Contents

	An introduction to the Fundamentals of Biomedical Science series	ix	3.5	Specific lineage haemopoiesis Bone marrow sampling and analysis	60
	Contributors	xiii	5.0	bone marrow sampling and analysis	.00
	Table 1: Reference Ranges Abbreviations	xv xvii	2	Peripheral Blood Cells in Health and Disease	73
1	Haematology and				
	Haemopoiesis	1	4	The red blood cell in health and disease	75
1	Introduction to haematology	3	4.1	The development of the red blood cell:	
11	What is haematology?	3		erythropoiesis	76
1.2			4.2	The red blood cell membrane	81
1.2	haematology laboratory	6	4.3	The cytoplasm of the red blood cell	89
1.3	The role of haematology in the provision		4.4	The death of the red cell	102
	of healthcare	10	4.5	Red cell morphology	104
1.4	The role of the professional body	12	4.6	An introduction to diseases of the red cell	109
2	Major haematology parameters				
	and basic techniques	16	5	Anaemia 1: The bone marrow,	
2.1	Obtaining a sample	17		micronutrients, and disease in	
2.2	Anticoagulants	18		other organs	113
2.3	An introduction to major techniques	19	5.1	Introduction to anaemia	114
2.4	The blood film	30	5.2	Anaemia arising from changes in	
2.5	The full blood count	32		the bone marrow	117
2.6	Rheology	38	5.3	Insufficient iron	121
2.7	The report form	40	5.4	Iron overload	126
2.8	Haemostasis	40	5.5	The role of the laboratory in	
2.9	Haematinics	46		iron-related pathology	130
2.10	The reference range	48	5.6	Anaemia arising from lack of vitamins	134
			5.7	Anaemia of chronic disease (ACD)	146
3	Haemopoiesis and the bone				
	marrow	52	6	Anaemia 2: Haemolysis	152
3.1	Overview of the cellular constituents		6.1	Introduction to haemolytic anaemia	152
	of the blood	52	6.2	Immune-mediated and other 'extrinsic'	
3.2	Ontogeny of haemopoiesis	53		causes of haemolytic anaemia	154
3.3	Bone marrow architecture and cellularity	54	6.3	Haemoglobinopathy	163
3.4	Models of differentiation, stem cells,		6.4	Membrane defects	184
	and growth factors	55	6.5	Principal enzyme defects	188

7	Blood-borne parasites	193	10.4	Bone marrow assessment	314
7.1	Introduction	193	10.5	Cytochemistry	321
7.2	Malaria	194	10.6	Immunophenotyping	324
7.3	Babesiosis	216	10.7	Cytogenetic analysis	332
7.4	Trypanosomiasis	218	10.8	Molecular techniques	336
7.5	Leishmaniasis	221			
7.6	Filariasis	222	11	An introduction to classification	
				systems: myeloid neoplasms	341
8	White blood cells in health		11.1	Why is classification important?	342
	and disease	229	11.2	The main classification systems	342
8.1	Introduction	230	11.3	Myelodysplastic syndrome	359
8.2	Granulocytes	230	11.4	Myelodysplastic/myeloproliferative diseases	365
8.3	Monocytes	248	11.5	Myeloproliferative neoplasms	367
8.4	Lymphocytes	250			
8.5	Plasma cells	263	12	The state of the s	
	That it is a second of the sec	203		systems: lymphoid neoplasms	377
2	Heamatala sical		12.1	The World Health Organization	
3	Haematological	265		(WHO) classification of tumours of	
	Malignancies	265		haematopoietic and lymphoid tissues	378
0	An internal continue to		12.2	WHO classification of precursor	201
9	An introduction to	267	12.3	lymphoid neoplasms	381
	haematological malignancies	267	12.5	Mature B-cell neoplasms Mature T-cell and NK-cell neoplasms	386
9.1	A background to haematological malignancies	268	12.4	Hodgkin lymphoma	413
9.2	Signal transduction	273	12.3	nougkiii iyiiipiioina	416
9.3	An introduction to the cell cycle	274	4	Haemostasis in Health and Disease	
9.4	Apoptosis	278	- 4		421
9.5	Cancer stem cells	279			
9.6	Chromosomes and nomenclature	281	13	Normal haemostasis	423
9.7	An introduction to genetic mutation	283	13	Normal macmostasis	423
9.8	Epigenetics	292	13.1	Introduction to haemostasis	423
9.9	Clonality	295	13.2	Primary haemostasis	424
9.10	Mechanisms of oncogenesis	299	13.3	Secondary haemostasis	435
9.11	Inheritance and leukaemia	300	13.4	Regulation of secondary haemostasis	447
9.12	Environmental causes of haematological		13.5	Fibrinolysis	453
	malignancies	301			
10	The laboratory investigation of		14	Bleeding disorders and their	4.00
	haematological malignancies	306		laboratory investigation	461
		300	14.1	Bleeding disorders	461
10.1	Patient presentation	307	14.2	Laboratory investigation of a	
10.2	The full blood count	309		suspected bleeding disorder	465
10.3	Blood film	312	14.3	Diagnosis of platelet disorders	490

15	Thrombophilia	507	17.3	Current therapeutic anticoagulant pharmaceuticals for arterial	
15.1	Introduction	507		thrombosis	584
15.2	Deficiency of the natural anticoagulants	509	17.4	Laboratory monitoring of anticoagulant therapy	. 585
15.3	Gain-of-function mutations	515	17.5	Management of VKA	
15.4	Other thrombophilias	518		anticoagulant therapy	603
15.5	Pitfalls of thrombophilia testing	519			
15.6	Antiphospholipid antibodies	523	5	Case Studies	613
15.7	Thrombosis	540			
			18	Case studies in haematology	615
16	Acquired disorders of haemostasis	545	18.1	Case study 1	615
161	Assuited blooding disorders	EAE	18.2	Case study 2	619
16.1	Acquired bleeding disorders	545	18.3	Case study 3	622
16.2	Acquired thrombotic disorders	561			
15 mg	All the second of the second o	= <0		Glossary	627
1/	Haemostasis and anticoagulation	568		References Index	646 647
17.1	Reasons for anticoagulation therapy	568		ilidex	047
17.2	Current therapeutic anticoagulant pharmaceuticals for VTE	573			