

Physiology

		AUTHOR	PUBLISHER	TYPE	PRICE
A⁻	<i>Physiology</i>	Costanzo	Elsevier, 2021, 7th ed., 528 pages, ISBN 9780323793339	Text	\$69
A⁻	<i>West's Pulmonary Pathophysiology: The Essentials</i>	West	Lippincott Williams & Wilkins, 2021, 10th ed., 272 pages, ISBN 9781975152819	Review/Test/75 q	\$62
B⁺	<i>BRS Physiology</i>	Costanzo	Lippincott Williams & Wilkins, 2022, 8th ed., 336 pages, ISBN 9781975153601	Review/Test/350 q	\$60
B⁺	<i>Pathophysiology of Heart Disease</i>	Lilly	Lippincott Williams & Williams, 2020, 7th ed., 480 pages, ISBN 9781975120597	Review	\$64
B⁺	<i>Lippincott Illustrated Reviews: Physiology</i>	Preston	Lippincott Williams & Wilkins, 2024, 3rd ed., 590 pages, ISBN 9781975196332	Review	\$82
B	<i>Vander's Renal Physiology</i>	Eaton	McGraw-Hill, 2023, 10th ed., 240 pages, ISBN 9781264278527	Text	\$49
B	<i>Endocrine Physiology</i>	Molina	McGraw-Hill, 2023, 6th ed., 320 pages, ISBN 9781264278459	Review	\$59
B	<i>Netter's Physiology Flash Cards</i>	Mulroney	Elsevier, 2024, 3rd ed., 458 pages, ISBN 9780443113444	Flash cards	\$46

SECTION IV

Abbreviations and Symbols

ABBREVIATION	MEANING
1st MC*	1st metacarpal
A-a	alveolar-arterial [gradient]
AA	Alcoholics Anonymous, amyloid A
AAA	abdominal aortic aneurysm
AAMC	Association of American Medical Colleges
AAo*	ascending aorta
Ab	antibody
ABPA	allergic bronchopulmonary aspergillosis
AC	adenylyl cyclase
ACA	anterior cerebral artery
Acetyl-CoA	acetyl coenzyme A
ACD	anemia of chronic disease
ACE	angiotensin-converting enzyme
ACh	acetylcholine
AChE	acetylcholinesterase
ACL	anterior cruciate ligament
ACom	anterior communicating [artery]
ACS	acute coronary syndrome
ACTH	adrenocorticotrophic hormone
AD	Alzheimer disease, autosomal dominant
ADA	adenosine deaminase, Americans with Disabilities Act
ADH	antidiuretic hormone
ADHD	attention-deficit hyperactivity disorder
ADP	adenosine diphosphate
ADPKD	autosomal-dominant polycystic kidney disease
AFP	α -fetoprotein
Ag	antigen, silver
AICA	anterior inferior cerebellar artery
AIDS	acquired immunodeficiency syndrome
AIHA	autoimmune hemolytic anemia
AKI	acute kidney injury
AKT	protein kinase B
AL	amyloid light [chain]
ALA	aminolevulinate
ALI	acute lung injury
ALK	anaplastic lymphoma kinase
ALL	acute lymphoblastic (lymphocytic) leukemia
ALP	alkaline phosphatase
ALS	amyotrophic lateral sclerosis
ALT	alanine transaminase
AMA	American Medical Association, antimitochondrial antibody
AML	acute myelogenous (myeloid) leukemia
AMP	adenosine monophosphate

ABBREVIATION	MEANING
ANA	antinuclear antibody
ANCA	antineutrophil cytoplasmic antibody
ANOVA	analysis of variance
ANP	atrial natriuretic peptide
ANS	autonomic nervous system
Ant*	anterior
Ao*	aorta
AOA	American Osteopathic Association
AP	action potential, A & P [ribosomal binding sites]
APC	antigen-presenting cell, activated protein C
APL	Acute promyelocytic leukemia
Apo	apolipoprotein
APP	amyloid precursor protein
APRT	adenine phosphoribosyltransferase
aPTT	activated partial thromboplastin time
APUD	amine precursor uptake decarboxylase
AR	attributable risk, autosomal recessive, aortic regurgitation
ARB	angiotensin receptor blocker
ARC	absolute risk of events in a control group
ARDS	acute respiratory distress syndrome
Arg	arginine
ARPKD	autosomal-recessive polycystic kidney disease
ART	antiretroviral therapy, absolute risk of events in an exposed or treatment group
AS	aortic stenosis
ASA	anterior spinal artery
Asc*	ascending
Asc Ao*	ascending aorta
ASD	atrial septal defect
ASO	anti-streptolysin O
AST	aspartate transaminase
AT	angiotensin, antithrombin
ATN	acute tubular necrosis
ATP	adenosine triphosphate
ATPase	adenosine triphosphatase
ATTR	transthyretin-mediated amyloidosis
AV	atrioventricular
AZT	azidothymidine
BAL	British anti-Lewisite [dimercaprol]
BBB	blood-brain barrier
BCG	bacille Calmette-Guérin
bd*	bile duct
BH ₄	tetrahydrobiopterin
BM	basement membrane

*Image abbreviation only

ABBREVIATION	MEANING
BOOP	bronchiolitis obliterans organizing pneumonia
BP	bisphosphate, blood pressure
BPG	bisphosphoglycerate
BPH	benign prostatic hyperplasia
BT	bleeding time
BUN	blood urea nitrogen
C*	caudate
Ca*	capillary
Ca ²⁺	calcium ion
CAD	coronary artery disease
CAF	common application form
cAMP	cyclic adenosine monophosphate
CBG	corticosteroid-binding globulin
CBSE	Comprehensive Basic Science Examination
CBSSA	Comprehensive Basic Science Self-Assessment
CBT	computer-based test, cognitive behavioral therapy
CCK	cholecystokinin
CCS	computer-based case simulation
CD	cluster of differentiation
CDK	cyclin-dependent kinase
cDNA	complementary deoxyribonucleic acid
CEA	carcinoembryonic antigen
CETP	cholesterol-ester transfer protein
CF	cystic fibrosis
CFTR	cystic fibrosis transmembrane conductance regulator
CGD	chronic granulomatous disease
cGMP	cyclic guanosine monophosphate
CGRP	calcitonin gene-related peptide
C _H 1–C _H 3	constant regions, heavy chain [antibody]
ChAT	choline acetyltransferase
CHD*	common hepatic duct
χ ²	chi-squared
CI	confidence interval
CIN	candidate identification number, carcinoma in situ, cervical intraepithelial neoplasia
CIS	Communication and Interpersonal Skills
CK	clinical knowledge, creatine kinase
CKD	chronic kidney disease
CK-MB	creatine kinase, MB fraction
C _L	constant region, light chain [antibody]
CL	clearance
Cl ⁻	chloride ion
CLL	chronic lymphocytic leukemia
CMC	carpometacarpal (joint)
CML	chronic myelogenous (myeloid) leukemia
CMV	cytomegalovirus
CN	cranial nerve
CN ⁻	cyanide ion
CNS	central nervous system
CNV	copy number variation
CO	carbon monoxide, cardiac output
CO ₂	carbon dioxide
CoA	coenzyme A
Coarct*	coarctation

ABBREVIATION	MEANING
COL1A1	collagen, type I, alpha 1
COL1A2	collagen, type I, alpha 2
COMT	catechol-O-methyltransferase
COP	coat protein
COPD	chronic obstructive pulmonary disease
CoQ	coenzyme Q
COVID-19	Coronavirus disease 2019
COX	cyclooxygenase
C _p	plasma concentration
CPAP	continuous positive airway pressure
CPR	cardiopulmonary resuscitation
Cr	creatinine
CRC	colorectal cancer
CREST	calcinosis, Raynaud phenomenon, esophageal dysfunction, sclerosis, and telangiectasias [syndrome]
CRH	corticotropin-releasing hormone
CRP	C-reactive protein
CS	clinical skills
C-section	cesarean section
CSF	cerebrospinal fluid
CT	computed tomography
CTP	cytidine triphosphate
CXR	chest x-ray
CysLT1	cysteinyl leukotriene-1
DA	dopamine
DAF	decay-accelerating factor
DAG	diacylglycerol
DAo*	descending aorta
DAT	dopamine transporter
dATP	deoxyadenosine triphosphate
DCIS	ductal carcinoma in situ
DCT	distal convoluted tubule
ddI	didanosine
DES	diethylstilbestrol
Desc Ao*	descending aorta
DEXA	dual-energy x-ray absorptiometry
DHAP	dihydroxyacetone phosphate
DHEA	dehydroepiandrosterone
DHF	dihydrofolic acid
DHT	dihydrotestosterone
DI	diabetes insipidus
DIC	disseminated intravascular coagulation
DIP	distal interphalangeal [joint]
DKA	diabetic ketoacidosis
DLCO	diffusing capacity for carbon monoxide
DM	diabetes mellitus
DNA	deoxyribonucleic acid
DNR	do not resuscitate
dNTP	deoxynucleotide triphosphate
DO	doctor of osteopathy
DOPAC	3,4-dihydroxyphenylacetic acid
DPGN	diffuse proliferative glomerulonephritis
DPM	doctor of podiatric medicine
DPP-4	dipeptidyl peptidase-4
DPPC	dipalmitoylphosphatidylcholine

*Image abbreviation only

ABBREVIATION	MEANING
DRESS	Drug reaction with eosinophilia and systemic symptoms
DS	double stranded
dsDNA	double-stranded deoxyribonucleic acid
dsRNA	double-stranded ribonucleic acid
DRG	dorsal root ganglion
d4T	didehydrodeoxythymidine [stavudine]
dTMP	deoxythymidine monophosphate
DTR	deep tendon reflex
DTs	delirium tremens
dUDP	deoxyuridine diphosphate
dUMP	deoxyuridine monophosphate
DVT	deep venous thrombosis
E*	euthromatin, esophagus
EBV	Epstein-Barr virus
ECA*	external carotid artery
ECF	extracellular fluid
ECFMG	Educational Commission for Foreign Medical Graduates
ECG	electrocardiogram
ECL	enterochromaffin-like [cell]
ECM	extracellular matrix
ECT	electroconvulsive therapy
ED ₅₀	median effective dose
EDRF	endothelium-derived relaxing factor
EDTA	ethylenediamine tetra-acetic acid
EDV	end-diastolic volume
EEG	electroencephalogram
EF	ejection fraction
EGF	epidermal growth factor
EHEC	enterohemorrhagic <i>E coli</i>
EIEC	enteroinvasive <i>E coli</i>
ELISA	enzyme-linked immunosorbent assay
EM	electron micrograph/microscopy
EMB	eosin–methylene blue
EPEC	enteropathogenic <i>E coli</i>
Epi	epinephrine
EPO	erythropoietin
EPS	extrapyramidal system
ER	endoplasmic reticulum, estrogen receptor
ERAS	Electronic Residency Application Service
ERCP	endoscopic retrograde cholangiopancreatography
ERP	effective refractory period
eRPF	effective renal plasma flow
ERT	estrogen replacement therapy
ERV	expiratory reserve volume
ESR	erythrocyte sedimentation rate
ESRD	end-stage renal disease
ESV	end-systolic volume
ETEC	enterotoxigenic <i>E coli</i>
EtOH	ethyl alcohol
EV	esophageal vein
F	bioavailability
FA	fatty acid
Fab	fragment, antigen-binding
FAD	flavin adenine dinucleotide

ABBREVIATION	MEANING
FADH ₂	reduced flavin adenine dinucleotide
FAP	familial adenomatous polyposis
F1,6BP	fructose-1,6-bisphosphate
F2,6BP	fructose-2,6-bisphosphate
FBPase	fructose biphosphatase
FBPase-2	fructose biphosphatase-2
Fc	fragment, crystallizable
FcR	Fc receptor
5f-dUMP	5-fluorodeoxyuridine monophosphate
Fe ²⁺	ferrous ion
Fe ³⁺	ferric ion
Fem*	femur
FENa	excreted fraction of filtered sodium
FEV ₁	forced expiratory volume in 1 second
FF	filtration fraction
FFA	free fatty acid
FGF	fibroblast growth factor
FGFR	fibroblast growth factor receptor
FGR	fetal growth restriction
FISH	fluorescence in situ hybridization
Fio ₂	fraction of inspired oxygen
FIT	fecal immunochemical testing
FKBP	FK506 binding protein
fMet	formylmethionine
FMG	foreign medical graduate
FMN	flavin mononucleotide
FN	false negative
FOXP3	forkhead box P3
FP, FP*	false positive, foot process
FRC	functional residual capacity
FSH	follicle-stimulating hormone
FSMB	Federation of State Medical Boards
FTA-ABS	fluorescent treponemal antibody—absorbed
FTD*	frontotemporal dementia
5-FU	5-fluorouracil
FVC	forced vital capacity
GABA	γ-aminobutyric acid
GAG	glycosaminoglycan
Gal	galactose
GBM	glomerular basement membrane
GC	glomerular capillary
G-CSF	granulocyte colony-stimulating factor
GERD	gastroesophageal reflux disease
GFAP	glial fibrillary acid protein
GFR	glomerular filtration rate
GGT	γ-glutamyl transpeptidase
GH	growth hormone
GHB	γ-hydroxybutyrate
GHRH	growth hormone–releasing hormone
G ₁	G protein, I polypeptide
GI	gastrointestinal
GIP	gastric inhibitory peptide
GIST	gastrointestinal stromal tumor
GLP-1	glucagon-like peptide-1

