

MOLECULAR AND CELLULAR BIOCHEMISTRY

Course Outline - Prelims 2023/2024

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First Year				
	Lecturer	MT	HT	TT
<u>Cellular Biochemistry</u>				
Cells as the basic unit of life	Prof. Lars Jansen	3		
	Prof. Francis Barr	4		
Multicellularity and Cell Signalling	Prof. Penny Handford	2		
	Prof. Petros Ligoxygakis	1		
	Prof. Catherine Pears	4		
	Prof Elena Seiradake	1		
Cell Metabolism	Prof. Penny Handford		9	
	Dr Mark Roberts		4	
Chemistry of Metabolism	Dr JL. Kiappes		5	
Cellular Biochemistry peer marking exercises				2
Cellular Biochemistry Classes	Organiser: Dr Naomi Petela		1	1
<u>Molecular Biochemistry</u>				
DNA is the code of life	Prof. Lars Jansen	8		
	Prof. Lidia Vasilieva	2		
The dynamic genome	Prof. Nick Lakin		4	
From genotype to phenotype to fitness	Prof. Alison Woollard		4	
	Prof Peter Sarkies		1	
Proteins	Prof. Jason Schnell	4	2	
	Dr Paul Elliott		4	
Biological membranes	Prof. Syma Khalid		5	
Molecular Biochemistry peer marking exercises				2
Molecular Biochemistry Classes	Organiser: Dr Naomi Petela	1	1	1
<u>Physical Biochemistry</u>				
Atomic and molecular structure I - classical and quantum mechanics, molecular bonding, and electronic transitions and spectroscopy	Dr Mark Wormald	9		
Atomic and molecular structure II –Non covalent interactions and folding of macromolecules	Dr David Staunton		4	
Thermodynamics I – Basic principles and solution thermodynamics	Dr Mark Wormald	4	3	
Thermodynamics II – equilibria and electrochemistry	Dr David Staunton		4	
Kinetics I - Chemical kinetics	Dr Sarah Shammas	4		
Kinetics II - Enzyme kinetics	Prof. Stephan Uphoff		4	
Physical Biochemistry exam preparation surgery	Dr Mark Wormald			2
Physical Biochemistry classes	Organiser: Dr John Walsby-Tickle	2	2	1
Physical Biochemistry workshops	Organiser: Dr John Walsby-Tickle	1	1	
<u>Mechanistic Biochemistry</u>				
Introduction to Organic Biochemistry	Matt Rattley	8		
Mechanistic Organic Biochemistry	Dr Sarah Jenkinson	3	6	
Chemistry of enzymatic reactions	Prof Simon Newstead & Dr David Staunton		6	
Biological chemistry of elements	Dr Mark Wormald	3	2	
Mechanistic Biochemistry exam preparation surgery				3
Mechanistic Biochemistry Workshop	Dr Sarah Jenkinson and Matt Rattley	1	2	2
<u>Quantitative Biochemistry</u>				
Principles of Mathematics	Dr Max Marcus	12		
Principles of Statistics	Dr Jack Miller		4	
Quantitative Biochemistry exam preparation surgery				2
Maths classes	Coordinator: Dylan Adlard	7	1	
Statistics classes	Coordinator: Dr Jack Miller & TBC		4	
<u>Practicals</u>				
Biochemistry	Dr Mark Wormald & Dr Naomi Petela	8P	8P	3P

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Course Outline - Final Honours School Part I 2023-2025

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Second Year (2023-24)				
	Block Leader	MT	HT	TT
<u>Toolboxes of Biochemistry</u>				
TB1: How do I isolate and characterize a gene	Prof Alison Woollard and Dr Mark Roberts	Wk 1/2		
TB2: How do I make and use a protein	Dr Mark Roberts	Wk 2/3		
TB3: How do I get a protein structure?	Prof Simon Newstead		Wk 1/2	
TB4: How do I visualize molecular structures and events inside cells?	Dr Lothar Schermelleh		Wk 1/2	
TB5: How do I understand protein dynamics and integrate structural information?	Prof Syma Khalid (Prof Phil Biggin on sabbatical)			Wk 3
TB6: How do I understand Protein interactions?	Prof Jason Schnell			Wk 4
<u>Cellular Chemistry</u>				
CC1: How do cells do chemistry?	Dr Mark Wormald	Wk 4		
CC2: How do cells make PMF?	Prof Benoit Kornmann	Wk 7		
CC3: How do cells use energy stored in membrane gradients?	Dr Mark Roberts		Wk 7	
CC4: Life without light and oxygen	Dr Mark Roberts			Wk 5
CC5: How are defence and attack linked in bacteria?	Prof Colin Kleanthous			Wk 7
<u>Molecular Processes</u>				
MP1: How do chemicals move across membranes	Prof Syma Khalid (Prof Phil Biggin on sabbatical)	Wk 5		
MP2: How are proteins processed?	Dr Paul Elliott		Wk 3	
MP3: How are macromolecules moved around cells?	Prof Ben Berks		Wk 4	
MP4: How does cell signaling work?	Prof Catherine Pears		Wk 6	
MP5: How do cells communicate in tissues and populations	Prof Penny Handford			Wk 1
<u>Information Transfer</u>				
IT1: How is DNA packaged in the cell?	Prof Rob Klose	Wk 6		
IT2: How do cells divide?	Prof Francis Barr			Wk 6
IT3: How are genes expressed?	Prof Jane Mellor		Wk 8	
IT5: How does RNA function?	Prof Andre Furger			Wk 2
IT8: How is DNA copied and segregated?	Dr Madhu Srinivasan	Wk 8		
<u>The Cell in Time and Space</u>				
TS1: What are the principles of the immune response?	Prof Petros Ligoxygakis		Wk 5	
<u>Synoptic Blocks</u>				
Block 1: Abstract, Ethics, Summary	Dr Mark Roberts			Wk 8

