testing. *In vitro* the curriculum includes study of effects of CNS acting drugs and also have to perform the effects of drugs on isolated organ (heart) and tissue (buccal cavity).

This manual includes 12 practical experiments on various topics like narcotic analgesics, drugs acting on CNS and heart, local anaesthetics, mydriatic and miotic drugs, muscle relaxants, pyrogen test, etc.

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Dedicated to Education



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Sharma | Pandey



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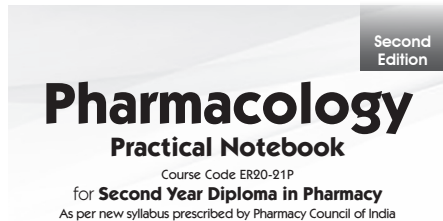
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Certificate

Student's Name: _____

Class _____ Roll No. _____

This is to certify that experiments, written in the index, have been performed by the student, are satisfactory.

Grade.....

Name and signature of lab. in-charge

College stamp



Date



Syllabus

Pharmacology—Practical

Course Code: ER20-21P

50 Hours (2 Hours/week)

Scope: This course provides the basic understanding about the uses, mechanisms of actions, dose-dependent responses of drugs in simulated virtual animal models and experimental conditions.

Course Objectives: This course will demonstrate/provide hands-on experience in the virtual platform using appropriate software on the following:

1. Study of pharmacological effects of drugs like local anaesthetics, mydriatic and mitotic on rabbit eye
2. Screening the effects of various drugs acting on the central nervous system
3. Study of drug effects on isolated organs/tissues
4. Study of pyrogen testing on rabbit

Course Outcomes: Upon successful completion of this course, the students will be able to:

1. Study and report the local anaesthetic, mydriatic and mitotic effects of the given drug on the rabbit eye
2. Choose appropriate animal experiment model to study the effects of the given drugs acting on the central nervous system and submit the report
3. Perform the effects of given tissues (simulated) on isolated organs/tissues and interpret the results
4. Interpret the dose-dependent responses of drugs in various animal experiment models

Practicals

Introduction to the following topics pertaining to the experimental pharmacology have to be discussed and documented in the practical manuals.

1. Introduction to experimental pharmacology
2. Study of laboratory animals
 - (a) Mice
 - (b) Rats
 - (c) Guinea pigs
 - (d) Rabbits
3. Commonly used instruments in experimental pharmacology
4. Different routes of administration of drugs in animals
5. Types of pre-clinical experiments: *In vivo*, *in vitro*, *ex vivo*, etc.
6. Techniques of blood collection from animals

Experiments

Note: Animals shall not be used for doing/demonstrating any of the experiments given. The given experiments shall be carried-out/demonstrated as the case may be, only with the use of software programs(s) such as 'Ex Pharm' or any other suitable software.

1. Study of local anaesthetics on rabbit eye
2. Study of mydriatic effect on rabbit eye
3. Study of miotic effect on rabbit eye
4. Effect of analgesics using analgesiometer
5. Study of analgesic activity by writhing test
6. Screening of anti-convulsant using electro convulsometer
7. Screening of muscle relaxants using rota-rod apparatus
8. Screening of CNS stimulants and depressants using actophotometer
9. Study of anxiolytic activity using elevated plus maze method
10. Study of effect of drugs (any 2) on isolated heart
11. Effect of drugs on ciliary motility on frog's buccal cavity
12. Pyrogen testing by rabbit method



Instructions

1. Always put on neat and clean white apron whenever you are working in the laboratory.
2. Bring always practical notebook for viva and evaluation.
3. Thoroughly clean the apparatus required in the practical work.
4. Handle the animals with care. They should be treated in a human way, care being taken to avoid any injury to the handler.
5. Before any surgical procedure the animal must be anaesthetized properly.
6. The physiological solution and working solution of drug should be prepared freshly at the time of conducting experiment.
7. The stock solution of the drugs can be stored under condition specified individually.
8. Do not weigh less than 10 mg on a high quality analytical balance. For less than 10 mg of weighing of the any drug. It is advisable to prepare its solution by dilution method.
9. The practical notebook should be completed in every respect and should be submitted on the same day to the teacher concerned for marking and signature.
10. Never throw waste papers and burnt match sticks in the sink, this will block the sink which may lead to overflowing. Put the waste materials in the dustbin.
11. Keep your working place neat and clean. After the work is finished the student should clean the apparatus and the other articles.
12. The water taps and gas taps should be tightly closed after the work is over.
13. Never take and use any chemical or reagents prior taking permission from the teacher or the laboratory technician.
14. Always be in college uniform and maintain strict discipline.
15. Electrical switches should be put off before leaving the laboratory.



Preface to the Second Edition

The Pharmacy Council of India made regulations under Section 10 of Pharmacy Act, 1948 called “The Education Regulations, 2020, for Diploma in Pharmacy course. “It was approved by Government of India, Ministry of Health and Family Welfare which was notified in October, 2020 and implemented in the year 2021 for “Diploma in Pharmacy” students.

As per ER guidelines of practical pharmacology clearly mention that the animals shall not be used for doing or demonstrating the experiments listed in syllabus. So, the concept of experimental pharmacology would be clear by using software program(s) like “Ex Pharm or by any other software by the concerned respected teachers. The ER, 2020 provides pre-clinical experiments both; *in vivo* which includes study of effects of anaesthetic, mydriatic and miotic, analgesic and pyrogen testing; *in vitro* the curriculum includes the study of effects of CNS acting drugs and also has to perform the effects of drug on isolated organ (heart) and tissue (buccal cavity).

This manual includes 12 experiments on various topics like Narcotics, Analgesics, Drugs acting on CNS and Heart, Local Anaesthetics, Mydriatic and Miotic drugs, Muscle relaxants, Pyrogen test, etc.

Blank pages are provided for calculations wherever applicable and consist of various observation tables. We shall gratefully acknowledge comments, suggestions and criticism by respected teachers and students for improvement for future edition. We express sincere thanks to Mr Satish Kumar Jain, Chairman & Managing Director and Mr YN Arjuna, Vice President—Publishing Editorial, and Publicity, CBS Publishers & Distributors for their cooperation, encouragement and assistance in bringing out the Second Edition of this Practical Notebook. Finally our gratitude is to our colleagues for their inspiration and motivation.

Varun Dutt Sharma
SK Pandey



Preface to the First Edition

The ultimate objective of technical education is to develop relevant skill, creativity and competency among the students so as to enable them to perform the tasks effectively and efficiently later in the world of work. Practical work consists of tasks which require some manipulation of apparatus or some action.

To obtain the above aim and to reduce the writing workload to some extent to the students, this practical notebook of "Pharmacology" for diploma in pharmacy, second year, has been written according to new syllabus as prescribed by Pharmacy Council of India, Education Regulations, 1991. This practical notebook contains 17 experiments, well illustrated with graphs and experimental data to make more meaningful and guideful to the students.

Few blank pages are provided at end of this manual so that students can use these pages for writing additional experiments guided by the teachers depending on availability of reagents and infrastructure of concern laboratory.

We shall gratefully acknowledge the comments, suggestions and criticism by respected teachers and students for improvement of future edition. We express sincere thanks to Mr Satish Kumar Jain, Chairman & Managing Director and Mr YN Arjuna, Vice President—Publishing Editorial, and Publicity, CBS Publishers & Distributors for their cooperation, encouragement and assistance in bringing out the present form of this manual. Finally our gratitude is to our colleagues and Smt. Chitra for her sincere cooperation in computer typing and setting.

Varun Dutt Sharma
SK Pandey



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