*Image abbreviation only

ABBREVIATION	MEANING
GLUT	glucose transporter
GM	granulocyte macrophage
GM-CSF	granulocyte-macrophage colony stimulating factor
GMP	guanosine monophosphate
GnRH	gonadotropin-releasing hormone
Gp	glycoprotein
G6P	glucose-6-phosphate
G6PD	glucose-6-phosphate dehydrogenase
GPe	globus pallidus externa
GPI	globus pallidus interna
GPI	glycosyl phosphatidylinositol
GRP	gastrin-releasing peptide
G _s	G protein, S polypeptide
GSH	reduced glutathione
GSSG	oxidized glutathione
GTP	guanosine triphosphate
GTPase	guanosine triphosphatase
GU	genitourinary
H*	heterochromatin
H ⁺	hydrogen ion
H ₁ , H ₂	histamine receptors
H ₂ S	hydrogen sulfide
ha*	hepatic artery
HAV	hepatitis A virus
HAVAb	hepatitis A antibody
Hb	hemoglobin
HBcAb/HBcAg	hepatitis B core antibody/antigen
HBcAb/HBeAg	hepatitis B early antibody/antigen
HBsAb/HBsAg	hepatitis B surface antibody/antigen
HbCO ₂	carbaminohemoglobin
HBV	hepatitis B virus
HCC	hepatocellular carcinoma
hCG	human chorionic gonadotropin
HCO ₃ ⁻	bicarbonate
Hct	hematocrit
HCTZ	hydrochlorothiazide
HCV	hepatitis C virus
HDL	high-density lipoprotein
HDN	hemolytic disease of the newborn
HDV	hepatitis D virus
H&E	hematoxylin and eosin
5-HETE	5-Hydroxyeicosatetraenoic acid
HEV	hepatitis E virus
HF	heart failure
Hfr	high-frequency recombination [cell]
HFpEF	heart failure with preserved ejection fraction
HFrEF	heart failure with reduced ejection fraction
HGPRT	hypoxanthine-guanine phosphoribosyltransferase
HHb	deoxygenated hemoglobin
HHS	hyperosmolar hyperglycemic state
HHV	human herpesvirus
5-HIAA	5-hydroxyindoleacetic acid
Hib	<i>Haemophilus influenzae</i> type b
HIT	heparin-induced thrombocytopenia

ABBREVIATION	MEANING
HIV	human immunodeficiency virus
HL	hepatic lipase
HLA	human leukocyte antigen
HMG-CoA	hydroxymethylglutaryl-coenzyme A
HMP	hexose monophosphate
HMWK	high-molecular-weight kininogen
HNPCC	hereditary nonpolyposis colorectal cancer
hnRNA	heterogeneous nuclear ribonucleic acid
H ₂ O ₂	hydrogen peroxide
HOCM	hypertrophic obstructive cardiomyopathy
HPA	hypothalamic-pituitary-adrenal [axis]
HPO	hypothalamic-pituitary-ovarian [axis]
HPV	human papillomavirus
HR	heart rate
HSL	hormone-sensitive lipase
HSP	Henoch-Schönlein purpura
HSV	herpes simplex virus
5-HT	5-hydroxytryptamine (serotonin)
HTLV	human T-cell leukemia virus
HTN	hypertension
HUS	hemolytic-uremic syndrome
HVA	homovanillic acid
IBD	inflammatory bowel disease
IBS	irritable bowel syndrome
IC	inspiratory capacity, immune complex
I _{Ca}	calcium current [heart]
I _f	funny current [heart]
ICA	internal carotid artery
ICAM	intercellular adhesion molecule
ICD	implantable cardioverter-defibrillator
ICE	Integrated Clinical Encounter
ICF	intracellular fluid
ICP	intracranial pressure
ID	identification
ID ₅₀	median infective dose
IDL	intermediate-density lipoprotein
IF	immunofluorescence, initiation factor
IFN	interferon
Ig	immunoglobulin
IGF	insulinlike growth factor
I _K	potassium current [heart]
IL	interleukin
IM	intramuscular
IMA	inferior mesenteric artery
IMG	international medical graduate
IMP	inosine monophosphate
IMV	inferior mesenteric vein
I _{Na}	sodium current [heart]
INH	isoniazid
INO	internuclear ophthalmoplegia
INR	International Normalized Ratio
IO	inferior oblique [muscle]
IOP	intraocular pressure
IP ₃	inositol triphosphate

*Image abbreviation only

ABBREVIATION	MEANING
IPV	inactivated polio vaccine
IR	current \times resistance [Ohm's law], inferior rectus [muscle]
IRV	inspiratory reserve volume
ITP	idiopathic thrombocytopenic purpura
IUD	intrauterine device
IV	intravenous
IVC	inferior vena cava
IVIG	intravenous immunoglobulin
JAK/STAT	Janus kinase/signal transducer and activator of transcription [pathway]
JGA	juxtaglomerular apparatus
JVD	jugular venous distention
JVP	jugular venous pulse
K ⁺	potassium ion
KatG	catalase-peroxidase produced by <i>M tuberculosis</i>
K _e	elimination constant
K _f	filtration constant
KG	ketoglutarate
Kid*	kidney
K _m	Michaelis-Menten constant
KOH	potassium hydroxide
L	left, lentiform, liver
LA	left atrial, left atrium
LAD	left anterior descending coronary artery
LAP	leukocyte alkaline phosphatase
Lat cond*	lateral condyle
Lb*	lamellar body
LCA	left coronary artery
LCAT	lecithin-cholesterol acyltransferase
LCC*	left common carotid artery
LCFA	long-chain fatty acid
LCL	lateral collateral ligament
LCME	Liaison Committee on Medical Education
LCMV	lymphocytic choriomeningitis virus
LCX	left circumflex coronary artery
LD	loading dose
LD ₅₀	median lethal dose
LDH	lactate dehydrogenase
LDL	low-density lipoprotein
LES	lower esophageal sphincter
LFA	leukocyte function-associated antigen
LFT	liver function test
LH	luteinizing hormone
Liv*	liver
LLL*	left lower lobe (of lung)
LLQ	left lower quadrant
LM	lateral meniscus, left main coronary artery, light microscopy
LMN	lower motor neuron
LOS	lipooligosaccharide
LP	lumbar puncture
LPA*	left pulmonary artery
LPL	lipoprotein lipase
LPS	lipopolysaccharide
LR	lateral rectus [muscle]

ABBREVIATION	MEANING
LT	labile toxin, leukotriene
LUL*	left upper lobe (of lung)
LV	left ventricle, left ventricular
M ₁ -M ₅	muscarinic (parasympathetic) ACh receptors
MAC	membrane attack complex, minimum alveolar concentration
MALT	mucosa-associated lymphoid tissue
MAO	monoamine oxidase
MAP	mean arterial pressure, mitogen-activated protein
MASLD	metabolic dysfunction-associated steatotic liver disease
Max*	maxillary sinus
MBL-MASP	mannose-binding lectin-associated serine protease
MC	midsystolic click, metacarpal
MCA	middle cerebral artery
MCAD	medium-chain acyl-coA dehydrogenase
MCAT	Medical College Admissions Test
MCHC	mean corpuscular hemoglobin concentration
MCL	medial collateral ligament
MCP	metacarpophalangeal [joint]
MCV	mean corpuscular volume
MD	maintenance dose
MDD	major depressive disorder
MDMA	3,4-methylenedioxymethamphetamine, ecstasy
Med cond*	medial condyle
MELAS syndrome	mitochondrial encephalopathy, lactic acidosis, and stroke-like episodes
MEN	multiple endocrine neoplasia
MERS	Middle East respiratory syndrome
Mg ²⁺	magnesium ion
MgSO ₄	magnesium sulfate
MHC	major histocompatibility complex
MI	myocardial infarction
MIF	müllerian inhibiting factor
MIRL	membrane inhibitor of reactive lysis
MLCK	myosin light-chain kinase
MLF	medial longitudinal fasciculus
MMC	migrating motor complex
MMR	measles, mumps, rubella [vaccine]
MODY	maturity-onset diabetes of the young
6-MP	6-mercaptopurine
MPGN	membranoproliferative glomerulonephritis
MPO	myeloperoxidase
MPO-ANCA/ p-ANCA	myeloperoxidase/perinuclear antineutrophil cytoplasmic antibody
MR	medial rectus [muscle], mitral regurgitation
MRI	magnetic resonance imaging
miRNA	microribonucleic acid
mRNA	messenger ribonucleic acid
MRSA	methicillin-resistant <i>S aureus</i>
MS	mitral stenosis, multiple sclerosis
MSH	melanocyte-stimulating hormone
mtDNA	mitochondrial DNA
mTOR	mammalian target of rapamycin
MTP	metatarsophalangeal [joint]
MTX	methotrexate

*Image abbreviation only

ABBREVIATION	MEANING
MVO ₂	myocardial volume oxygen consumption
MVP	mitral valve prolapse
N*	nucleus
Na ⁺	sodium ion
NAAT	nucleic acid amplification test
NAD	nicotinamide adenine dinucleotide
NAD ⁺	oxidized nicotinamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP ⁺	oxidized nicotinamide adenine dinucleotide phosphate
NADPH	reduced nicotinamide adenine dinucleotide phosphate
NBME	National Board of Medical Examiners
NBOME	National Board of Osteopathic Medical Examiners
NBPME	National Board of Podiatric Medical Examiners
NE	norepinephrine
NET	norepinephrine transporter
NF	neurofibromatosis
NFAT	nuclear factor of activated T-cell
NH ₃	ammonia
NH ₄ ⁺	ammonium
NK	natural killer [cells]
NK ₁	neurokinin-1
N _M	nicotinic ACh receptor in neuromuscular junction
NMDA	N-methyl-d-aspartate
NMJ	neuromuscular junction
NMS	neuroleptic malignant syndrome
N _N	nicotinic ACh receptor in autonomic ganglia
NREM	non-rapid eye movement (sleep)
NRMP	National Residency Matching Program
NNRTI	non-nucleoside reverse transcriptase inhibitor
NO	nitric oxide
N ₂ O	nitrous oxide
NPH	neutral protamine Hagedorn, normal pressure hydrocephalus
NPV	negative predictive value
NRTI	nucleoside reverse transcriptase inhibitor
NSAID	nonsteroidal anti-inflammatory drug
NSE	neuron-specific enolase
NSTEMI	non-ST-segment elevation myocardial infarction
NTD	neural tube defect
Nu*	nucleolus
OAA	oxaloacetic acid
OCD	obsessive-compulsive disorder
OCP	oral contraceptive pill
ODC	oxygen-hemoglobin dissociation curve
OH	hydroxy
1,25-OH D ₃	calcitriol (active form of vitamin D)
25-OH D ₃	storage form of vitamin D
OPV	oral polio vaccine
OR	odds ratio
ori	origins of replication
OS	opening snap
OSA	obstructive sleep apnea
OTC	Ornithine transcarbamylase
OVL ^T	organum vasculosum of the lamina terminalis

ABBREVIATION	MEANING
P-body	processing body (cytoplasmic)
P-450	cytochrome P-450 family of enzymes
PA	posteroanterior, pulmonary artery
PABA	<i>para</i> -aminobenzoic acid
PaCO ₂	arterial PCO ₂
PACO ₂	alveolar PCO ₂
PAH	<i>para</i> -aminohippuric acid
PAMP	pathogen-associated molecular patterns
PAN	polyarteritis nodosa
Pao ₂	partial pressure of oxygen in arterial blood
PAo ₂	partial pressure of oxygen in alveolar blood
PAP	Papanicolaou [smear], prostatic acid phosphatase, posteromedial papillary muscle
PAPPA	pregnancy-associated plasma protein A
PAS	periodic acid–Schiff
Pat*	patella
Pb	Barometric (atmospheric) pressure
PBP	penicillin-binding protein
PC	platelet count, pyruvate carboxylase
PCA	posterior cerebral artery
PCC	prothrombin complex concentrate
PCL	posterior cruciate ligament
Pco ₂	partial pressure of carbon dioxide
PCom	posterior communicating [artery]
PCOS	polycystic ovarian syndrome
PCP	phencyclidine hydrochloride, <i>Pneumocystis jirovecii</i> pneumonia
PCR	polymerase chain reaction
PCT	proximal convoluted tubule
PCV13	pneumococcal conjugate vaccine
PCWP	pulmonary capillary wedge pressure
PDA	patent ductus arteriosus, posterior descending artery
PDE	phosphodiesterase
PDGF	platelet-derived growth factor
PDH	pyruvate dehydrogenase
PE	pulmonary embolism
PECAM	platelet–endothelial cell adhesion molecule
PECO ₂	expired air PCO ₂
PEP	phosphoenolpyruvate
PF	platelet factor
PFK	phosphofructokinase
PFK-2	phosphofructokinase-2
PFT	pulmonary function test
PG	phosphoglycerate
Ph ₂ O	water pressure
P _i	plasma interstitial osmotic pressure, inorganic phosphate
PICA	posterior inferior cerebellar artery
PID	pelvic inflammatory disease
PiO ₂	PO ₂ in inspired air
PIP	proximal interphalangeal [joint]
PIP ₂	phosphatidylinositol 4,5-bisphosphate
PIP ₃	phosphatidylinositol 3,4,5-bisphosphate
PKD	polycystic kidney disease
PKR	interferon-α–induced protein kinase
PKU	phenylketonuria

*Image abbreviation only

ABBREVIATION	MEANING
PLAP	placental alkaline phosphatase
PLP	pyridoxal phosphate
PML	progressive multifocal leukoencephalopathy
PMN	polymorphonuclear [leukocyte]
P _{net}	net filtration pressure
PNET	primitive neuroectodermal tumor
PNS	peripheral nervous system
Po ₂	partial pressure of oxygen
PO ₄ ³⁻	phosphate
POMC	proopiomelanocortin
Pop*	popliteal artery
Pop a*	popliteal artery
Post*	posterior
PPAR	peroxisome proliferator-activated receptor
PPD	purified protein derivative
PPI	proton pump inhibitor
PPM	parts per million
PPSV23	pneumococcal polysaccharide vaccine
PPV	positive predictive value
PR3-ANCA/ c-ANCA	cytoplasmic antineutrophil cytoplasmic antibody
PrP	prion protein
PrP ^C	cellular prion protein
PrP ^{SC}	scrapie isoform of the prion protein
PRPP	phosphoribosylpyrophosphate
PSA	prostate-specific antigen
PSS	progressive systemic sclerosis
PT	prothrombin time, proximal tubule
PTEN	phosphatase and tensin homolog
PTH	parathyroid hormone
PTHrP	parathyroid hormone–related protein
PTSD	post-traumatic stress disorder
PTT	partial thromboplastin time
PV	plasma volume, venous pressure, portal vein
p _v *	pulmonary vein
PVC	polyvinyl chloride
PVR	pulmonary vascular resistance
PYR	pyrrolidonyl aminopeptidase
R	correlation coefficient, right, R variable [group]
R ₃	Registration, Ranking, & Results [system]
RA	right atrium, right atrial
RAAS	renin-angiotensin-aldosterone system
RANK-L	receptor activator of nuclear factor-κ B ligand
RAS	reticular activating system
RBF	renal blood flow
RCA	right coronary artery
REM	rapid eye movement
RER	rough endoplasmic reticulum
Rh	<i>rhesus</i> antigen
RLL*	right lower lobe (of lungs)
RLQ	right lower quadrant
RML*	right middle lobe (of lung)
RNA	ribonucleic acid
RNP	ribonucleoprotein

