

# BIOCHEMISTRY WITH A MEDICAL PERSPECTIVE

Online Biochemistry Course, Faculty of Medicine, University of Toronto, Canada

## Course Schedule

Summer Semester 16 April to 28 July 2018

Week	Section / Online Quiz	Dates (Week Start)	Lectures	Lecturer	Medical Vignettes By Dr. Murray	Text Chapter
			<b>Course Introductory Lecture (Mandatory), E - presence Controls Video</b>	Dr. Reithmeier	<b>*One medical vignette will be selected per weekly lecture series*</b>	
1	<b>Proteins and Enzymes</b>	16 Apr 2018	Lecture 1 - <b>Biochemistry and the Unity of Life</b> Lecture 2 - <b>Water, Weak bonds, pH</b> Lecture 3 - <b>Amino Acids</b> Lecture 4 - <b>Protein 3D Structure: Part 1</b>	Dr. Reithmeier Dr. Reithmeier Dr. Reithmeier Dr. Reithmeier	<b>Water and pH Balance</b> <b>Pathological Conditions Result if Protein Intake Is Inadequate</b> <b>Protein Misfolding and Aggregation Are Associated with Some Neurological Diseases</b>	1 2 3 4,5
2		23 Apr 2018	Lecture 5 - <b>Protein 3D Structure: Part 2</b> Lecture 6 - <b>Enzymes: Basic Concepts</b> Lecture 7 - <b>Enzyme Kinetics</b> Lecture 8 - <b>Enzyme Regulation, Allostery</b>	Dr. Reithmeier Dr. Baker Dr. Baker Dr. Baker	<b>Vitamin C Deficiency Causes Scurvy</b> <b>Medical Uses of Enzymes: Diagnostic Enzymology</b> <b>Variations in Km Can Have Physiological Consequences</b>	4, 5 6 7 7
<b>Quiz 1</b>		<b>30 Apr 2018</b>				
3		30 Apr 2018	Lecture 9 - <b>Enzyme Inhibition</b> Lecture 10 - <b>Enzyme Mechanisms</b> Lecture 11 - <b>Hemoglobin</b> Lecture 12 - <b>Carbohydrates One</b>	Dr. Baker Dr. Baker Dr. Baker Dr. Baker	<b>Penicillin Irreversibly Inactivates a Key Enzyme in Bacterial Cell Wall Synthesis</b> <b>Sickle Cell Anemia</b> <b>CO- The Silent Killer</b>	8 8 9 10
4		07 May 2018	Lecture 13 - <b>Carbohydrates Two</b> Lecture 14 - <b>Lipids: Fatty Acids, Membrane Lipids</b> Lecture 15 - <b>Membrane Structure and Membrane Proteins</b> Lecture 16 - <b>Membrane Transport Proteins</b>	Dr. Baker Dr. Reithmeier Dr. Reithmeier Dr. Reithmeier	<b>Lactose Intolerance</b> <b>Liposomes</b>	10 11 12 12
<b>Quiz 2</b>		<b>14 May 2018</b>				
5	<b>Metabolism</b>	14 May 2018	Lecture 17 - <b>Membrane Signaling Proteins</b> Lecture 18 - <b>Metabolism : Basic Concepts</b> Lecture 19 - <b>Glycolysis</b>	Dr. Reithmeier Dr. Baker Dr. Baker	<b>Digitalis</b> <b>Cholera and Whooping Cough Are Due to Altered G-protein Activity</b>	13 15 16

