



Faculty of Pharmacy

Department I

University Clinic of Toxicology, Drug Industry, Management and Legislation

Associate Professor, Position 41

Topics

1. Fundamental aspects of scientific research: purpose, characteristics, terminology, objectives
2. Stages of scientific research: general process, cyclic nature of stages, application in drug development.
3. Scientific documentation methodology - types of literature, stages, and importance of keywords
4. Scientific documentation in the pharmaceutical field - indexes, abstract journals, and access methods.
5. Modern strategies for online scientific documentation in the pharmaceutical field: online documentation methods, main sources for accessing specialized journals, university subscriptions to scientific resources (types and access methods).
6. Ethics and bioethics in scientific research – principles, regulations, and challenges: definitions and fundamental concepts, european and national legislation, ethical and bioethical issues in the medical and pharmaceutical fields, intellectual property, copyright, plagiarism prevention, informed consent.
7. Methods for processing experimental data: fundamental concepts and applicability in pharmacy, classification of experimental data, population and sample concepts, data processing, presentation of data.
8. Comparative analysis and advanced processing of experimental data in pharmaceutical research: methods for comparing values between laboratories or populations, comparison of control and treated groups, calculation rules for expressing results in significant figures, error propagation through calculations.
9. Experimental optimization strategies – factorial design and process stages: factorial design, rules for constructing the experimental matrix, stages of experimental design.
10. Scientific writing – goals, structures, and fundamental principles: purpose of scientific writing, types of scientific publications, importance of impact factor, principles of scientific writing style.
11. Scientific writing and presentation of works – rules and best practices: general rules for drafting a scientific article, types of oral presentations in the scientific field and essential rules for effective presentations, rules for using computer tools in drafting and presenting.
12. Thesis writing – structure, contributions, and conclusions: specific components of thesis structure and characteristics of each section, importance of clearly delineating personal contributions versus those derived from scientific documentation, relevance of clear, pertinent, and well-founded conclusions in the thesis.
13. Introduction to toxicology – fundamental concepts and toxicity assessment: object, history, and definitions of toxicology, toxic substances and types of poisoning, main tests used for toxicity assessment, dose-effect relationship in toxicology, factors influencing toxicity.
14. Toxicokinetics: processes of transport, metabolism, and elimination of toxic substances – transport mechanisms, absorption, distribution, and metabolism of toxic substances.
15. Toxicodynamics i: mechanisms of toxic action and effects on the organism – mechanisms of action, mutagenic and carcinogenic actions.
16. Toxicodynamics ii: mechanisms of toxic action and pathological processes of a toxic nature – teratogenic action, immunotoxicity, toxic actions on the nervous, pulmonary, hepatic, renal, and cardiac systems.
17. Prevention and treatment of poisoning: measures, antidotes, and toxicological expertise – first aid measures, antidotes, treatment of chronic poisoning, poisoning prevention, toxicological expertise.
18. Toxicology of gaseous substances: mechanisms and toxic effects –CO, CO₂; halogens; sulfur compounds (H₂S, SO₂); nitrogen compounds (NH₃, nitrogen oxides).
19. Toxicology of volatile substances I: mechanisms and toxic effects – resorcinol, formaldehyde,



polycyclic aromatic hydrocarbons; halogenated aliphatic hydrocarbons (CH_3Cl , CCl_4 , vinyl chloride, CHCl_3).

20. Toxicology of volatile substances II: mechanisms and toxic effects – hydroxyl compounds (ethanol, methanol, ethylene glycol, phenol); acrolein, aniline, hydrocyanic acid, nitro derivatives, and amino derivatives of aromatics; hydrocyanic acid.

21. Toxicology of mineral substances: corrosive acids and bases, and toxic metals – mechanisms of toxic action, effects on tissues and organs, symptoms, and treatments for acute and chronic poisoning.

22. Toxicology of plant and animal toxins, mycotoxins, and higher fungi: mechanisms of toxic action, examples of plant toxins, animal toxins, mycotoxins, diagnosis, and treatment of poisonings.

23. Toxicology of nicotine, volatile solvents, and inhalants: etiology, mechanisms, symptomatology, and treatments – nicotine poisoning, solvents (naphtha, monocyclic aromatic hydrocarbons), amyl and butyl nitrites, gasoline, ether, acetone.

24. Toxicology of food and pharmaceutical additives, toxicology of detergents, warfare toxic substances, and radiotoxicology: definition and classification of main types of food and pharmaceutical additives, chemical composition of detergents and cleaning agents, definition and classification of warfare toxic substances (neurotoxic agents, blistering agents, chemical warfare agents), definition and classification of radiation sources (ionizing and non-ionizing radiation), mechanisms of toxic action, symptomatology, treatment.

25. Toxicology of pesticides: insecticides, fungicides, rodenticides, and herbicides – etiology, symptomatology, mechanisms, and treatment.