ABBREVIATION	MEANING
ROS	reactive oxygen species
RPF	renal plasma flow
RPGN	rapidly progressive glomerulonephritis
RPR	rapid plasma reagin
RR	relative risk, respiratory rate
rRNA	ribosomal ribonucleic acid
RS	Reed-Stenberg [cells]
RSC*	right subclavian artery
RSV	respiratory syncytial virus
RTA	renal tubular acidosis
RUL*	right upper lobe (of lung)
RUQ	right upper quadrant
RV	residual volume, right ventricle, right ventricular
RVH	right ventricular hypertrophy
[S]	substrate concentration
SA	sinoatrial
SAA	serum amyloid–associated [protein]
SAM	S-adenosylmethionine
SARS	severe acute respiratory syndrome
SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
SCC	squamous cell carcinoma
SCD	sudden cardiac death
SCID	severe combined immunodeficiency disease
SCJ	squamocolumnar junction
SCM	sternocleidomastoid muscle
SCN	suprachiasmatic nucleus
SD	standard deviation
SE	standard error [of the mean]
SEP	Spoken English Proficiency
SER	smooth endoplasmic reticulum
SERM	selective estrogen receptor modulator
SERT	serotonin transporter
SGLT	sodium-glucose transporter
SHBG	sex hormone–binding globulin
SIADH	syndrome of inappropriate [secretion of] antidiuretic hormone
SIDS	sudden infant death syndrome
SJS	Stevens-Johnson syndrome
SLD	steatotic liver disease
SLE	systemic lupus erythematosus
SLL	small lymphocytic lymphoma
SLT	Shiga-like toxin
SMA	superior mesenteric artery
SMX	sulfamethoxazole
SNARE	soluble NSF attachment protein receptor
SNC	substantia nigra pars compacta
SNP	single nucleotide polymorphism
SNr	substantia nigra pars reticulata
SNRI	serotonin and norepinephrine receptor inhibitor
snRNA	small nuclear RNA
snRNP	small nuclear ribonucleoprotein
SO	superior oblique [muscle]
SOAP	Supplemental Offer and Acceptance Program
Sp*	spleen

*Image abbreviation only

ABBREVIATION	MEANING
spp	species
SR	superior rectus [muscle]
SRP	signal recognition particle
SS	single stranded
ssDNA	single-stranded deoxyribonucleic acid
SSPE	subacute sclerosing panencephalitis
SSRI	selective serotonin reuptake inhibitor
ssRNA	single-stranded ribonucleic acid
St*	stomach
ST	Shiga toxin
StAR	steroidogenic acute regulatory protein
STEMI	ST-segment elevation myocardial infarction
STI	sexually transmitted infection
STN	subthalamic nucleus
SV	splenic vein, stroke volume
SVC	superior vena cava
SVR	systemic vascular resistance
SVT	supraventricular tachycardia
T*	thalamus, trachea
$t_{1/2}$	half-life
T_3	triiodothyronine
T_4	thyroxine
TAA	thoracic aortic aneurysm
TAPVR	total anomalous pulmonary venous return
TB	tuberculosis
TBG	thyroxine-binding globulin
TBV	total blood volume
3TC	dideoxythiacytidine [lamivudine]
TCA	tricarboxylic acid [cycle], tricyclic antidepressant
Tc cell	cytotoxic T cell
TCR	T-cell receptor
TDF	tenofovir disoproxil fumarate
TdT	terminal deoxynucleotidyl transferase
TE	tracheoesophageal
TFT	thyroid function test
TG	triglyceride
TGA	transposition of great arteries
TGF	transforming growth factor
Th cell	helper T cell
THF	tetrahydrofolic acid
TI	therapeutic index
TIA	transient ischemic attack
Tib*	tibia
TIBC	total iron-binding capacity
TIPS	transjugular intrahepatic portosystemic shunt
TLC	total lung capacity
TLR	toll-like receptors
T_m	maximum rate of transport
TMP	trimethoprim
TN	true negative
TNF	tumor necrosis factor
TNM	tumor, node, metastases [staging]
TOP	topoisomerase
ToRCHeS	<i>Toxoplasma gondii</i> , rubella, CMV, HIV, HSV-2, syphilis
TP	true positive
tPA	tissue plasminogen activator
TPO	thyroid peroxidase, thrombopoietin


*Image abbreviation only

ABBREVIATION	MEANING
TPP	thiamine pyrophosphate
TPPA	<i>Treponema pallidum</i> particle agglutination assay
TPR	total peripheral resistance
TR	tricuspid regurgitation
TRAP	tartrate-resistant acid phosphatase
TRECs	T-cell receptor excision circles
TRH	thyrotropin-releasing hormone
tRNA	transfer ribonucleic acid
TSH	thyroid-stimulating hormone
TSI	triple sugar iron
TSS	toxic shock syndrome
TSST	toxic shock syndrome toxin
TTP	thrombotic thrombocytopenic purpura
TTR	transthyretin
TXA ₂	thromboxane A ₂
UDP	uridine diphosphate
UMN	upper motor neuron
UMP	uridine monophosphate
UPD	uniparental disomy
URI	upper respiratory infection
USMLE	United States Medical Licensing Examination
UTI	urinary tract infection
UTP	uridine triphosphate
UV	ultraviolet
V ₁ , V ₂	vasopressin receptors
V _A	alveolar ventilation
VC	vital capacity
V _d	volume of distribution
V _D	physiologic dead space
V(D)J	variable, (diversity), joining gene segments rearranged to form Ig genes
VDRL	Venereal Disease Research Laboratory
V _E	minute ventilation
VEGF	vascular endothelial growth factor
V _H	variable region, heavy chain [antibody]
VHL	von Hippel-Lindau [disease]
VIP	vasoactive intestinal peptide
VIPoma	vasoactive intestinal polypeptide-secreting tumor
VJ	light-chain hypervariable region [antibody]
V _L	variable region, light chain [antibody]
VLCA	very-long-chain fatty acids
VLDL	very low density lipoprotein
VMA	vanillylmandelic acid
VMAT	vesicular monoamine transporter
V _{max}	maximum velocity
VPL	ventral posterior nucleus, lateral
VPM	ventral posterior nucleus, medial
VPN	vancomycin, polymyxin, nystatin [media]
V/Q	ventilation/perfusion [ratio]
VRE	vancomycin-resistant enterococcus
VSD	ventricular septal defect
V _T	tidal volume
VTE	venous thromboembolism
vWF	von Willebrand factor
VZV	varicella-zoster virus
XLA	X-linked agammaglobulinemia
XR	X-linked recessive
XX/XY	normal complement of sex chromosomes for female/male
ZDV	zidovudine [formerly AZT]


SECTION IV


Image Acknowledgments


In this edition, in collaboration with MediQ Learning, LLC, and a variety of other partners, we are pleased to include the following clinical images and diagrams for the benefit of integrative student learning.

Portions of this book identified with the symbol  are copyright © USMLE-Rx.com (MediQ Learning, LLC).

Portions of this book identified with the symbol  are copyright © Dr. Richard Usatine and are provided under license through MediQ Learning, LLC.

Portions of this book identified with the symbol  are listed below by page number.





















This symbol  refers to material that is available in the public domain.




This symbol  refers to the Creative Commons Attribution license, full text at <http://creativecommons.org/licenses/by/4.0/>.

This symbol  refers to the Creative Commons Attribution-Share Alike license, full text at: <http://creativecommons.org/licenses/by-sa/4.0/>.






Original images may have been modified by cropping and/or labeling. Where appropriate, all rights to the derivative work by MediQ Learning, LLC are reserved.

Biochemistry










- 32 **Chromatin structure.** Electron micrograph showing heterochromatin, euchromatin, and nucleolus.  Roller RA, Rickett JD, Stickle WB. The hypobranchial gland of the estuarine snail *Stramonita haemastoma canaliculata* (Gray) (Prosobranchia: Muricidae): a light and electron microscopical study. *Am Malac Bull.* 1995;11(2):177-190. Available at <https://archive.org/details/americanm101119931994amer>.
- 47 **Cilia structure: Image A.** Cross section of Chlamydomonas flagella with the membrane removed.  Bui KH, Pigino G, Ishikawa T. Three-dimensional structural analysis of eukaryotic flagella/cilia by electron cryo-tomography. *J Synchrotron Radiat.* 2011 Jan;18(1):2-5. DOI: 10.1107/S0909049510036812.
- 47 **Cilia structure: Image B.** Cilia structure of basal body.  Riparbelli MG, Cabrera OA, Callaini G, et al. Unique properties of *Drosophila* spermatocyte primary cilia. *Biol Open.* 2013 Nov 15;2(11):1137-1147. DOI: 10.1242/bio.20135355.
- 47 **Primary ciliary dyskinesia.** Dextrocardia.  Oluwadare O, Ayoka AO, Akomolafe RO, et al. The role of electrocardiogram in the diagnosis of dextrocardia with mirror image atrial arrangement and ventricular position in a young adult Nigerian in Ile-Ife: a case report. *J Med Case Rep.* 2015;9:222. DOI: 10.1186/s13256-015-0695-4.
- 49 **Osteogenesis imperfecta: Image A.** Skeletal deformities in upper extremity of child.  Vanakker OM, Hemelsoet D, De Paepe. Hereditary connective tissue diseases in young adult stroke: a comprehensive synthesis. *Stroke Res Treat.* 2011;7:12903. DOI: 10.4061/2011/712903.
- 49 **Osteogenesis imperfecta: Image B.** Blue sclera.  Herbert L. Fred, MD, Hendrik A. van Dijk. Images of Memorable Cases: Cases 40, 41 & 42. OpenStax CNX. Dec 3, 2008. Download for free at <http://cnx.org/contents/fe89fbf7-c641-4ad8-8871-80017adfd2cf@3>.
- 49 **Ehlers-Danlos syndrome: Images A and B.** Hyperextensibility of skin (A) and DIP joint (B).  Whitaker JK, Alexander P, Chau DYS, et al. Severe conjunctivochalasis in association with classic type Ehlers-Danlos syndrome. *BMC Ophthalmol.* 2012;2:47. DOI: 10.1186/1471-2415-12-47.
- 53 **Karyotyping.**  Paar C, Herber G, Voskova, et al. available under: A case of acute myeloid leukemia (AML) with an unreported combination of chromosomal abnormalities: gain of isochromosome 5p, tetrasomy 8 and unbalanced translocation der(19)t(17;19)(q23;p13). *Mol Cytogenet.* 2013;6:40. DOI: 10.1186/1755-8166-6-40.
- 53 **Fluorescence in situ hybridization.**  Paar C, Herber G, Voskova D, et al. A case of acute myeloid leukemia (AML) with an unreported combination of chromosomal abnormalities: gain of isochromosome 5p, tetrasomy 8 and unbalanced translocation der(19)t(17;19)(q23;p13). *Mol Cytogenet.* 2013 Sep 30;6(1):40. DOI: 10.1186/1755-8166-6-40.
- 55 **Genetic terms.** Café-au-lait spots.  Dumitrescu CE and Collins MT. McCune-Albright syndrome. *Orphanet J Rare Dis.* 2008;3:12. DOI: 10.1186/1750-1172-3-12.
- 59 **Muscular dystrophies.** Fibrofatty replacement of muscle.  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.
- 64 **Vitamin A.** Bitot spots on conjunctiva.  The US Department of Health and Human Services and Dr. J. Justin Older.
- 65 **Vitamin B₂.** Angular cheilitis.  Shetti A, Gupta I, Charantimath SM. Oral candidiasis: aiding in the diagnosis of HIV-A case report. *Case Rep Dent.* 2011:929616. DOI: 10.1155/2011/929616.
- 65 **Vitamin B₃.** Pellagra.  van Dijk HA, Fred H. Images of memorable cases: case 2. Connexions Web site. Dec 4, 2008. Available at: <http://cnx.org/contents/3d3dcb2e-8e98-496f-91c2-fe94e93428a1@3@3/>.
- 68 **Vitamin D.** X-ray of lower extremity in child with rickets.  Linglart A, Bissie-Duplan M, Briot K, et al. Therapeutic management of hypophosphatemic rickets from infancy to adulthood. *Endocr Connect.* 2014 Mar 14;3(1):R13-30. DOI: 10.1530/EC-13-0103.
- 69 **Protein-energy malnutrition: Image A.** Child with kwashiorkor.  The US Department of Health and Human Services and Dr. Lyle Conrad.
- 69 **Protein-energy malnutrition: Image B.** Child with marasmus.  The US Department of Health and Human Services and Don Eddins.
- 82 **Alkaptonuria.** Ochronotic pigment on the sclera of the eyes of the patient.  Wilke A, Steverding D. Ochronosis as an unusual cause of valvular defect: a case report. *J Med Case Reports.* 2009;3:9302. DOI: 10.1186/1752-1947-3-9302.
- 86 **Lysosomal storage diseases: Image A.** “Cherry-red” spot on macula in Tay-Sachs disease.  Dr. Jonathan Trobe.
- 86 **Lysosomal storage diseases: Image B.** Angiokeratomas.  Burlina AP, Sims KB, Politei JM, et al. Early diagnosis of peripheral nervous system involvement in Fabry disease and treatment of neuropathic pain: the report of an expert panel. *BMC Neurol.* 2011;11:61. DOI: 10.1186/1471-2377-11-61.




