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Third Year (2024-25) – Outline for next year				
	Block Leader	MT	HT	TT
<u>Toolboxes of Biochemistry</u>				
TB7: How do I analyse genomes?	Prof Rob Klose	Wk 4		
TB8: How do I understand genes and genomes?	Prof Alison Woollard	Wk 5		
<u>Cellular Chemistry</u>				
CC6: How do humans regulate metabolism?	Prof Lisa Heather	Wk 1		
CC8: How do we engineer biology?	Prof Weston Struwe		Wk 4	
<u>Molecular Processes</u>				
MP6: Structure based drug design and emerging properties of proteins	Prof Phil Biggin		Wk 2	
MP7: How do neurons convey and sense information?	Prof Elena Seiradake	Wk 2		
<u>Information Transfer</u>				
IT4: how is DNA Maintained	Prof Nick Lakin	Wk 6		
IT6: How is DNA accessed?	Prof Neil Brockdorff		Wk 6	
<u>The Cell in Time and Space</u>				
TS2: What is cancer	Prof Catherine Pears	Wk 3		
TS3: Infectious disease	Prof Nicole Zitzmann	Wk 7		
TS4: What are the principles of development?	Prof Alison Woollard	Wk 8		
TS5: How do organisms evolve	Prof Peter Sarkies		Wk 3	
TS6: How is the nervous system put together?	Prof Elena Seiradake		Wk 5	
TS7: Challenges for the biosciences	Prof Lynne Cox		Wk 7	
<u>Synoptic Blocks</u>				
Block 2: Intro to Part II	Dr Mark Roberts		Wk 1	
Block 3: Student Posters	Dr Mark Roberts		Wk 8	

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Second Year (2022-23) – As delivered last year				
	Block Leader	M	H	T
<u>Toolboxes of Biochemistry</u>				
TB1: How do I isolate and characterize a gene (Molecular toolbox 1)	Prof Alison Woollard and Dr Mark Roberts	Wk 1/2		
TB2: How do I purify a protein (Molecular toolbox 2)	(Prof Matt Higgins) Prof Jason Schnell	Wk 2/3		
TB3: How do I get a protein structure? (Protein toolbox 1)	Prof Simon Newstead		Wk 2	
TB4: How do I see molecules and cells? (Cellular toolbox)	Dr Lothar Schermelleh		Wk 3	
TB5: How do I understand protein dynamics and integrate structural information? (Protein toolbox 2)	Prof Phil Biggin			Wk 3
TB6: How do I understand Protein interactions? (Molecular toolbox 3)	Prof Jason Schnell			Wk 6
<u>Cellular Chemistry</u>				
CC1: How do cells do chemistry?	Dr Mark Wormald	Wk 4		
CC2: How do cells make PMF?	Prof Benoit Kornmann		Wk 1	
CC3: How do cells use energy stored in membrane gradients?	Prof Maïke Bublitz		Wk 7	
CC4: Life without light and oxygen	Dr Mark Roberts		Wk 6	
CC5: How are defence and attack linked in bacteria?	Prof Colin Kleanthous			Wk 7
<u>Molecular Processes</u>				
MP1: How do chemicals move across membranes	Prof Phil Biggin	Wk 5		
MP2: How are proteins processed?	Dr Paul Elliott	Wk 7		
MP3: How are macromolecules moved around cells?	Prof Ben Berks		Wk 5	
MP4: How do cells respond to signals?	Prof Catherine Pears		Wk 4	
MP5: How do cells communicate in tissues and populations	Prof Penny Handford			Wk 2
<u>Information Transfer</u>				
IT1: How is DNA packaged in the cell?	Prof Rob Klose	Wk 6		
IT2: How do cells divide?	Prof Francis Barr	Wk 8		
IT3: How are genes expressed?	Prof Jane Mellor			Wk 5
IT4: How is DNA copied and maintained?	(Prof Nick Lakin) Prof Matthew Whitby		Wk 8	
<u>The Cell in Time and Space</u>				
TS1: What are the principles of the immune response?	Prof Petros Ligoxygakis			Wk 1
TS2: What is Cancer?	Prof Catherine Pears			Wk 4
<u>Synoptic Blocks</u>				
Block 1:	Dr Mark Roberts			Wk 8

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<u>Cellular Chemistry</u>				
CC6: How do humans regulate metabolism?	Prof Lisa Heather	Wk 1		
CC8: How do we engineer biology?	Prof Matt Higgins & Prof Weston Struwe		Wk 4	
<u>Molecular Processes</u>				
MP6: Structure based drug design and emerging properties of proteins	Prof Syma Khalid (Prof Phil Biggin on sabbatical)	Wk 7		
MP7: How do neurons convey and sense information?	Prof Elena Seiradake	Wk 6		
<u>Information Transfer</u>				
IT5: How does RNA function?	Prof Andre Furger	Wk 2		
IT6: How is DNA accessed?	Prof Neil Brockdorff		Wk 1	
IT7: Information Transfer Extension	Prof Lars Jansen		Wk 7	
<u>The Cell in Time and Space</u>				
TS3: Infectious disease	Prof Nicole Zitzmann	Wk 3		
TS4: What are the principles of development?	Prof Alison Woollard	Wk 8		
TS5: How do organisms evolve	Prof Peter Sarkies		Wk 3	
TS6: How is the nervous system put together?	Prof Elena Seiradake		Wk 5	
TS7: Challenges for the biosciences	Prof Lynne Cox		Wk 6	
<u>Synoptic Blocks</u>				
Block 2: Intro to Part II	Dr Mark Roberts		Wk 2	
Block 3: Student Posters	Dr Mark Roberts		Wk 8	