

# SCS2900- Pharmacology: Principles and Clinical Applications

## Course Directors

Drs. Michelle Arnot and Rebecca Laposa  
4207 Medical Sciences Building  
Department of Pharmacology and Toxicology  
Course email: [online.pharmacology@utoronto.ca](mailto:online.pharmacology@utoronto.ca)  
Departmental Office: 416-978-2728  
Website: <http://onlinepharmacology.med.utoronto.ca/>

## Teaching Assistants:

Donald Wang

## Textbooks

Required:

1. **Basic and Clinical Pharmacology** (12th Edition) by Katzung, Masters, Trevor.  
ISBN 978-0-07-176401-8
2. For students without a background in Physiology:  
**Principles of Human Physiology** (5th Edition) by Cindy Stanfield.  
ISBN 13: 978-0-321-81934-5

## Evaluation

Discussion Board Participation & Assignment	ongoing	20%
Online quizzes (best 12 of 16)	ongoing	30%
Final (cumulative)	TBA	50%
Total		100%

**Students who successfully complete this course will have gained:**

- A broader understanding of principles that govern the fate of drugs in the body (pharmacokinetics) and exert their effects (pharmacodynamics)
- The ability to apply and integrate this information to understand clinical use and clinical limitations of drugs

**More specifically students will be able to:**

- Understand what is considered a drug and how drugs may be found in nature or created by man
- Understand how the physiochemical structure of a compound can alter how it is absorbed, distributed and cleared by the body
- Appreciate how the route of administration is designed to take into account both the drug's physiochemical properties and the body's physiology to ensure that therapeutic concentrations reach targeted sites of action
- Describe how physiological processes (protein binding, ionization) can change a drug's kinetic profile in the body (i.e. absorption and distribution)
- Recognize how properties of a compound can alter its bioavailability (plasma concentration) and how this relates to a drug's measure of clinical effectiveness
- Understand and explain how drugs are biotransformed and eliminated by the body, focusing on both renal and hepatic clearance.
- Understand and explain the different enzymatic processes that are involved in drug metabolism, especially in the liver, and how drug metabolism may alter route of administration, dosing and clinical effectiveness
- Apply pharmacokinetic principles (absorption, distribution, clearance) to better understand drug dosing
- Describe different classes of drugs in relationship to their mechanism of action
- Understand how drug effectiveness and potency are measured, clinically and in the laboratory setting
- Recognize the diversity of drug targets found within the body
- Through example drugs, recognize and understand how specific drug-target interactions can alter physiology
- Through examples appreciate the use of drugs in the clinical setting
- Identify and understand how a drug can elicit an unwanted or adverse effect
- Appreciate and understand how drug interactions, genetics and stage of life (i.e. pregnancy, aging) contribute to modulating clinical outcomes
- Extend recognition of drug use in society, outside of the therapeutic context
- Communicate a better understanding of how drugs work in the body

Week	Dates	Assigned Lecture Number	Assigned Quiz	Instructor	Supportive Readings Katzung (12th Ed) Chapter: page no.
1	Sept 29 - Oct 5	L1A: Intro to SCS2900		Drs. Arnot + Laposa	
		L1B: Intro to Pharmacology		Dr. Ross	1
		L2: What is a Drug		Dr. Ross	1
		<a href="#">Interview I: Importance of New Drug Development, Dr Ross</a>		Dr. Arnot	
		L3: Drugs as molecules		Dr. Ross	1
2	Oct 6- Oct 12	L4: Overview: Pharmacokinetics and Physiology Concepts	Quiz 1: L1-3, I1 Oct 6 6pm- Oct 7 8pm	Dr. Burnham	1 5
		L5: Route of Administration		Dr. Burnham	
		<a href="#">V1: Formulations</a>		Dr. Shear	
		L6: Mechanism of Drug Absorption		Dr. Burnham	1: 8-13
3	Oct 13-Oct 19	L7: Drug Distribution I	Quiz 2: L4-6, V1 Oct 13 6pm- Oct 14 8pm	Dr. Burnham	3
		L8: Drug Distribution II		Dr. Burnham	3
		L9: Intro to Clearance & Biotransformation		Dr. Burnham	3
		<a href="#">V2: Anaesthetics</a>		Dr. Shear	
4	Oct 20- Oct 26	L10: Biotransformation I	Quiz 3: L7-9, V2 Oct 20 6pm- Oct 21 8pm	Dr. Burnham	4
		L11: Biotransformation II		Dr. Burnham	4
		<a href="#">Visit I: Tyndale Lab</a>			
		L12: Total Body Clearance		Dr. Burnham	3
5	Oct 27- Nov 2	L13: Organ Clearance	Quiz 4: L10-12, Visit 1 Oct 27 6pm- Oct 28 8pm	Dr. Burnham	3
		L14: Clinical PK		Dr. Burnham	3
		<a href="#">V3: What is Clinical Pharmacology ?</a>		Dr. Shear	
		L15: Intro to Pharmacodynamics		Dr. Ross	2
6	Nov 3	L16: Drug- Receptor Interactions	Quiz 5: L13-	Dr. Ross	2