- 86 **Lysosomal storage diseases: Image C.** Gaucher cells in Gaucher disease.  Mohindroo S. Type-3 Gaucher disease with bilateral necrosis of the neck of femur: a case report. *Cases J.* 2009; 9380. DOI: 10.1186/1757-1626-2-9380.
- 86 **Lysosomal storage diseases: Image D.** Foam cells in Niemann-Pick disease.  Degtyareva, A, Mikhailova, S, Zakharova, Y, et al. Visceral symptoms as a key diagnostic sign for the early infantile form of Niemann-Pick disease type C in a Russian patient: a case report. *J Med Case Reports.* 2016;10:143. DOI: 10.1186/s13256-016-0925-4.
- 92 **Abetalipoproteinemia.** Small bowel mucosa shows clear enterocytes.  Najah M, Youssef SM, Yahia HM, et al. Molecular characterization of Tunisian families with abetalipoproteinemia and identification of a novel mutation in MTTP gene. *Diagn Pathol.* 2013 Apr 4;8:54. DOI: 10.1186/1746-1596-8-54.



































Immunology








































- 94 **Lymph node: Image A.** Lymph node histology.  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.
- 96 **Thymus.** “Sail sign” on x-ray of normal thymus in neonate.  Di Serafino M, Esposito F, Severino R, et al. Think thymus, think well: the chest x-ray thymic signs. *J Pediatr Mth Care.* 2016;1(2):108-109. DOI: 10.19104/japm.2016.108.
- 105 **Complement disorders.** Urine discoloration in paroxysmal nocturnal hemoglobinuria.  Nakamura N, Sugawara T, Shirato K, et al. Paroxysmal nocturnal hemoglobinuria in systemic lupus erythematosus: a case report. *J Med Case Reports.* 2011;5:550. DOI: 10.1186/1752-1947-5-550
- 115 **Immunodeficiencies: Image A.** Telangiectases on face.  Scarano V, De Santis D, Suppressa P, et al. Hypogonadotropic hypogonadism associated with hereditary hemorrhagic telangiectasia. *Case Reports in Endo.* 2013;vol 2013. DOI: 10.1155/2013/520284.
- 115 **Immunodeficiencies: Image B.** Giant granules in granulocytes in Chédiak-Higashi syndrome.  Morrone K, Wang Y, Huizing M, et al. Two Novel Mutations Identified in an African-American Child with Chediak-Higashi Syndrome. *Case Rep Med.* 2010;2010:967535. vol. 2010, Article ID 967535, 4 pages, 2010.DOI: 10.1155/2010/967535.

Microbiology

- 123 **Stains: Image A.** *Trypanosoma lewisi* on Giemsa stain.  The US Department of Health and Human Services and Dr. Mae Melvin.
- 123 **Stains: Image B.** Foamy macrophages containing the characteristic rod-shaped inclusion bodies of Whipple disease.  Tran HA. Reversible hypothyroidism and Whipple's disease. *BMC Endocr Disord.* 2006 May 10;6:3. DOI: 10.1186/1472-6823-6-3.
- 123 **Stains: Image C.** *Mycobacterium tuberculosis* on Ziehl-Neelsen stain.  The US Department of Health and Human Services and Dr. George P. Kubica.
- 123 **Stains: Image D.** *Cryptococcus neoformans* on India ink stain.  The US Department of Health and Human Services.
- 123 **Stains: Image E.** *Coccidioides immitis* on silver stain.  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.
- 125 **Encapsulated bacteria.** Capsular swelling of *Streptococcus pneumoniae* using the Neufeld-Quellung test.  The US Department of Health and Human Services.
- 126 **Catalase-positive organisms.** Oxygen bubbles released during catalase reaction.  The US Department of Health and Human Services and Annie L. Vestal.
- 133 **Hemolytic bacteria.** α - and β -hemolysis.  The US Department of Health and Human Services and Richard R. Facklam, Ph.D.
- 133 ***Staphylococcus aureus*.**  The US Department of Health and Human Services and Dr. Richard Facklam.

- 134 ***Streptococcus pneumoniae*.**  The US Department of Health and Human Services and Dr. Mike Miller.
- 134 ***Streptococcus pyogenes* (group A streptococci).**  The US Department of Health and Human Services and Dr. Mike Miller.
- 135 ***Bacillus anthracis*.** Ulcer with black eschar in cutaneous anthrax.  The US Department of Health and Human Services and James H. Steele.
- 136 ***Clostridioides difficile*.** Pseudomembranous enterocolitis on colonoscopy.  Abe I, Kawamura YJ, Sasaki J, Konishi F. Acute fulminant pseudomembranous colitis which developed after ileostomy closure and required emergent total colectomy: a case report. *J Med Case Rep.* 2012 May 14;6:130. DOI: 10.1186/1752-1947-6-130.
- 136 ***Clostridia: Image A.*** Gas gangrene due to *Clostridium perfringens*.  Schröpfer E, Rauthe S, Meyer T. Diagnosis and misdiagnosis of necrotizing soft tissue infections: three case reports. *Cases J.* 2008;1:252. DOI: 10.1186/1757-1626-1-252.
- 137 ***Corynebacterium diphtheriae*.** Endoscopic findings of epiglottitis and larynx.  Tagini F, Pillonel T, Croxatto A, et al. Distinct genomic features characterize two clades of *Corynebacterium diphtheriae*: proposal of *Corynebacterium diphtheriae* Subsp. *diphtheriae* Subsp. nov. and *Corynebacterium diphtheriae* Subsp. *lausannense* Subsp. nov. *Front. Microbiol.* 2018;9. DOI: 10.3389/fmicb.2018.01743.
- 137 ***Listeria monocytogenes*.** Actin rockets.  Schuppler M, Loessner MJ. The opportunistic pathogen *Listeria monocytogenes*: pathogenicity and interaction with the mucosal immune system. *Int J Inflamm.* 2010;2010:704321. DOI: 10.4061/2010/704321.
- 137 ***Nocardia* vs *Actinomyces*: Image A.** *Nocardia* on acid-fast stain.  Venkataramana K. Human *Nocardia* infections: a review of pulmonary nocardiosis. *Cereus.* 2015;7(8):e304. DOI: 10.7759/cureus.304.
- 137 ***Nocardia* vs *Actinomyces*: Image B.** *Actinomyces israelii* on Gram stain.  The US Department of Health and Human Services.
- 138 ***Mycobacteria*.** Acid-fast stain.  The US Department of Health and Human Services and Dr. George P. Kubica
- 139 **Leprosy: Image B.** Tuberculoid lesion.  The US Department of Health and Human Services and Dr. Robert Fass, Ohio State Dept. of Medicine.
- 140 ***Neisseria*: Image A.** Intracellular *N gonorrhoeae*.  The US Department of Health and Human Services and Bill Schwartz.
- 141 ***Legionella pneumophila*.** Lung findings of unilateral and lobar infiltrate.  Robbins NM, Kumar A, Blair BM. *Legionella pneumophila* infection presenting as headache, confusion and dysarthria in a human immunodeficiency virus-1 (HIV-1) positive patient: case report. *BMC Infect Dis.* 2012;12:225. DOI: 10.1186/1471-2334-12-225.
- 141 ***Pseudomonas aeruginosa*: Image A.**  Gormley M, Aspray T, Kelly D, et al. Pathogen cross-transmission via building sanitary plumbing systems in a full scale pilot test-rig. *PLOS ONE.* 2017;12(2):e0171556.DOI: 10.1371/journal.pone.0171556.
- 141 ***Pseudomonas aeruginosa*: Image B.** Ecthyma gangrenosum.  Gençer S, Ozer S, Ege Gül A, et al. Ecthyma gangrenosum without bacteremia in a previously healthy man: a case report. *J Med Case Rep.* 2008 Jan 22;2:14. DOI: 10.1186/1752-1947-2-14.
- 143 ***Klebsiella*.**  The US Department of Health and Human Services.
- 143 ***Campylobacter jejuni*.**  The US Department of Health and Human Services.
- 144 ***Vibrio cholerae*.**  Phetsouvanh R, Nakatsu M, Arakawa E, et al. Fatal bacteremia due to immotile *Vibrio cholerae* serogroup O21 in Vientiane, Laos—a case report. *Ann Clin Microbiol Antimicrob.* 2008;7:10. DOI: 10.1186/1476-0711-7-10.
- 144 ***Helicobacter pylori*.**  The US Department of Health and Human Services, Dr. Patricia Fields, and Dr. Collette Fitzgerald.

- 144 **Spirochetes.** Appearance on darkfield microscopy.  The US Department of Health and Human Services.
- 144 **Lyme disease: Image A.** *Ixodes* tick.  The US Department of Health and Human Services and Dr. Michael L. Levin.
- 144 **Lyme disease: Image B.** Erythema migrans.  The US Department of Health and Human Services and James Gathany.
- 145 **Syphilis: Image A.** Treponeme on darkfield microscopy.  The US Department of Health and Human Services and Renelle Woodall.
- 145 **Syphilis: Image B.** Whole-body maculopapular rash in secondary syphilis.  The US Department of Health and Human Services and Susan Lindsley.
- 145 **Syphilis: Image C, left.** Maculopapular rash on palms in secondary syphilis.  The US Department of Health and Human Services.
- 145 **Syphilis: Image C, right.** Maculopapular rash on palms in secondary syphilis.  Drahansky M, Dolezel M, Urbanek J, et al. Influence of skin diseases on fingerprint recognition. *J Biomed Biotechnol.* 2012;2012:626148. DOI: 10.1155/2012/626148.
- 145 **Syphilis: Image D.** Condyloma lata.  The US Department of Health and Human Services and Susan Lindsley.
- 145 **Syphilis: Image E.** Gumma.  Chakir K, Benchikhi H. Granulome centro-facial révélant une syphilis tertiaire. *Pan Afr Med J.* 2013;15:82. DOI: 10.11604/pamj.2013.15.82.3011.
- 145 **Syphilis: Image F.** Snuffles and rhagades in congenital syphilis.  The US Department of Health and Human Services and Susan Lindsley.
- 145 **Syphilis: Image G.** Hutchinson teeth in congenital syphilis.  The US Department of Health and Human Services and Susan Lindsley.
- 147 ***Gardnerella vaginalis*.**  The US Department of Health and Human Services and M. Rein.
- 148 **Rickettsial diseases and vector-borne illnesses: Image A.** Rash of Rocky Mountain spotted fever.  The US Department of Health and Human Services.
- 148 **Rickettsial diseases and vector-borne illnesses: Image B.** *Ehrlichia morulae*.  Williams CV, Van Steenhouse JL, Bradley JM, et al. Naturally occurring *Ehrlichia chaffeensis* infection in two prosimian primate species: ring-tailed lemurs (*Lemur catta*) and ruffed lemurs (*Varecia variegata*). *Emerg Infect Dis.* 2002;8(12):1497-1500. DOI: 10.3201/eid0812.020085.
- 148 **Rickettsial diseases and vector-borne illnesses: Image C.** *Anaplasma phagocytophilum* in neutrophil. Courtesy of Dr. Bobbi Pritt.
- 148 ***Mycoplasma pneumoniae*.**  Rottem S, Kosower ND, Kornspan JD. Contamination of tissue cultures by *Mycoplasma*. In: Ceccherini-Nelli L, ed: Biomedical tissue culture. 2016. DOI: 10.5772/51518.
- 149 **Systemic mycoses: Image A.** *Histoplasma*.  The US Department of Health and Human Services and Dr. D.T. McClenan.
- 149 **Systemic mycoses: Image B.** *Blastomyces dermatitidis* undergoing broad-base budding.  The US Department of Health and Human Services and Dr. Libero Ajello.
- 149 **Systemic mycoses: Image C.** Lesions of blastomycosis.  The US Department of Health and Human Services and Dr. Lucille K. Georg.
- 149 **Systemic mycoses: Image D.** Endospheres in coccidiomycosis.  The US Department of Health and Human Services.
- 149 **Systemic mycoses: Image E.** “Captain’s wheel” shape of *Paracoccidioides*.  The US Department of Health and Human Services and Dr. Lucille K. Georg.
- 150 **Opportunistic fungal infections: Image A.** Budding yeast of *Candida albicans*.  The US Department of Health and Human Services and Dr. Gordon Roberstad.
- 150 **Opportunistic fungal infections: Image B.** Germ tubes of *Candida albicans*.  The US Department of Health and Human Services and Dr. Hardin.
- 150 **Opportunistic fungal infections: Image C.** Oral thrush.  The US Department of Health and Human Services and Dr. Sol Silverman, Jr.
- 150 **Opportunistic fungal infections: Image E.** Aspergilloma in left lung.  Souilamas R, Souilamas JI, Alkhamees K, et al. Extra corporal membrane oxygenation in general thoracic surgery: a new single veno-venous cannulation. *J Cardiothorac Surg.* 2011;6:52. DOI: 10.1186/1749-8090-6-52.
- 150 **Opportunistic fungal infections: Image F.** *Cryptococcus neoformans* on India ink stain.  The US Department of Health and Human Services and Dr. Leonor Haley.
- 150 **Opportunistic fungal infections: Image G.** *Cryptococcus neoformans* on mucicarmin stain.  The US Department of Health and Human Services and Dr. Leonor Haley.
- 150 **Opportunistic fungal infections: Image H.** Mucor.  The US Department of Health and Human Services and Dr. Lucille K. Georg.
- 150 **Opportunistic fungal infections: Image I.** Mucormycosis.  Jiang N, Zhao C, Yang S, et al. A retrospective analysis of eleven cases of invasive rhino-orbito-cerebral mucormycosis presented with orbital apex syndrome initially. *BMC Ophthalmol.* 2016;16:10. DOI: 10.1186/s12886-016-0189-1.
- 151 ***Pneumocystis jirovecii*: Image A.** Interstitial opacities in lung.  Chuang C, Zhanhong X, Yinyin G, et al. Unsuspected *Pneumocystis* pneumonia in an HIV-seronegative patient with untreated lung cancer: circa case report. *J Med Case Rep.* 2007;1:15. DOI: 10.1186/1752-1947-1-115.
- 151 ***Pneumocystis jirovecii*: Image B.** CT of lung.  Oikonomou A, Prassopoulos P. Mimics in chest disease: interstitial opacities. *Insights Imaging.* 2013 Feb;4(1):9-27. DOI: 10.1007/s13244-012-0207-7.
- 151 ***Pneumocystis jirovecii*: Image C.** Disc-shaped yeast.  Kirby S, Satoskar A, Brodsky S, et al. Histological spectrum of pulmonary manifestations in kidney transplant recipients on sirolimus inclusive immunosuppressive regimens. *Diagn Pathol.* 2012;7:25. DOI: 10.1186/1746-1596-7-25.
- 151 ***Sporothrix schenckii*.** Subcutaneous mycosis.  Govender NP, Maphanga TG, Zulu TG, et al. An outbreak of lymphocutaneous sporotrichosis among mine-workers in South Africa. *PLoS Negl Trop Dis.* 2015 Sep;9(9):e0004096. DOI: 10.1371/journal.pntd.0004096.
- 152 **Protozoa—gastrointestinal infections: Image A.** *Giardia lamblia* trophozoite.  The US Department of Health and Human Services and Dr. Stan Erlandsen.
- 152 **Protozoa—gastrointestinal infections: Image B.** *Giardia lamblia* cyst.  The US Department of Health and Human Services.
- 152 **Protozoa—gastrointestinal infections: Image C.** Flask-shaped ulcers in colon in *Entamoeba histolytica* infection. The US Department of Health and Human Services and Dr. Mae Melvin.
- 152 **Protozoa—gastrointestinal infections: Image D.** *Entamoeba histolytica* trophozoites. The US Department of Health and Human Services.
- 152 **Protozoa—gastrointestinal infections: Image E.** *Entamoeba histolytica* cyst. The US Department of Health and Human Services.
- 152 **Protozoa—gastrointestinal infections: Image F.** *Cryptosporidium* oocysts. The US Department of Health and Human Services.
- 153 **Protozoa—CNS infections: Image A.** Ring-enhancing lesion in brain due to *Toxoplasma gondii*. Rabhi S, Amrani K, Maaroufi M, et al. Hemichorea-hemiballismus as an initial manifestation in a Moroccan patient with acquired immunodeficiency syndrome and toxoplasma infection: a case report and review of the literature. *Pan Afr Med J.* 2011;10:9. DOI: 10.4314/pamj.v10i0.72216.





