Bibliography

1. C. George Thomas. Research Methodology and Scientific Writing Second Edition, Springer, 2021, ISBN: 978-3-030-64864-0;
2. Lukáš Bielik. Methodology of science - an introduction. Comenius University in Bratislava, 2019, ISBN: 978-80-223-4782-2;
3. Taylor RB. Medical writing a guide for clinicians, educators, and researchers. 3rd ed. 2018. Cham: Springer International Publishing; 2018;
4. C.A. Mack. How to write a good scientific paper, Published by SPIE (Society of Photo-Optical Instrumentation Engineers), Bellingham, Washington USA, 2018, ISBN: 9781510619135;
5. E. Socaciu, C. Vică, E. Mihailov, T. Gibeau, V. Mureșan, M. Constantinescu. Etică și integritate academică, Editura Universității din București, 2018, București, România, ISBN 978-606-16-1021-1.
6. Gastel B. and Day RA. How to Write and Publish a Scientific Paper (8th ed.). 2016. Greenwood.
7. Cristina A. Dehelean, Corina Danciu, Georgeta M. Simu, Codruța M. Soica, Elemente de metodologia cercetării științifice, Ed. Victor Babeș Timișoara, 2013
8. Joubert PH, Rogers SM. Strategic Scientific and Medical Writing - The Road to Success. 1st ed. 2015. Berlin, Heidelberg: Springer Berlin Heidelberg; 2015.
9. Cristina A. Dehelean, Dorina Gheorgheosu, Daniela Ionescu, Noțiuni de toxicologie generală, Ed. Victor Babeș Timișoara, 2013;
10. Lauren M. Aleksunes; David L. Eaton. Chapter 2. Principles of Toxicology, in: Casarett & Doull's Toxicology: The Basic Science of Poisons, 9nd edition, Curtis D. Klaassen (editor), 2019, ISBN 978-1-259-86374-5;
11. Lois D. Lehman-McKeeman. Chapter 3. Mechanisms of Toxicity, in: Casarett & Doull's Toxicology: The Basic Science of Poisons, 9nd edition, Curtis D. Klaassen (editor), 2019, ISBN 978-1-259-86374-5;
12. Angela L. Slitt. Chapter 5. Absorption, Distribution, and Excretion of Toxicants, in: Casarett & Doull's Toxicology: The Basic Science of Poisons, 9nd edition, Curtis D. Klaassen (editor), 2019, ISBN 978-1-259-86374-5;
13. Andrew Parkinson; Brian W. Ogilvie; David B. Buckley; Faraz Kazmi; Oliver Parkinson. Chapter



6. Biotransformation of Xenobiotics, in: Casarett & Doull's Toxicology: The Basic Science of Poisons, 9nd edition, Curtis D. Klaassen (editor), 2019, ISBN 978-1-259-86374-5;
14. Kannan Krishnan. Chapter 7. Toxicokinetics, in: Casarett & Doull's Toxicology: The Basic Science of Poisons, 9nd edition, Curtis D. Klaassen (editor), 2019, ISBN 978-1-259-86374-5;
15. Gupta, P.K. (2020). Pesticides. In: Problem Solving Questions in Toxicology:. Springer, Cham. https://doi.org/10.1007/978-3-030-50409-0_11;
16. James V. Bruckner; S. Satheesh Anand; D. Alan Warren. Chapter 24. Toxic Effects of Solvents and Vapors, in: Casarett & Doull's Toxicology: The Basic Science of Poisons, 9nd edition, Curtis D. Klaassen (editor), 2019, ISBN 978-1-259-86374-5;
17. Supratim Choudhuri; Ronald F. Chanderbhan; Antonia Mattia. Chapter 27. Food Toxicology: Fundamental and Regulatory Aspects, in: Casarett & Doull's Toxicology: The Basic Science of Poisons, 9nd edition, Curtis D. Klaassen (editor), 2019, ISBN 978-1-259-86374-5;
18. Awuchi, C.G.; Ondari, E.N.; Nwozo, S.; Odongo, G.A.; Eseoghene, I.J.; Twinomuhwezi, H.; Ogbonna, C.U.; Upadhyay, A.K.; Adeleye, A.O.; Okpala, C.O.R. Mycotoxins' Toxicological Mechanisms Involving Humans, Livestock and Their Associated Health Concerns: A Review. *Toxins* 2022, 14, 167. <https://doi.org/10.3390/toxins14030167>;
19. Elena Loredana Ungureanu and Gabriel Mustatea. Toxicity of Heavy Metals. In: *Environmental Impact and Remediation of Heavy Metals*, InTechOpen 2022.
20. Burcham PC *An Introduction to Toxicology* Ed Springer-Verlag London 2014 ISBN 978 1-4471-5552-2 ISBN 978-1- 4471-5553-9 (eBook);
21. Traboulsi H, Cherian M, Abou Rjeili M, Preteroti M, Bourbeau J, Smith BM, Eidelman DH, Baglole CJ. Inhalation Toxicology of Vaping Products and Implications for Pulmonary Health. *Int J Mol Sci.* 2020 May 15;21(10):3495. doi: 10.3390/ijms21103495;
22. Ahmad Alshannaq, and Jae-Hyuk Yu. Occurrence, Toxicity, and Analysis of Major Mycotoxins in Food. *Int. J. Environ. Res. Public Health* 2017, 14, 632; doi:10.3390/ijerph14060632.