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Chemistry 260: Medicinal Chemistry in Jamaica: an International Perspective

Course Subject Details

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What is "Medicinal Chemistry"?

- Medicinal chemistry is the application of chemistry in the context of **human medicine**.
- Medicinal chemistry deals with how biologically active compounds are **isolated, designed, and synthesized**.
- Medicinal chemistry focuses on how the **structure of a drug relates to its activity**.

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Why Jamaica?

- Site of an international conference on medicinal and natural products chemistry first week of January.
- University of the West Indies Mona campus has a strong graduate program in natural products chemistry.
- Yeah, like WHY NOT Jamaica, mon?

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Credit Considerations

- Chemistry 260 counts toward the Chemistry major. It will have plenty of content and include significant in- and outside-class work.
- Also counts toward Biomedical Studies.

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Other Considerations

- Prerequisites: Chemistry 248 and 254
- Maximum number of students: 16
- Frequency: every OTHER year
- Estimated cost: $3200

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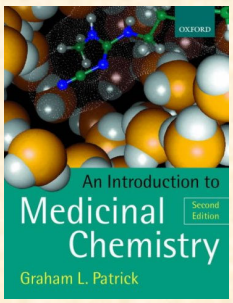
Required Textbook

- Undergraduate-focused
- Readable
- Context of specific drugs with specific interactions
- Requires only a Chemistry 248 level of prior knowledge



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Grading (subject to revision)

- participation (15%)
- quizzes and exams (35%)
- nonlab written work (40%)
- lab-based written work (10%)

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General Format

- mornings: Two hour-long sessions each day will be in the form of seminars, with individual students or groups of students responsible for preparing handouts, initiating the discussions and providing additional input based on past coursework.
- afternoons: guest presentations, field trips, free time, maybe some lab work
- evenings: reading/homework/free time

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In this course you will…

- …learn how basic research into the biochemical mechanism of disease leads to the targeted development of drugs,
- …gain an appreciation for the drug development process, and
- …learn about the molecule structures of specific drugs, and how these relate to their function.

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Three Main Concept Areas

PART I: Drug Action

PART II: Drug Discovery, Design, and Development

PART III: History of Drug Development

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Part I: Drug Action

What is a “drug”?

What sort of molecular systems do drugs target?

How do drugs affect specific enzymes?

How do cell receptors work, and how do drugs affect cell-cell communication?

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PART II: Drug Discovery, Design, and Development

How are drugs discovered?

How can you *design* a drug to play a specific role?

How do medicinal chemists start with a “pretty good” drug and develop a “really fantastic” drug?

How is *selectivity* achieved?

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PART III: History of Drug Development

What is a "sulfa drug"?

How does penicillin work?

How can drugs be used to treat cancer? HIV? neurological disorders?

Why is drug development so expensive?

What is the future of drug development?

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Increase Your Vocabulary

receptor	agonist	antagonist
sensitization	desensitization	tolerance
dependence	G-protein	intercalating agent
lead compound	prodrug	pharmacokinetics
clinical trial	pharmacophore	antibacterial and antiviral
cholinergic	anticholinergic	anticholinesterase
adrenergic	beta-blocker	analgesic
pharmaceutical	drug "cocktail"	chemotherapeutic index

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Context of the Discussion

Throughout the course, specific drugs will be discussed in terms of their molecular structure and how that structure relates to their specific function within known biochemical pathways.

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Specific Drugs We Will Study:

antibacterial and antiviral agents: sulfa drugs, penicillins, cephalosporins, clavulanic acid, thienamycin, olivanic acids, nocardicins, vancomycin, valinomycin, gramicidin A, rifamycins, streptomycin, tetracyclines, chloramphenicol, erythromycin, ciprofloxacin, AZT, acyclovir

cholinergics, anticholinergics, and anticholinesterases: nicotine, muscarine, carbachol, atropine, hyoscine, tubocurarine and related compounds, dyflos, sarin

adrenergics: adrenaline, noradrenaline, L-dopa, amphetamine, ephedrine, propranolol and related beta-blockers, reserpine

analgesics: aspirin, opium, codeine, quinine, strychnine, cocaine, lysergic acid diethylamide, morphine, oxymorphine, enkaphalins, endorphins, GABA

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How do I find out more about Chemistry 260?

- Read about it on the St. Olaf web site.
- Go to http://www.stolaf.edu/people/hansonr/**jamaica**
- Stop by and talk with me about it (SC346).
- Get the application.