- 153 **Protozoa—CNS infections: Image B.** *Toxoplasma gondii* tachyzoite.  The US Department of Health and Human Services and Dr. L.L. Moore, Jr.
- 153 **Protozoa—CNS infections: Image C.** Primary amebic meningoencephalitis.  The US Department of Health and Human Services and Dr. Govinda S. Visvesvara.
- 153 **Protozoa—CNS infections: Image D.** *Trypanosoma brucei gambiense*.  The US Department of Health and Human Services and Dr. Mae Melvin.
- 154 **Protozoa—hematologic infections: Image A.** *Plasmodium* trophozoite ring form.  The US Department of Health and Human Services and Steven Glenn.
- 154 **Protozoa—hematologic infections: Image B.** *Plasmodium* with trophozoite ring.  The US Department of Health and Human Services and Mae Melvin.
- 154 **Protozoa—hematologic infections: Image C.** Gametocyte of *Plasmodium falciparum* in RBC membrane.  The US Department of Health and Human Services.
- 154 **Protozoa—hematologic infections: Image D.** *Babesia* with ring form and with “Maltese cross” form.  The US Department of Health and Human Services.
- 155 **Protozoa—others: Image A.** *Trypanosoma cruzi*.  The US Department of Health and Human Services and Dr. Mae Melvin.
- 155 **Protozoa—others: Image B.** Cutaneous leishmaniasis.  Sikorska K, Gesing M, Olszarski R, et al. Misdiagnosis and inappropriate treatment of cutaneous leishmaniasis: a case report. *Trop Dis Travel Med Vaccines*. 2022 Aug 1;8(1):18. DOI: 10.1186/s40794-022-00175-5.
- 155 **Protozoa—others: Image C.** Macrophage with amastigotes.  The US Department of Health and Human Services and Dr. Francis W. Chandler.
- 155 **Protozoa—others: Image D.** *Trichomonas vaginalis*.  The US Department of Health and Human Services.
- 156 **Nematodes (roundworms): Image A.** *Enterobius vermicularis* egg.  The US Department of Health and Human Services, B.G. Partin, and Dr. Moore.
- 156 **Nematodes (roundworms): Image B.** *Ascaris lumbricoides* egg.  The US Department of Health and Human Services.
- 156 **Nematodes (roundworms): Image C.** Cutaneous larva migrans.  Benbella I, Khalki H, Lahmadi K, et al. Syndrome de larva migrans cutanée sur pied malformé (à propos d'un cas). *Pan Afr Med J*. 2016;23:50. DOI: 10.11604/pamj.2016.23.50.8696.
- 156 **Nematodes (roundworms): Image D.** *Trichinella spiralis* cysts in muscle.  Franssen FFJ, Fonville M, Takumi K, et al. *Vet Res*. Antibody response against *Trichinella spiralis* in experimentally infected rats is dose dependent. 2011;42(1):113. DOI: 10.1186/1297-9716-42-113.
- 156 **Nematodes (roundworms): Image E.** Elephantiasis.  The US Department of Health and Human Services.
- 157 **Cestodes (tapeworms): Image A.** *Taenia solium*.  The US Department of Health and Human Services Robert J. Galindo.
- 157 **Cestodes (tapeworms): Image B.** Neurocysticercosis.  Sonhaye L, Tchaou M, Amadou A, et al. Valeur diagnostique de la tomodensitométrie dans la cysticercose cérébrale à Lomé. *Pan Afr Med J*. 2015;20:67. DOI: 10.11604/pamj.2015.20.67.6085.
- 157 **Cestodes (tapeworms): Image C.** *Echinococcus granulosus*.  The US Department of Health and Human Services.
- 157 **Cestodes (tapeworms): Image D.** Hyatid cyst of *Echinococcus granulosus*.  The US Department of Health and Human Services and Dr. I. Kagan.
- 157 **Cestodes (tapeworms): Image E.** *Echinococcus granulosus* cyst in liver.  Ma Z, Yang W, Yao Y, et al. The adventitia resection in treatment of liver hydatid cyst: a case report of a 15-year-old boy. *Case Rep Surg*. 2014;2014:123149. DOI: 10.1155/2014/123149.
- 157 **Trematodes (flukes): Image A.** *Schistosoma mansoni* egg with lateral spine.  The US Department of Health and Human Services and Dr. D. S. Martin.
- 157 **Trematodes (flukes): Image B.** *Schistosoma haematobium* egg with terminal spine.  The US Department of Health and Human Services.
- 158 **Ectoparasites: Image A.** Scabies.  Siegfried EC, Hebert AA. Diagnosis of atopic dermatitis: mimics, overlaps, and complications. *Clin Med*. 2015 May;4(5):884–917. DOI: 10.3390/jcm4050884.
- 158 **Ectoparasites: Image B.** Nit of a louse.  Turgut B, Kurt J, Çatak O, et al. Phthiasis palpebrarum mimicking lid eczema and blepharitis. *J Ophthalmol*. 2009;803951. DOI: 10.1155/2009/803951.
- 161 **DNA viruses: Image B.** Febrile pharyngitis.  Balfour HH Jr, Dunmire SK, Hogquist KA. *Clin Transl Immunology*. 2015;4(2):e33. DOI: 10.1038/cti.2015.1.
- 163 **Herpesviruses: Image A.** Keratoconjunctivitis in HSV-1 infection.  Yang HK, Han YK, Wee WR, et al. Bilateral herpetic keratitis presenting with unilateral neurotrophic keratitis in pemphigus foliaceus: a case report. *J Med Case Rep*. 2011;5:328. DOI: 10.1186/1752-1947-5-328.
- 163 **Herpesviruses: Image B.** Herpes labialis.  The US Department of Health and Human Services and Dr. Herrmann.
- 163 **Herpesviruses: Image C.** Neonatal herpes.  The US Department of Health and Human Services.
- 163 **Herpesviruses: Image D.** Varicella zoster rash.  The US Department of Health and Human Services and Dr. John Noble, Jr.
- 163 **Herpesviruses: Image F.** Hepatosplenomegaly due to EBV infection.  Gow NJ, Davidson RN, Ticehurst R, et al. Case report: no response to liposomal daunorubicin in a patient with drug-resistant HIV-associated visceral leishmaniasis. *PLoS Negl Trop Dis*. 2015 Aug;9(8):e0003983. DOI: 10.1371/journal.pntd.0003983.
- 163 **Herpesviruses: Image G.** Atypical lymphocytes in Epstein-Barr virus infection.  Takahashi T, Maruyama Y, Saitoh M, et al. Fatal Epstein-Barr virus reactivation in an acquired aplastic anemia patient treated with rabbit antithymocyte globulin and cyclosporine A. *Case Rep Hematol*. 2015;2015:926874. DOI: 10.1155/2015/926874.
- 163 **Herpesviruses: Image I.** Roseola vaccinia.  The US Department of Health and Human Services.
- 163 **Herpesviruses: Image J.** Kaposi sarcoma.  The US Department of Health and Human Services and Dr. Steve Kraus.
- 163 **HSV identification.** Positive Tzanck smear in HSV-2 infection.  The US Department of Health and Human Services and Joe Miller.
- 165 **Rotavirus.**  The US Department of Health and Human Services and Erskine Palmer.
- 166 **Rubella virus.** Rubella rash.  The US Department of Health and Human Services.
- 167 **Acute laryngotracheobronchitis.** Steeple sign. Reproduced, with permission, from Dr. Frank Gaillard and www.radiopaedia.org.
- 167 **Measles (rubeola) virus.** Koplik spots.  The US Department of Health and Human Services.
- 167 **Mumps virus.** Swollen neck and parotid glands.  The US Department of Health and Human Services.




- 168 **Zika virus.** Noncontrast-enhanced CT scan showing cerebellar hypoplasia. Petribu NCL, Fernandes ACV, Abath MB, et al. Common findings on head computed tomography in neonates with confirmed congenital Zika syndrome. *Radiol Bras*. 2018 Nov-Dec;51(6):366-371. DOI: 10.1590/0100-3984.2017.0119.
- 169 **Rabies virus: Image A.** Transmission electron micrograph. The US Department of Health and Human Services Dr. Fred Murphy, and Sylvia Whitfield.
- 169 **Rabies virus: Image B.** Negri bodies. The US Department of Health and Human Services and Dr. Daniel P. Perl.
- 169 **Ebola virus.** The US Department of Health and Human Services and Cynthia Goldsmith.
- 170 **Hepatitis viruses.** Mild lobular activity and a Councilman body. Sedej K, Toplak N, Praprotnik M, et al. Autoimmune hepatitis as a presenting manifestation of mixed connective tissue disease in a child. Case report and review of the literature. *Pediatr Rheumatol Online J*. 2015 Nov 10;13(1):47. DOI: 10.1186/s12969-015-0046-4.
- 176 **Osteomyelitis.** X-ray (left) and MRI (right) views. Huang P-Y, Wu P-K, Chen C-F, et al. Osteomyelitis of the femur mimicking bone tumors: a review of 10 cases. *World J Surg Oncol*. 2013;11:283. DOI: 10.1186/1477-7819-11-283.
- 177 **Red rashes of childhood: Image B.** Rash of measles. The US Department of Health and Human Services.
- 177 **Red rashes of childhood: Image D.** Sandpaperlike rash of scarlet fever. The US Department of Health and Human Services.
- 177 **Red rashes of childhood: Image E.** Chicken pox. The US Department of Health and Human Services and Dr. J.D. Millar.
- 178 **Common vaginal infections: Image B.** *Trichomonas* vaginitis. The US Department of Health and Human Services and Jim Pledger.
- 178 **Common vaginal infections: Image C.** Motile trichomonads. Joe Miller.
- 178 **Common vaginal infections: Image D.** *Candida* vulvovaginitis. The US Department of Health and Human Services, Dr. N.J. Fiumara, and Dr. Gavin Hart.
- 179 **Sexually transmitted infections: Image A.** Chancroid. The US Department of Health and Human Services and Dr. Greg Hammond.
- 179 **Sexually transmitted infections: Image B.** Condylomata acuminata. The US Department of Health and Human Services and Susan Lindsley.
- 179 **Sexually transmitted infections: Image D.** Donovanosis. The US Department of Health and Human Services and Dr. Pinozzi.
- 179 **Sexually transmitted infections: Image E.** Buboec of lymphogranuloma venereum. The US Department of Health and Human Services and O.T. Chambers.
- 179 **Sexually transmitted infections: Image F.** Chancre of primary syphilis. The US Department of Health and Human Services and Susan Lindsley.
- 180 **TORCH infections: Image A.** “Blueberry muffin” rash. Benmiloud S, Elhaddou G, Belghiti ZA, et al. Blueberry muffin syndrome. *Pan Afr Med J*. 2012;13:23.
- 180 **TORCH infections: Image B.** Cataract in infant with congenital rubella. The US Department of Health and Human Services.
- 180 **TORCH infections: Image C.** Periventricular calcifications in congenital cytomegalovirus infection. Bonthius D, Perlman S. Congenital viral infections of the brain: lessons learned from lymphocytic choriomeningitis virus in the neonatal rat. *PLoS Pathog*. 2007;3:e149. DOI: 10.1371/journal.ppat.0030149.

