WELCOME TO

PHARMACOLOGY

@ UALBERTA!
Pharmacology...

The scientific study of the effects of drugs and chemicals on living organisms

• Involves studies on:
  ✓ how organisms handle drugs
  ✓ identification and validation of new targets for drug action
  ✓ the design and development of new drugs to prevent, treat and cure disease
Pharmacology is ‘APPLIED’ biochemistry, cell biology, physiology, genetics, and biophysics
PHARMACOLOGY

**Pharmacokinetics**
- Adsorption/distribution/metabolism/elimination
- How the System affects the Drug

**Pharmacodynamics**
- Mechanism
- How the Drug affects the System

**Drug** ➔ **ADME** ➔ **biological system**

**pharmacodynamics** ➔ **Activity** ➔ **drugs** ➔ **biological system**
<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
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<tbody>
<tr>
<td>BIOL 107</td>
<td>PMCOL 200</td>
<td>PMCOL 303</td>
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<tr>
<td>CHEM 101</td>
<td>BIOCH 200</td>
<td>PMCOL 305</td>
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<tr>
<td>CHEM 102</td>
<td>PHYSL 210A OR PHYSL 212</td>
<td>PMCOL 337</td>
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<tr>
<td>CHEM 164 OR 261 OR 264/266</td>
<td>PHYSL 210B OR PHYSL 214</td>
<td>PMCOL 343</td>
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<td>STAT 141 OR 151</td>
<td>CHEM 263</td>
<td>PMCOL 344</td>
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<th>YEAR 4 SPECIALIZATION</th>
<th>YEAR 4 HONOURS</th>
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<td>PMCOL</td>
<td>PMCOL 498 A</td>
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FOURTH YEAR SPECIALIZATION STUDENTS MUST PICK *12 FROM THE FOLLOWING PMCOL COURSES: 401, 402, 403, 412, 415, 416, 425, 450, 475

FOURTH YEAR HONOURS STUDENTS MUST PICK *12 FROM THE FOLLOWING PMCOL COURSES: 412, 415, 416, 425, 450, 475

SCIENCE OPTIONS MUST BE FROM: BIOCH, BIOL, CELL, CHEM, GENET, MATH, MICRO, PHYS, PHYSIOL, PMCOL, STAT OR ZOOL (EXCEPT ZOOL 241 or 242) - COURSES TAKEN FROM ANY AREA OTHER THAN LISTED ABOVE WILL NOT BE COUNTED AS SCIENCE OPTIONS

ARTS OPTIONS MAY BE ANY COURSE OFFERED BY THE FACULTY OF ARTS OR CHRTC

APPROVED OPTIONS MAY BE 1) ANY COURSES OFFERED BY SCIENCE 2) ANY COURSES OFFERED BY ARTS 3) COURSES FROM OTHER FACULTIES THAT ARE APPROVED BY THE PROGRAM ADVISOR

THERE IS A JUNIOR COURSE LIMIT OF *42
Pharmacology Undergraduate Courses

**PMCOL 200**
DRUGS – An introduction to pharmacology

**PMCOL 301/302**
Introduction to Research in Pharmacology

**PMCOL 303**
Introduction to Toxicology

**PMCOL 305**
An Introduction to the Pharmacology of Drug Abuse

**PMCOL 337**
Experimental Procedures in Pharmacology

**PMCOL 343/344**
Scientific Basis of Pharmacology

**PMCOL 371**
Cellular Neuroscience

**PMCOL 401/402**
Pharmacology Research

**PMCOL 412**
Drugs and the Nervous System

**PMCOL 415**
Cardiovascular Pharmacology

**PMCOL 416**
Current Topics in Endocrine Pharmacology

**PMCOL 425**
Problem Solving in Pharmacology and Therapeutics

**PMCOL 450**
Introduction to the Pharmacology of Diabetes

**PMCOL 475**
Signal Transduction Systems as Pharmacological Targets

**PMCOL 498**
Pharmacology Research Project
Undergraduate Research Opportunities

- Do “real” pharmacology research in a professor’s laboratory.
  - PMCOL 301/302 (3rd year 1 term research experience)
  - PMCOL 401/402 (4th year 1 term research experience)
  - PMCOL 498 (Honours only – 2 term research project)
- Ask about summer research opportunities!
Pharmacology Research

22 research laboratories in MSB, Katz, HMRC, LKSC

**Areas of Research**
- Cardiovascular Pharmacology
- Metabolic Disorders (e.g. Diabetes)
- Molecular Pharmacology
- Neuropharmacology
Pharmacology Research

- Research investigations occur at the:
  - molecular
  - sub-cellular
  - cellular
  - tissue/organ
  - whole organism level

- Pharmacology is a critical component in the development of modern ‘precision medicine’
Pharmacology Graduate Program

- The objective of the MSc program is to lead the students in the development of critical scientific thinking and in the acquisition of solid knowledge of pharmacology principles and specific area of research.

  - At the end of the program MSc graduates must be able to formulate hypotheses and to propose experimental strategies to test them.

- The objective of the PhD program is to form the next generation of scientists in pharmacological and biomedical sciences.

  - PhD students will be involved in cutting-edge scientific research and will develop critical thinking as well as communication and problem-solving skills.
  - Upon completion of the PhD program our students should be able to perform scientific research independently.
Career opportunities/responsibilities rely to some extent on educational degree level attained (BSc, MSc, PhD), but include...

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<tr>
<th>Pharmaceutical Researcher</th>
<th>Pharmaceutical Sales</th>
<th>Clinical Pharmacologist</th>
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<tbody>
<tr>
<td>Toxicology Testing</td>
<td>Recruitment Consultant</td>
<td>Clinical Trials Scientist</td>
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<tr>
<td>Biomedical Researcher</td>
<td>Quality Assurance Officer</td>
<td>Scientific Journalist</td>
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<tr>
<td>Regulatory Affairs Officer</td>
<td>Professional Society Executive Director</td>
<td>Scientific Equipment/Supply Sales and Technical Support</td>
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<tr>
<td>Patent Work</td>
<td>Medical Writer</td>
<td>Scientific Journal Editor</td>
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<tr>
<td>Science Policy Analysts and Lobbyists</td>
<td>Professional Research Grant Writers/Reviewers</td>
<td>Pharmaceutical/Biotechnology Business Consultants</td>
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