

Course Outline for Medicinal Chemistry

Part 1: Introduction to Medicinal Chemistry [10 L]

- i) Overview of drugs, their targets, efficacy vs toxicity
- ii) Basics of drug development pipeline, industrial and academic research
- iii) Pharmacokinetics and pharmacodynamics
- iv) Lipophilicity vs membrane permeability
- v) Prodrug concept: prodrug design, case studies
- vi) Drug delivery: Active and passive targeting
- vii) Important tools and cell biology assays

Part 2: Organic drugs [10 L]

- i) Small molecule drugs vs macromolecule drugs: Pharmacokinetic aspects
- ii) Fluorine in drug design
- iii) Case studies: Oxamniquine, Quinolones, etc.

Part 3: Inorganic drugs including metal complexes [10 L]

- i) Historical overview, Salvarsan, Platinum-based anticancer drugs
- ii) Mechanism of action, resistance to platinum drugs
- iii) Recent developments and targeted delivery
- iv) Ruthenium and other non-platinum anticancer drugs
- v) Metal complexes in photodynamic therapy
- vi) Current topics: Catalytic drugs, theragnostic drugs

Reference books and reviews.

- i) An introduction to medicinal Chemistry, Graham L. Patrick
- ii) An introduction to Drug Synthesis, Graham L. Patrick
- iii) Principles of Bioinorganic Chemistry, S.J. Lippard and J. M. Berg
- iv) Bioinorganic Medicinal Chemistry, Editor(s): Prof. Dr. Enzo Alessio
- v) Medicinal Organometallic Chemistry, Editors: Gérard Jaouen, Nils Metzler-Nolte
- vi) Metallomics insights into the programmed cell death induced by metal-based anticancer compounds, Metallomics. 2014 , 6(5), 978-95.
- vii) The Next Generation of Platinum Drugs: Targeted Pt(II) Agents, Nanoparticle Delivery, and Pt(IV) Prodrugs, Chem. Rev. 2016, 116, 3436–3486

Instructor: Malay Patra

Days: Monday (10:00-11:30 am), Friday (10:00-11:30 am)

First lecture: January 21, 2022

Mode of Evaluation: Assignments & Surprise Quiz (30%), Mid-term exam (30%),

Final Exam. (40%)