- 181 **Pelvic inflammatory disease: Image A.** Purulent cervical discharge. The US Department of Health and Human Services and Dr. Lourdes Fraw and Jim Pledger.
- 181 **Pelvic inflammatory disease: Image B.** Adhesions in Fitz-Hugh-Curtis syndrome. Grigoriadis G, Green J, Amin A, et al. Fitz-Hugh-Curtis syndrome: an incidental diagnostic finding during laparoscopic sterilization. *Cureus* 12(9):e1030 4. DOI: 10.7759/cureus.10304.
- 186 **Vancomycin.** Red man syndrome. O'Meara P, Borici-Mazi R, Morton R, et al. DRESS with delayed onset acute interstitial nephritis and profound refractory eosinophilia secondary to vancomycin. *Allergy Asthma Clin Immunol*. 2011;7:16. DOI: 10.1186/1710-1492-7-16.













Pathology





- 205 **Necrosis: Image A.** Coagulative necrosis. The US Department of Health and Human Services and Dr. Steven Rosenberg.
- 205 **Necrosis: Image B.** Liquefactive necrosis. Ghaly R, Candido K, Knezevic N. Perioperative fatal embolic cerebrovascular accident after radical prostatectomy. *Surg Neurol Int*. 2010;1:26. DOI: 10.4103/2152-7806.65055.
- 205 **Necrosis: Image C.** Caseous necrosis. Szalusi-Jordanow O, Augustynowicz-Kopeć E, Czopowicz M, et al. Intracardiac tuberculomas caused by *Mycobacterium tuberculosis* in a dog. *BMC Vet Res*. 2016 Jun 14;12(1):109. DOI: 10.1186/s12917-016-0731-7.
- 205 **Necrosis: Image D.** Fat necrosis. Chee C. Panniculitis in a patient presenting with a pancreatic tumour and polyarthritis: a case report. *J Med Case Rep*. 2009 Jul 6;3:7331. DOI: 10.4076/1752-1947-3-7331.
- 205 **Necrosis: Image E.** Fibrinoid necrosis. Ahmed S, Kitchen J, Hamilton S, et al. A case of polyarteritis nodosa limited to the right calf muscles, fascia, and skin: a case report. *J Med Case Rep*. 2011 Sep 12;5:450. DOI: 10.1186/1752-1947-5-450.
- 205 **Necrosis: Image F.** Acral gangrene. The US Department of Health and Human Services and William Archibald.
- 206 **Ischemia.** Van Assche LM, Kim HW, Jensen CJ, et al. A new CMR protocol for non-destructive, high resolution, ex-vivo assessment of the area at risk simultaneous with infarction: validation with histopathology. *J Cardiovasc Magn Reson*. 2012;14(Suppl 1):O7. DOI: 10.1186/1532-429X-14-S1-O7.
- 206 **Types of infarcts: Image B.** Pale infarct. Hanes DW, Wong ML, Jenny Chang CW, et al. Embolization of the first diagonal branch of the left anterior descending coronary artery as a porcine model of chronic trans-mural myocardial infarction. *J Transl Med*. 2015 Jun 6;13:187. DOI: 10.1186/s12967-015-0547-4.
- 207 **Types of calcification.** Dystrophic calcification. Adapted from da Silva RMS, de Mello RJV. Fat deposition in the left ventricle: descriptive and observational study in autopsy. *Lipids Health Dis*. 2017 May 2;16(1):86. DOI: 10.1186/s12944-017-0475-9.
- 207 **Psammoma bodies.** Wang C, Chen Y, Zhang L, et al. Thoracic psammomatous meningioma with osseous metaplasia: a controversial diagnosis of a case report and literature review. *World J Surg Oncol*. 2019 Aug 24;17(1):150. doi: 10.1186/s12957-019-1694-5.
- 208 **Amyloidosis: Image A.** Gastric amyloid deposits on Congo red stain. Desport E, Bridoux F, Sirac C, et al. Centre national de référence pour l'amylose AL et les autres maladies par dépôts d'immunoglobulines monoclonales. Al amyloidosis. *Orphanet J Rare Dis*. 2012 Aug 21;7:54. doi: 10.1186/1750-1172-7-54.
- 208 **Amyloidosis: Image B.** Gastric amyloid deposits on Congo stain viewed under polarized light. Desport E, Bridoux F, Sirac C, et al. Centre national de référence pour l'amylose AL et les autres maladies par dépôts d'immunoglobulines monoclonales. Al amyloidosis. *Orphanet J Rare Dis*. 2012 Aug 21;7:54. doi: 10.1186/1750-1172-7-54.

- 210 Acute inflammation.** Pericardium with severe inflammation, neutrophilic infiltration and fibrin with entrapped clusters of bacteria.  Ajili F, Souissi A, Bougrine F, et al. Coexistence of pyoderma gangrenosum and sweet's syndrome in a patient with ulcerative colitis. *Pan Afr Med J*. 2015;21:151. DOI: 10.11604/pamj.2015.21.151.6364.
- 213 Granulomatous inflammation.** Granuloma.  Guirado E, Schlesinger LS. Modeling the Mycobacterium tuberculosis granuloma: the critical battlefield in host immunity and disease. *Front Immunol*. 2013;4:98. DOI: 10.3389/fimmu.2013.00098.
- 214 Scar formation: Image A.** Hypertrophic scar.  Baker R, Urso-Baiarda F, Linge C, et al. Cutaneous scarring: a clinical review. *Dermatol Res Pract*. 2009;2009:625376. DOI: 10.1155/2009/625376.
- 214 Scar formation: Image B.** Keloid scar.  Tirgan MH. Neck keloids: evaluation of risk factors and recommendation for keloid staging system. *F1000Res*. 2016 Jun 28;5:1528. DOI: 10.12688/f1000research.9086.2.
- 219 Common metastases: Image A.** Multiple foci of low signal intensity of the bone marrow.  Oprea-Lager DE, Cysouw MCF, Boellaard R, et al. Bone metastases are measurable: the role of whole-body MRI and positron emission tomography. *Front Oncol*. 2021;11:772530. DOI: 10.3389/fonc.2021.772530
- 219 Common metastases: Image B.** Right liver lobe with a metastatic tumor and a satellite focus.  Paschke L, Juszczak M, Slupski M. Surgical treatment of recurrent urachal carcinoma with liver metastasis: a case report and literature review. *World J Surg Oncol*. 2016 Nov 28;14(1):296. DOI: 10.1186/s12957-016-1057-4.
- 225 Lipofuscin.**  Bae Y, Ito T, Iida T, et al. Intracellular propionibacterium acnes infection in glandular epithelium and stromal macrophages of the prostate with or without cancer. *PLoS One*. 2014 Feb 28;9(2):e90324. DOI: 10.1371/journal.pone.0090324.
- Cardiovascular**
- 288 Heart anatomy: Image A.** MRI showing normal cardiac anatomy.  Zhang J, Chen L, Wang X, et al. Compounding local invariant features and global deformable geometry for medical image registration. *PLoS One*. 2014;9(8):e105815. DOI: 10.1371/journal.pone.0105815.
- 302 Congenital heart diseases: Image B.** Tetralogy of Fallot.  Rashid AKM: Heart diseases in Down syndrome. In: Dey S, ed: Down syndrome. DOI: 10.5772/46009.
- 303 Congenital heart diseases: Image D.** Atrial septal defect.  Teo KSL, Dundon BK, Molaei P, et al. Percutaneous closure of atrial septal defects leads to normalisation of atrial and ventricular volumes. *J Cardiovasc Magn Reson*. 2008;10(1):55. DOI: 10.1186/1532-429X-10-55.
- 303 Congenital heart diseases: Image E.** Patent ductus arteriosus.  Henjes CR, Nolte I, Wesfaedt P. Multidetector-row computed tomography of thoracic aortic anomalies in dogs and cats: patent ductus arteriosus and vascular rings. *BMC Vet Res*. 2011;7:57. DOI: 10.1186/1746-6148-7-57.
- 304 Coarction of the aorta.** MRI showing coarctation of the aorta.  Parisis, H, Al-Alao, B, Soo, A., et al. Single stage repair of a complex pathology: end stage ischaemic cardiomyopathy, ascending aortic aneurysm and thoracic coarctation. *J Cardiothorac Surg*. 2011;6:152. DOI: 10.1186/1749-8090-6-152.
- 304 Hypertension.** "String of beads" appearance of renal artery in fibromuscular dysplasia.  Plouin PF, Perdu J, LaBatide-Alanore A, et al. Fibromuscular dysplasia. *Orphanet J Rare Dis*. 2007;7:28. DOI: 10.1186/1750-1172-2-28.
- 305 Hyperlipidemia signs: Image C.** Tendinous xanthoma.  Huri G, Joachim N. An unusual case of hand xanthomatosis. *Case Rep Orthop*. 2013;2013:183018. DOI: 10.1155/2013/183018.
- 306 Cholesterol emboli syndrome.** Cholesterol emboli.  Yamaguchi S, Kakazu M, Osamu A. Intestinal cholesterol embolism resulting from intra-aortic balloon pumping: a case report. *J Med Case Rep*. 2014 Jun 20;8:213. DOI: 10.1186/1752-1947-8-213.
- 306 Arteriosclerosis: Image A.** Hyaline type.  Sostaric-Zuckermann IC, Borel N, Kaiser C, et al. Chlamydia in canine or feline coronary arteriosclerotic lesions. *BMC Res Notes*. 2011 Sep 9;4:350. DOI: 10.1186/1756-0500-4-350.
- 306 Arteriosclerosis: Image B.** Hyperplastic type.  Huang J, Han SS, Qin DD, et al. Renal interstitial arteriosclerotic lesions in lupus nephritis patients: a cohort study from China. *PLoS One*. 2015 Nov 6;10(11):e0141547. DOI: 10.1371/journal.pone.0141547.
- 307 Aortic dissection.**  Qi Y, Ma X, Li G, et al. Three-dimensional visualization and imaging of the entry tear and intimal flap of aortic dissection using CT virtual intravascular endoscopy. *PLoS One*. 2016;11(10) e0164750. DOI: 10.1371/journal.pone.0164750.
- 309 Evolution of myocardial infarction: Images A and B.** Heart tissue at 0-24 hours (image A) and 1-3 days (image B) after myocardial infarction.  Chang J, Nair V, Luk A, et al. Pathology of myocardial infarction. *Diagn Histopath*. 2013;19:7-12. DOI: 10.1016/j.mpdhp.2012.11.001.
- 309 Evolution of myocardial infarction: Image C.** Heart tissue 3-14 days after myocardial infarction.  Diarmid AK, Pellicori P, Cleland JG, et al. Taxonomy of segmental myocardial systolic dysfunction. *Eur Heart J*. 2017 Apr 1;38(13):942-954. DOI: 10.1093/eurheartj/ehw140.
- 309 Evolution of myocardial infarction: Image D.** Heart tissue after myocardial infarction showing dense fibrous scar replacing myocyte loss.  Michaud K, Basso C, d'Amati G, et al on behalf of the Association for European Cardiovascular Pathology. Diagnosis of myocardial infarction at autopsy: AECVP reappraisal in the light of the current clinical classification. *Virchows Arch*. 2020;476:179-194.
- 314 Myocardial infarction complications: Image A.** Papillary muscle rupture.  Routy B, Huynh T, Fraser R, et al. Vascular endothelial cell function in catastrophic antiphospholipid syndrome: a case report and review of the literature. *Case Rep Hematol*. 2013;2013:710365. DOI: 10.1155/2013/710365.
- 314 Myocardial infarction complications: Image B.** Free wall rupture of left ventricle.  Zacarias ML, da Trindade H, Tsutsu J, et al. Left ventricular free wall impeding rupture in post-myocardial infarction period diagnosed by myocardial contrast echocardiography: case report. *Cardiovasc Ultrasound*. 2006;4:7. DOI: 10.1186/1476-7120-4-7.
- 315 Cardiomyopathies: Image A.** Dilated cardiomyopathy.  Gho JMIH, van Es R, Stathonikos N, et al. High resolution systematic digital histological quantification of cardiac fibrosis and adipose tissue in phospholamban p.Arg14del mutation associated cardiomyopathy. *PLoS One*. 2014;9:e94820. DOI: 10.1371/journal.pone.0094820.
- 315 Cardiomyopathies: Image B.** Hypertrophic obstructive cardiomyopathy.  Benetti MA, Belo Nunes RA, Benvenuti LA. Case 2/2016 - 76-year-old male with hypertensive heart disease, renal tumor and shock. *Arq Bras Cardiol*. 2016 May; 106(5): 439-446. DOI: 10.5935/abc.20160067.
- 316 Heart failure.** Pitting edema.  Ong HS, Sze CW, Koh TW, Coppack SW. How 40 kilograms of fluid retention can be overlooked: two case reports. *Cases J*. 2009;2(1):33. DOI: 10.1186/1757-1626-2-33.
- 317 Cardiac tamponade: Image A.** Echocardiogram showing cardiac tamponade.  Maharaj SS, Chang SM. Cardiac tamponade as the initial presentation of systemic lupus erythematosus: a case report and review of the literature. *Pediatr Rheumatol Online J*. 2015;13: 9. DOI: 10.1186/s12969-015-0005-0.
- 318 Infective endocarditis: Image A.** Vegetations on heart valves.  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.













- 318 **Infective endocarditis: Image C.** Osler nodes.  Yang ML, Chen YH, Lin WR, et al. Case report: infective endocarditis caused by *Brevundimonas vesicularis*. *BMC Infect Dis*. 2006;6:179. DOI: 10.1186/1471-2334-6-179.
- 319 **Acute pericarditis.**  Bogaert J, Francone M. Cardiovascular magnetic resonance in pericardial diseases. *J Cardiovasc Magn Reson*. 2009;11:14. DOI: 10.1186/1532-429X-11-14.
- 320 **Hereditary hemorrhagic telangiectasia.** Telangiectasias on the tongue and hard palate.  Kiyeng JC, Siika A, Koech C, et al. Definite hereditary hemorrhagic telangiectasia in a 60-year-old black Kenyan woman: a case report. *J Med Case Rep*. 2016 May 25;10(1):126. DOI: 10.1186/s13256-016-0909-4.