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			Lecture 20 – Accessing Glycogen Stores	Dr. Baker		24
6		21 May 2018	Lecture 21 – Pyruvate Dehydrogenase Complex and the Citric Acid Cycle	Dr. Baker	<b>Exercise Depends on Various Means of Generating ATP</b> <b>Beriberi-A Disease Due to Deficiency Of Thiamine (Vitamin B-1)</b>	18,19
		Lecture 22 - Oxidative Phosphorylation/The Electron Transport Chain	Dr. Baker	20		
		Lecture 23 - Oxidative Phosphorylation/Proton Motive Force	Dr. Baker	21		
		Lecture 24 – Rebuilding Glycogen	Dr. Baker	25		
<b>Quiz 3 28 May 2018</b>						
7		28 May 2018	Lecture 25 - Fat Mobilization	Dr. Baker	<b>A Biochemical Understanding Of Glycogen Storage Diseases (GSDs) Is Possible</b>	27
		Lecture 26 - Fatty Acid Degradation, ATP Production and Gluconeogenesis	Dr. Baker	17,27		
		Lecture 27 - Diabetes and Ketone Bodies	Dr. Baker	27		
		Lecture 28 - Discovery of Insulin	Dr. Baker	13,27		
8		04 Jun 2018	Lecture 29 - Fatty Acid and Triacylglycerol Synthesis	Dr. Baker	<b>Hyperglycemia</b> <b>Familial Hypercholesterolemia (FH)</b>	28,29
		Lecture 30 - Cholesterol Synthesis	Dr. Baker	29		
		Lecture 31 - Lipoproteins	Dr. Baker	29		
		Lecture 32 - Biochemistry of Platelets and Eicosanoids	Dr. Baker	28		
<b>Quiz 4 11 Jun 2018</b>						
9		11 Jun 2018	Lecture 33 - Phospholipid Synthesis	Dr. Baker	<b>Tay-Sachs Disease</b> <b>Inherited Defects Of The Urea Cycle Cause Hyperammonemia</b>	29
		Lecture 34 - Phosphoinositides and Signaling	Dr. Baker	13		
		Lecture 35 - Amino Acid Synthesis	Dr. Reithmeier	31		
		Lecture 36 - Nucleotide Metabolism	Dr. Reithmeier	32		
10	<b>Nucleic Acids</b>	18 Jun 2018	Lecture 37 - Amino Acid Degradation and The Urea Cycle	Dr. Reithmeier	<b>Loss of Allosteric Control Can Result in Pathological Conditions</b>	30
		Lecture 38 - Nucleic Acid Structure One	Dr. Kelley	33		
		Lecture 39 - Nucleic Acid Structure Two	Dr. Kelley	33		
		Lecture 40 - DNA Replication	Dr. Kelley	34		
<b>Quiz 5 25 Jun 2018</b>						

Week	Section / Online Quiz	Dates (Week Start)	Lectures	Lecturer	Medical Vignettes By Dr. Murray	Text Chapter
11		25 Jun 2018	Lecture 41 - DNA Repair Lecture 42 - Transcription I Lecture 43 - Transcription II Lecture 44 - Prokaryotic Regulation	Dr. Kelley Dr. Kelley Dr. Kelley Dr. Kelley	Some Genetic Diseases Are Caused by The Expansion of Repeats of Three Nucleotides Cancers Are Caused by Defective Repair of DNA	35 36 36 37
12		02 July 2018	Lecture 45 - Eukaryotic Regulation Lecture 46 - RNA Processing Lecture 47 - Genetic Code Lecture 48 - tRNAs and Amino Acids	Dr. Kelley Dr. Kelley Dr. Kelley Dr. Kelley	Mutations that Affect pre-mRNA and Alternative Splicing Cause Disease Genetic Defects Causing Cystic Fibrosis	37 38 39 39
<b>Quiz 6</b>		<b>09 Jul 2018</b>				
13		09 Jul 2018	Lecture 49 - Translation I Lecture 50 - Translation II Lecture 51 - Protein Secretion Lecture 52 - Translation Regulation	Dr. Kelley Dr. Kelley Dr. Kelley Dr. Kelley	Some Antibiotics and Some Toxins Act by Inhibiting Protein Synthesis	40 40 40 40
14		16 Jul 2018	Lecture 53 - Recombinant Technology I Lecture 54 - Recombinant Technology II	Dr. Kelley Dr. Kelley	Gene Therapy, Transgenic Animals	5, 41 5, 41
<b>MOCK QUIZ</b>		<b>Available 16 Jul 2018</b>				

## Final Examination 2018

### Date

28 July 2018

### Duration of Exam

3 hours

### Material Tested

Final exam includes all topics covered throughout the course