


SYLLABUS FOR DOCTOR OF PHILOSOPHY IN IMMUNOLOGY

IMPHD 01. Immunology- Research Methodology

1. Scientific Research: Science and it's characteristics:
 - Hypothesis; theories and laws in science; Ad hoc-hypothesis, axillary hypothesis, observation, evidence and proofs.
 - Testability, Repeatability, falsifiability
 - Qualitative and quantitative research
2. Experiment designing:
 - Planning of experiments, experiment Design, Standardization, observational requirements, instrumental requirements, documentation of experiments.
 - Sample, procedure of sampling, sample size
 - Selection of controls
 - Observation and data collection
3. Data analysis:
 - Nature and types of data typical examples, Data acquisition, treatment of data, data interpretation, significance of statistical tools in data interpretation, errors and inaccuracies.
 - Data presentation: graph, tables, histograms and pi diagrams.
 - Statistical testing of hypothesis. Biased observations, influences of observations, using and acknowledging observations by others.
4. Management of Data: Data storage and management of data.
5. Scientific reporting:
 - Writing a research report, scientific writing, format for scientific reporting, tables, text, footnoted, illustrations and paginations, references, index.
 - Applications of computer packages in bibliographic management
 - Preparation of research project: Formulating research idea, defining problem and literature search, finalizing the outline of writing.

References:

1. Essentials of research design and methodology, Geoffrey Marczyk, David Dematteo, David Festinger 2005
2. Research methodology in the medical and biological sciences, Petter Laake, Haakon Breien Benestav and Bjorn Reino Olsen, 2007
3. Research Methodology, Dipak Kumar Battacharya, Second edition, 2006
4. Researching information system and computing, Briony J Oates, 2006
5. Research methodology-methods and techniques, C.R. Kothari, second edition, 2004



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Time: 3 hrs

Max marks: 70

PART A

Answer any eight questions (5 marks each)

(8x5=40)

1. Define and explain the term "Research". Explain its importance and objectives.
2. Write a brief note on experimental design
3. What is hypothesis? Give an account of procedure for testing of hypothesis.
4. Write a short note on Importance of reproducibility in research
5. Give an account of concept of sampling
6. Write a short note on Importance of proper controls in research setting
7. Give an account of different methods of acquisition of data
8. Write a short note on different types of charts
9. Explain about computational tools for bibliographic management
10. Write a short note on Importance of calculating statistical significance in research

PART B

Answer any three questions (10 marks each).

(3x10=30)

1. Explain important factors to consider during formulation of a research idea with an example.
2. What is sampling? Explain the procedure of sampling. What are the factors taken into account while sampling.
3. A drug named "X", which is a mixture of three compounds A,B,C in a ratio 1:1:1 and a vehicle "V", showing liver toxicity on day 5 when treated with a single dose of 100mg/KG body weight in mice. There is a pilot study report show compound B has liver toxicity at concentration more than 20mg/KG bodyweight. How you design a single experiment to prove compound B is contributing to the liver toxicity of "X" with proper controls.
4. How you write an original research article? What are the important factors to be considered during original article preparation?
5. Write a short note on
 - a. Citation
 - b. Indexing
 - c. H-index
 - d. i10 index
 - e. Impact factor



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