Endocrine
















- 330 **Thyroid development: Image A.** Thyroglossal duct cyst.  Kartini D, Panigoro S, Harahap A. Sistrunk procedure on malignant thyroglossal duct cyst. *Case Rep Oncol Med*. 2020 Jan 16;2020:6985746. DOI: 10.1155/2020/6985746.
- 344 **Hypothyroidism vs hyperthyroidism: Image A.** Onycholysis.  Gallouj S, Mernissi FZ. Leuconychie transversale induite par la manucurie: y a-t-il un apport de la dermoscopie? [Transverse leuconychia induced by manicure: is there a contribution from dermoscopy?]. *Pan Afr Med J*. 2014;18:39. Published 2014 May 10. DOI: 10.11604/pamj.2014.18.39.3761.
- 344 **Hypothyroidism vs hyperthyroidism: Image B.** Pretibial myxedema.  Fred H, van Dijk HA. Images of memorable cases: case 144. Connexions Web site. Dec 8, 2008. Available at: <https://cnx.org/contents/SCJeD6Jm@3/Images-of-Memorable-Cases-Case-144>.
- 344 **Hypothyroidism vs hyperthyroidism: Image C.** Periorbital edema.  Dandekar F, Camacho M, Valerio J, et al. *Case Rep Ophthalmol Med*. 2015;2015:126501. DOI: 10.1155/2015/126501.
- 345 **Hypothyroidism: Image B.** Florid Hashimoto's thyroiditis histology.  Oruci M, Ito Y, Buta M, et al. Right thyroid hemiagenesis with adenoma and hyperplasia of parathyroid glands -case report. *BMC Endocr Disord*. 2012 Nov 13;12:29. DOI: 10.1186/1472-6823-12-29.
- 345 **Hypothyroidism: Image C.**  Mazza E, Quagliano F, Suriani A, et al. Thyroidectomy for painful thyroiditis resistant to steroid treatment: three new cases with review of the literature. *Case Rep Endocrinol*. 2015;2015:138327. DOI: 10.1155/2015/138327.
- 345 **Hypothyroidism: Image E.** Before and after treatment of congenital hypothyroidism.  Bailey P. The thyroid gland in medicine. *Popular Science Monthly* August 1897;481-489. Available at <https://archive.org/details/popularsciencemo51newy/page/486/mode/2up>.
- 345 **Hypothyroidism: Image F.** Congenital hypothyroidism.  Rastogi MV, LaFranchi SH. Congenital hypothyroidism. *Orphanet J Rare Dis*. 2010 Jun 10;5:17. DOI: 10.1186/1750-1172-5-17.
- 346 **Hyperthyroidism: Image B.** Graves disease histology.  LiVolsi VA, Baloch ZW. The pathology of hyperthyroidism. *Front Endocrinol (Lausanne)*. 2018 Dec 3;9:737. DOI: 10.3389/fendo.2018.00737.
- 346 **Thyroid adenoma.**  Terada T. Brain metastasis from thyroid adenomatous nodules or an encapsulated thyroid follicular tumor without capsular and vascular invasion: a case report. *Cases J*. 2009;2:7180. DOI: 10.4076/1757-1626-2-7180.
- 348 **Hypoparathyroidism.** Shortened 4th and 5th digits.  Ferrario C, Gastaldi G, Portmann L, et al. Bariatric surgery in an obese patient with Albright hereditary osteodystrophy: a case report. *J Med Case Rep*. 2013;7:111. DOI: 10.1186/1752-1947-7-111.
- 349 **Hyperparathyroidism.** Multiple lytic lesions.  Khaoula BA, Kaouther BA, Ines C, et al. An unusual presentation of primary hyperparathyroidism: pathological fracture. *Case Rep Orthop*. 2011;2011:521578. DOI: 10.1155/2011/521578.

- 353 **Adrenal insufficiency.** Mucosal hyperpigmentation in primary adrenal insufficiency.  Wina Dharmesti NW, Saraswati MR, Suastika K, et al. Challenging Diagnosis of Addison's Disease Presenting with Adrenal Crisis. *Case Rep Endocrinol*. 2021 Oct 11;2021:7137950. DOI: 10.1155/2021/7137950.
- 355 **Pheochromocytoma.**  Muneer T, Tariq A, Siddiqui A H, et al. Malignant pheochromocytoma with widespread bony and pulmonary metastases. *Cureus*. 10(9):e3348. DOI: 10.7759/cureus.3348.
- 356 **Multiple endocrine neoplasias.** Mucosal neuroma.  Martucciello G, Lerone M, Bricco L, et al. Multiple endocrine neoplasias type 2B and RET proto-oncogene. *Ital J Pediatr*. 2012;38:9. DOI: 10.1186/1824-7288-38-9.
- 357 **Carcinoid tumors.**  Katsuyoshi F, Hidenobu K, Masayuki O, et al. Gastric Carcinoid with Hypergastrinemia: Report of Three Cases. *Case Reports in Medicine*. 2010;348761. DOI: 10.1155/2010/348761.


















Gastrointestinal

- 365 **Ventral wall defects: Image A.** Gastroschisis.  Bhat V, Moront M, Bhandari V. Gastroschisis: a state-of-the-art review. *Children (Basel)*. 2020 Dec 17;7(12):302. DOI: 10.3390/children7120302.
- 365 **Ventral wall defects: Image B.** Omphalocele.  Lamquami S, Mamouni N, Errarhay S, et al. Antenatal diagnosis of isolated omphalocele. *Pan Afr Med J*. 2015 Jul 31;21:233. doi: 10.11604/pamj.2015.21.233.7151.
- 365 **Ventral wall defects: Image C.** Congenital diaphragmatic hernia.  Rastogi MV, LaFranchi SH. Congenital hypothyroidism. *Orphanet J Rare Dis*. 2010;5:17. DOI: 10.1186/1750-1172-5-17.
- 366 **Intestinal atresia.**  Saha M. Alimentary tract atresias associated with anorectal malformations: 10 years' experience. *J Neonatal Surg*. 2016 Oct-Dec;5(4):43. DOI: 10.21699/jns.v5i4.449.
- 367 **Pancreas and spleen embryology.** Annular pancreas.  Mahdi B, Selim S, Hassen T, et al. A rare cause of proximal intestinal obstruction in adults—annular pancreas: a case report. *Pan Afr Med J*. 2011;10:56.
- 367 **Retroperitoneal structures.**  Sammut J, Ahiaku E, Williams DT. Complete regression of renal tumour following ligation of an accessory renal artery during repair of an abdominal aortic aneurysm. *Ann R Coll Surg Engl*. 2012 Sep;94(6):e198–e200. DOI: 10.1308/003588412X13373405384972.
- 369 **Digestive tract anatomy.** Transverse histologic section of the normal oesophageal wall.  Wei Y, Wu S, Shi D, et al. Oesophageal carcinoma: comparison of ex vivo high-resolution 3.0 T MR imaging with histopathological findings. *Sci Rep*. 2016 Oct 11;6:35109. DOI: 10.1038/srep35109.
- 369 **Digestive tract histology: Image A.**  Sato Y, Fujino T, Kasagawa A, et al. Twelve-year natural history of a gastric adenocarcinoma of fundic gland type. *Clin J Gastroenterol*. 2016 Dec;9(6):345-351. DOI: 10.1007/s12328-016-0680-5.
- 369 **Digestive tract histology: Image B.** Jejunum. Non-neoplastic parietal cells.  Chen J, Tellez G, Richards JD, Escobar J. Identification of Potential Biomarkers for Gut Barrier Failure in Broiler Chickens. *Front Vet Sci*. 2015 May 26;2:14. DOI: 10.3389/fvets.2015.00014.
- 374 **Liver tissue architecture.** Portal triad.  Liver development. In: Zorn AM. Stem book. Cambridge: Harvard Stem Cell Institute, 2008. Available at www.stembook.org/node/512.
- 375 **Biliary structures.** Gallstones.  Issa H, Al-Salem AH. Hepatobiliary manifestations of sickle cell anemia. *Gastroenterology Res*. 2010 Feb;3(1):1-8. DOI: 10.4021/gr2010.01.
- 377 **Hernias: Image A.** Congenital diaphragmatic hernia.  Tovar J. Congenital diaphragmatic hernia. *Orphanet J Rare Dis*. 2012;7:1. DOI: 10.1186/1750-1172-7-1.




























- 381 **Peyer patches.**  Kapoor K, Singh O. Ileal and jejunal Peyer's patches in buffalo calves: Histomorphological comparison. *Vet World*. 2015 Nov;8(11):1273-8. DOI: 10.14202/vetworld.2015.1.
- 383 **Oral pathologies: Image A.** Aphthous ulcer.  Peterson DE, O'Shaughnessy JA, Rugo HS, et al. Oral mucosal injury caused by mammalian target of rapamycin inhibitors: emerging perspectives on pathobiology and impact on clinical practice. *Cancer Med*. 2016 Aug;5(8):1897-1907. DOI: 10.1002/cam4.761.
- 383 **Oral pathologies: Image B.** Leukoplakia of tongue.  The US Department of Health and Human Services and J.S. Greenspan, B.D.S., University of California, San Francisco; Sol Silverman, Jr., D.D.S.
- 383 **Oral pathologies: Image C.** Sialolithiasis.  Pastor-Ramos V, Cuervo-Diaz A, Aracil-Kessler L. Sialolithiasis. Proposal for a new minimally invasive procedure: piezoelectric surgery. *J Clin Exp Dent*. 2014 Jul;6(3):e295-e298. DOI: 10.4317/jced.51253.
- 383 **Oral pathologies: Image D.** Pleomorphic adenoma histology.  Genelhu MC, Cardoso SV, Gobbi H, Cassali GD. A comparative study between mixed-type tumours from human salivary and canine mammary glands. *BMC Cancer*. 2007 Nov;28;7:218. DOI: 10.1186/1471-2407-7-218.
- 383 **Achalasia.**  Agrusa A, Romano G, Frazzetta G, et al. Achalasia secondary to submucosal invasion by poorly differentiated adenocarcinoma of the cardia, siewert II: consideration on preoperative workup. *Case Rep Surg*. 2014;2014:654917. DOI: 10.1155/2014/654917.
- 384 **Other esophageal pathologies: Image A.** White pseudomembrane of *Candida* infection in esophagitis.  Takahashi Y, Nagata N, Shimbo T. Long-term trends in esophageal candidiasis prevalence and associated risk factors with or without HIV infection: lessons from an endoscopic study of 80,219 patients. *PLoS One*. 2015; 10(7):e0133589. DOI: 10.1371/journal.pone.0133589.
- 384 **Other esophageal pathologies: Image B.** Esophageal varices on endoscopy.  Costaguta A, Alvarez F. Etiology and management of hemorrhagic complications of portal hypertension in children. *Int J Hepatol*. 2012;2012:879163. DOI: 10.1155/2012/879163.
- 384 **Other esophageal pathologies: Image C.** Pneumomediastinum.  Bakshshae M, Jokar MH, Mirfeizi Z, et al. Subcutaneous emphysema, pneumomediastinum and pneumothorax in a patient with dermatomyositis. *Iran J Otorhinolaryngol*. 2017 Mar;29(91):113-116.
- 385 **Barrett esophagus: Image A.** Endoscopy image.  Japan Esophageal Society. Japanese classification of esophageal cancer, 11th edition: part I. *Esophagus*. 2017;14(1):1-36. DOI: 10.1007/s10388-016-0551-7.
- 386 **Ménétrier disease.**  Chung M, Pittenger J, Flomenhoft D, et al. Atypical clinical and diagnostic features in Ménétrier's disease in a child. *Case Rep Gastrointest Med*. 2011;2011:480610. DOI: 10.1155/2011/480610.
- 386 **Gastric cancer.**  Tan Y, Fu J, Li X. A minor (<50%) signet-ring cell component associated with poor prognosis in colorectal cancer patients: a 26-year retrospective study in China. *PLoS One*. 2015;10(3):e0121944. DOI: 10.1371/journal.pone.0121944.
- 387 **Ulcer complications.** Free air under diaphragm in perforated ulcer. Reproduced, with permission, from Dr. Frank Gaillard and www.radiopaedia.org.
- 388 **Malabsorption syndromes: Image A.** Celiac disease.  Sedda S, Caruso R, Marafini I, et al. Pyoderma gangrenosum in refractory celiac disease: a case report. *BMC Gastroenterol*. 2013;13:162. DOI: 10.1186/1471-230X-13-162.
- 388 **Malabsorption syndromes: Image B.** *Tropheryma whipplei* on PAS stain.  Tran HA. Reversible hypothyroidism and Whipple's disease. *BMC Endocr Disord*. 2006;6:3. DOI: 10.1186/1472-6823-6-3.
- 389 **Inflammatory bowel diseases: Image A.** Wall thickening in Crohn disease.  Imširović, Bilal & Zerem, Enver & Guso, Emir. (2021). Role of Imaging in Small Bowel Crohn's Disease. 10.5772/intechopen.96098.
- 389 **Inflammatory bowel diseases: Images B and C.** Normal mucosa (B) and punched-out ulcers (C) in ulcerative colitis.  Ishikawa D, Ando T, Watanabe O, et al. Images of colonic real-time tissue sonoelastography correlate with those of colonoscopy and may predict response to therapy in patients with ulcerative colitis. *BMC Gastroenterol*. 2011;11:29. DOI: 10.1186/1471-230X-11-29.
- 390 **Appendicitis.**  Ali M, Iqbal J, Sayani R. Accuracy of computed tomography in differentiating perforated from nonperforated appendicitis, taking histopathology as the gold standard. *Cureus*. 2018 Dec 15;10(12):e3735. DOI: 10.7759/cureus.3735.
- 390 **Diverticula of the gastrointestinal tract: Image B.** Diverticulosis.  Sartelli M, Moore FA, Ansaloni L, et al. A proposal for a CT driven classification of left colon acute diverticulitis. *World J Emerg Surg*. 2015;10:3. DOI: 10.1186/1749-7922-10-3.
- 390 **Diverticula of the gastrointestinal tract: Image C.** Diverticulitis.  Hupfeld L, Burcharth J, Pommergaard HC, Rosenberg J. The best choice of treatment for acute colonic diverticulitis with purulent peritonitis is uncertain. *Biomed Res Int*. 2014;2014:380607. DOI: 10.1155/2014/380607.
- 391 **Zenker diverticulum.**  Dionigi G, Sessa F, Rovera F, et al. Ten year survival after excision of squamous cell cancer in Zenker's diverticulum: report of a case. *World J Surg Oncol*. 2006 Mar 28;4:17. DOI: 10.1186/1477-7819-4-17.
- 392 **Intussusception.** Ultrasound showing target sign.  Christianakis E, Sakelaropoulos A, Papantziimas C, et al. Pelvic plastron secondary to acute appendicitis in a child presented as appendiceal intussusception. a case report. *Cases J*. 2008;1:135. DOI: 10.1186/1757-1626-1-135.
- 392 **Volvulus.** Coffee bean sign.  Yigit M, Turkdogan KA. Coffee bean sign, whirl sign and bird's beak sign in the diagnosis of sigmoid volvulus. *Pan Afr Med J*. 2014;19:56. DOI: 10.11604/pamj.2014.19.56.5142.
- 393 **Other intestinal disorders: Image A.** Necrosis due to occlusion of SMA.  Van De Winkel N, Cheragwandi A, Nieboer K, et al. Superior mesenteric arterial branch occlusion causing partial jejunal ischemia: a case report. *J Med Case Rep*. 2012;6:48. DOI: 10.1186/1752-1947-6-48.
- 393 **Other intestinal disorders: Image B.** Loops of dilated bowel suggestive of small bowel obstruction.  Welte FJ, Crosso M. Left-sided appendicitis in a patient with congenital gastrointestinal malrotation: a case report. *J Med Case Rep*. 2007;1:92. DOI: 10.1186/1752-1947-1-92.
- 393 **Other intestinal disorders: Image C.** Pneumatosis intestinalis.  Pelizzo G, Nakib G, Goruppi I, et al. Isolated colon ischemia with norovirus infection in preterm babies: a case series. *J Med Case Rep*. 2013;7:108. DOI: 10.1186/1752-1947-7-108.
- 394 **Colonic polyps: Image A.**  Shussman N, Wexner SD. Colorectal polyps and polyposis syndromes. *Gastroenterol Rep (Oxf)*. 2014 Feb;2(1):1-15. doi: 10.1093/gastro/got041.
- 394 **Colonic polyps: Image B.** Peutz-Jeghers syndrome.  Gondak RO, et al. Oral pigmented lesions: Clinicopathologic features and review of the literature. *Med Oral Patol Oral Cir Bucal*. 2012 Nov 1;17(6):e919-24.
- 394 **Colonic polyps: Image D.** Adenomatous polyps in villous adenoma.  Rehani B, Chasen RM, Dowdy Y, et al. Advanced adenoma diagnosis with FDG PET in a visibly normal mucosa: a case report. *J Med Case Reports*. 2007;1:99. DOI: 10.1186/1752-1947-1-99.