	- Nov 9		15, V3 Nov 3 6pm- Nov 4 8pm		
		<a href="#">Visit II: Ramsey/Salahpour Lab</a>			
		L17: Drug Classification I- Agonist		Dr. Ross	2
		L18: Drug Classification II- Antagonists and Partial Agonists		Dr. Ross	2
		L19: Receptor Diversity & Enzymes as Targets		Dr. Ross	
7	Nov 10- Nov 16	L20: Enzyme Targets II: ASA & NSAIDS	Quiz 6: L16- 19, Visit II Nov 10 6pm- Nov 11 8pm	Dr. Ross	36: 635-640
		L21: Enzyme Targets III: ACE- Inhibitors & ACHase Inhibitors		Dr. Ross	7: 105-111 11: 184-185
		L22: Enzyme Targets IV: Antibiotics		Dr. Ross	43: 790-793 (top) 46: 831-832
		<a href="#">V4: HIV- AIDS Drug Therapy</a>		Dr. Shear	
8	Nov 17- Nov 23	L23: GPCR I: Introduction	Quiz 7: L20- 22, V4 Nov 17 6pm - Nov 18 8pm	Dr. George	7: review 105-111 8: 115-120 9: 129-141 (top) 10: 157-161 (top)
		L24: GPCR II: Drugs that Modulate		Dr. George	
		L25: GPCR III: Quirks and Quarks of Receptor Signaling		Dr. George	
		<a href="#">V5: Clinical Agents that target GPCRs</a>		Dr. George	
9	Nov 24- Nov 30	L26: Drugs that target: GC & PDE	Quiz 8: L23- 25, V5 Nov 24 6pm- Nov 25 8pm	Dr. Ross	12: 193-200 19: 331-334 20: 339-346
		L27: Tyrosine Kinase Receptors I		Dr. Ross	47:743-747 (top)
		L28: Tyrosine Kinase Receptors II: Pharmacology		Dr. Ross	47:753-763
10	Dec 1- Dec 7	L29: Drug Transporters as Targets	QUIZ 9: L26- 28 Dec 1 6pm- Dec 2 8pm	Dr. Grant	30: 522- 525; 530- 532 15: 251-255; 258- 261
		<a href="#">Interview II: Importance of Drug Transporters, Dr Piquette-Miller</a>		Dr. Ross	

		L30: Membrane Physiology and Ion Channels		Dr. Grant	21: 359-363; 367-369
11	Dec 8- Dec 14	L31: VGIC I: Structure and Function	QUIZ 10 L29-30, I2 Dec 8 6pm- Dec 9 8pm	Dr. Grant	22:373-382 12:201-205 14:228-231; 235-237, 240 24:404-409 26:453-455
		L32: VGIC II: Modulation		Dr. Grant	
12	Dec 15- Dec 21	L33: LGIC: Structure and Function: Nicotonic Ach receptor		Dr. Grant	7: 99-103 22: 378-382
		L34: LGIC II: GABA-A receptor		Dr. Grant	
		V6: Muscle Relaxation		Dr. Shear	
13	Dec 22- Dec 28	<b>OFF</b>			
14	Dec 29- Jan 4	<b>OFF</b>			
15	Jan 5- Jan 11	L35: Nuclear Receptors I	QUIZ 11: L31-34, V6 Jan 5 6pm- Jan 6 8pm	Dr. Grant	
		L36: Nuclear Receptors II: Steroid Hormones		Dr. Grant	39: 698-709 40: 716-720; 722-724
		L37: Nuclear Receptors III: Non steroids		Dr. Grant	38: 684-687 42: 772-773
		V7: Environmental Factors and Genes		Dr. Shear	
16	Jan 12- Jan 18	L38: Genes as Targets	QUIZ 12: L35-37, V7 Jan 12 6pm- Jan13 8pm	Dr. Grant	
		L39: Immunopharmacology		Dr. Grant	36: 647-649 55: 979-984; 991-996
		L40: Drug Variability		Dr. Grant	
17	Jan 19- Jan 25	L41: Pharmacogenetics	QUIZ 13: L38-40 Jan 19 6pm-	Dr. Grant	

			Jan 20 8pm		
		Interview III: Application of PGx, Dr Tyndale		Dr. Ross	
		L42: Drug-Drug Interactions		Dr. Grant	66 (all)
		L43: Adverse Drug Reactions		Dr. Grant	55: 981-983
		V8: Geriatric Pharmacology		Dr. Shear	
18	Jan 26 - Feb 1	L44: Intro to Toxicology	QUIZ 14:L41-43, I3, V8 Jan 27-Jan28 6 pm	Dr. Grant	56: 1001-1002
		L45: Teratogenesis		Dr. Grant	59:1041-1043
		L46: Perinatal Pharmacology		Dr. Grant	59: 1039-1040
		Visit III: Motherisk at Sick Childrens Hospital, Dr Koren		Dr. Arnot	
19	Feb 2 - Feb 8	L47: Drug Misuse	QUIZ 15: L44-46, Visit 3 Feb 2 6pm- Feb 3 8pm	Dr. Ross	32 (all)
		Interview IV: History of Drug Misuse, Dr Kalant		Dr. Ross	
		L48: Natural and Herbal Compounds in Performance and Therapeutics		Dr. Ross	64: 1125- 1131 (top)
		L49: Drugs in Sports		Dr. Ross	
20	Feb 9- Feb 15	L50: Review: Pharmacokinetics L51: Review: Pharmacodynamics L52: Review: Special Topics	QUIZ 16: L47-49, I3 Feb 9 6pm- Feb 10 8pm	Dr. Ross	
		V9: New Targets in Drug Discovery		Dr. Wong	
21	Feb 16 - Feb 21	EXAM FEB 21: Organized by School of Continuing Studies	Review Quiz for fun Feb 16 6pm- Feb 17 8pm PRACTICE QUESTIONS		