- 395 **Colorectal cancer: Image A.** Polyp.  Takiyama A, Nozawa H, Ishihara S, et al. Secondary metastasis in the lymph node of the bowel invaded by colon cancer: a report of three cases. *World J Surg Oncol*. 2016;14:273. DOI: 10.1186/s12957-016-1026-y.
- 396 **Cirrhosis and portal hypertension.** Liver abnormalities in cirrhosis.  Blackburn PR, Hickey RD, Nace RA, et al. Silent tyrosinemia type I without elevated tyrosine or succinylacetone associated with liver cirrhosis and hepatocellular carcinoma. *Hum Mutat*. 2016 Oct;37(10):1097–1105. DOI: 10.1002/humu.23047.
- 398 **Alcoholic liver disease: Image B.** Mallory bodies.  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.
- 398 **Alcoholic liver disease: Image C.**  Miranda-Mendez A, Lugo-Baruqui A, Armendariz-Borunda J. Molecular basis and current treatment for alcoholic liver disease. *Int J Environ Res Public Health*. 2010 May;7(5):1872–88. DOI: 10.3390/ijerph7051872.
- 399 **Liver tumors: Image A.** Cavernous liver hemangioma.  Yano T, Kobayashi T, Kuroda S, et al. Obstructive jaundice caused by a giant liver hemangioma with Kasabach-Merritt syndrome: a case report. *Surg Case Rep*. 2015 Dec;1(1):93. DOI: 10.1186/s40792-015-0095-4.
- 399 **Liver tumors: Image B.** Hepatocellular carcinoma/hepatoma. Reproduced, with permission, from Jean-Christophe Fournet and Humpath.
- 400 **α_1 -antitrypsin deficiency.** Liver histology.  Dettmer M, Cathomas G, Willi N. Alpha 1-antitrypsin retention in an ectopic liver. *Diagn Pathol*. 2011 Feb 28;6:16. DOI: 10.1186/1746-1596-6-16.
- 402 **Wilson disease.** Kayser-Fleischer rings.  Herbert L. Fred, MD, Hendrik A. van Dijk. Images of Memorable Cases: 50 Years at the Bedside. OpenStax CNX. Dec 8, 2008. Download for free at <http://cnx.org/contents/e7b71f2c-a51e-4c9f-8db2-066a4c3643e4@7.2>.
- 402 **Hemochromatosis.** Hemosiderin deposits.  Mathew J, Leong MY, Morley N, et al. A liver fibrosis cocktail? Psoriasis, methotrexate and genetic hemochromatosis. *BMC Dermatol*. 2005;5:12. DOI: 10.1186/1471-5945-5-12.
- 402 **Biliary tract disease.** Endoscopic retrograde cholangiopancreatography shows “beading” of bile ducts in primary sclerosing cholangitis.  Law S-T, Lee W-K, Li MK-K, et al. A gentleman with anemia and cholestasis. *Case Rep Med*. 2010;2010:536207. DOI: 10.1155/2010/536207.
- 403 **Cholelithiasis and related pathologies: Image B.** Large gallstone.  Spangler R, Van Pham T, Khoujah D, et al. Abdominal emergencies in the geriatric patient. *Int J Emerg Med*. 2014;7:43. DOI: 10.1186/s12245-014-0043-2.
- 403 **Cholelithiasis and related pathologies: Image C.** Porcelain gallbladder.  Fred H, van Dijk H. Images of memorable cases: case 19. Connexions Web site. December 4, 2008. Available at: <http://cnx.org/content/m14939/1.3/>.
- 404 **Pancreatitis: Image A.** Diffuse peripancreatic stranding.  Landa E, Ganim I, Vigandt E, et al. Meloxicam-induced pancreatitis. *Cureus*. 2021 Jan 28;13(1):e12976. DOI: 10.7759/cureus.12976.
- 404 **Pancreatitis: Image B.** Pancreatic pseudocyst.  Cawich SO, Murphy T, Shah S, et al. Endoscopic transmural drainage of pancreatic pseudocysts: technical challenges in the resource poor setting. *Case Rep Gastrointest Med*. 2013;2013:942832. DOI: 10.1155/2013/942832.
- 404 **Pancreatitis: Image C.** Chronic pancreatitis.  Sommer CA, Wilcox CM. Pancreatico-pericardial fistula as a complication of chronic pancreatitis. *F1000Res*. 2014 Jan 29;3:31. DOI: 10.12688/f1000research.3-31.v1.
- 405 **Pancreatic adenocarcinoma: Image A.** Histology.  Zapata M, Cohen C, Siddiqui MT. Immunohistochemical expression of SMAD4, CK19, and CA19-9 in fine needle aspiration samples of pancreatic adenocarcinoma: Utility and potential role. *Cytojournal*. 2007 Jun 22;4:13. DOI: 10.1186/1742-6413-4-13.















Hematology and Oncology

- 412 **Neutrophils: Image A.**  The US Department of Health and Human Services and Dr. F. Gilbert.
- 412 **Neutrophils: Image B.** Dohle bodies.  Modabbernia MJ, Mirsafa AR, Modabbernia A, et al. Catatonic syndrome associated with lead intoxication: a case report. *Cases J*. 2009 Aug 11;2:8722. DOI: 10.4076/1757-1626-2-8722.
- 413 **Erythrocytes.**  The US Department of Health and Human Services and Drs. Noguchi, Rodgers, and Schechter.
- 413 **Thrombocytes (platelets).**  The US Department of Health and Human Services and Dr. F. Gilbert.
- 413 **Monocytes.**  The US Department of Health and Human Services and Dr. Mae Melvin.
- 413 **Macrophages.**  De Tommasi AS, Otranto D, Furlanello T, et al. Evaluation of blood and bone marrow in selected canine vector-borne diseases. *Parasit Vectors*. 2014;7:534. DOI: 10.1186/s13071-014-0534-2.
- 414 **Dendritic cells.**  Cheng J-H, Lee S-Y, Lien Y-Y, et al. Immunomodulating activity of *Nymphaea rubra* roxb. extracts: activation of rat dendritic cells and improvement of the TH1 immune response. *Int J Mol Sci*. 2012;13:10722–10735. DOI: 10.3390/ijms130910722.
- 414 **Mast cells.**  Borelli V, Martinelli M, Luppi S, et al. Mast cells in peritoneal fluid from women with endometriosis and their possible role in modulating sperm function. *Front. Physiol*. 2020;10:1543. DOI: 10.3389/fphys.2019.01543.
- 415 **Plasma cells.**  The US Department of Health and Human Services and Dr. Francis W. Chandler.
- 420 **RBC morphology: Image J.** Sick cell.  The US Department of Health and Human Services and the Sickle Cell Foundation of Georgia, Jackie George, and Beverly Sinclair.
- 421 **RBC inclusions: Image A.** Ringed sideroblast.  Invernizzi R, Quaglia F, Porta MG. Importance of classical morphology in the diagnosis of myelodysplastic syndrome. *Mediterr J Hematol Infect Dis*. 2015 May 1;7(1):e2015035. DOI: 10.4084/MJHID.2015.035.
- 421 **RBC inclusions: Image B.** Basophilic stippling.  Herbert L. Fred, MD, and Hendrik A. van Dijk. Images of Memorable Cases: Case 81. OpenStax CNX. Dec 3, 2008.
- 421 **RBC inclusions: Image C.** Howell-Jolly bodies.  Vives-Corrons J-I. The rare anaemias. 2019. DOI: 10.5772/intechopen.86986.
- 425 **Microcytic, hypochromic anemias: Image A.**  Bock F, Borucki K, Vorwerk P, et al. A two-and-a-half-year-old breastfed toddler presenting with anemia: a case report. *BMC Res Notes*. 2014;7:917. DOI: 10.1186/1756-0500-7-917.
- 425 **Microcytic, hypochromic anemias: Image D.** “Hair-on-end” appearance and thinning of the outer table of the skull.  Sunil A, Sivarajakumar B, Kumari V. Beta-thalassemia presenting as moyamoya syndrome with a review of skeletal manifestations. *Cureus*. 15(5):e38372. DOI: 10.7759/cureus.38372.
- 425 **Microcytic, hypochromic anemia: Image E.** Lead lines in lead poisoning. Reproduced, with permission, from Dr. Frank Gaillard and www.radiopaedia.org.
- 428 **Intrinsic hemolytic anemias.**  El Ariss AB, Younes M, Matar J. Prevalence of sickle cell trait in the southern suburb of Beirut, Lebanon. *Mediterr J Hematol Infect Dis*. 2016;8(1):e2016015. DOI: 10.4084/MJHID.2016.015.
- 430 **Heme synthesis, porphyrias, and lead poisoning: Image A.** Basophilic stippling in lead poisoning.  van Dijk HA, Fred HL. Images of memorable cases: case 81. Connexions Web site. December 3, 2008. Available at https://cnx.org/contents/MZa_Ph4e@4/Images-of-Memorable-Cases-Case-81.

- 430 **Heme synthesis, porphyrias, and lead poisoning: Image B.** Porphyria cutanea tarda. [Image] Bovenschen HJ, Vissers WHPM. Primary hemochromatosis presented by porphyria cutanea tarda: a case report. *Cases J.* 2009;2:7246. DOI: 10.4076/1757-1626-2-7246.
- 431 **Coagulation disorders.** Hemarthrosis. [Image] Lakjiri S, Mernissi FZ. Tabetic arthropathy revealing neurosyphilis: a new observation. *Pan Afr Med J.* 2014;18:198. DOI: 10.11604/pamj.2014.18.198.4893.
- 434 **Hodgkin lymphoma.** Reed-Sternberg cells. [Image] Knecht H, Righolt C, Mai S. Genomic instability: the driving force behind refractory/relapsing Hodgkin's lymphoma. *Cancers (Basel).* 2013 Jun;5(2):714–725. DOI: 10.3390/cancers5020714.
- 435 **Non-Hodgkin lymphoma: Image B.** Jaw lesion in Burkitt lymphoma. [Image] Bi CF, Tang Y, Zhang WY, et al. Sporadic Burkitt lymphomas of children and adolescents in Chinese: a clinicopathological study of 43 cases. *Diagn Pathol.* 2012;7:72. DOI:10.1186/1746-1596-7-72.
- 435 **Non-Hodgkin lymphoma: Image C.** Primary CNS lymphoma. [Image] Mansour A, Qandeel M, Abdel-Razeq H, et al. MR imaging features of intracranial primary CNS lymphoma in immune competent patients. *Cancer Imaging.* 2014;14(1):22. DOI: 10.1186/1470-7330-14-22.
- 435 **Non-Hodgkin lymphoma: Image D.** Mycosis fungoides/Sézary syndrome. [Image] Chaudhary S, Bansal C, Ranga U, et al. Erythrodermic mycosis fungoides with hypereosinophilic syndrome: a rare presentation. *Ecancermedicalscience.* 2013;7:337. DOI:10.3332/ecancer.2013.337
- 436 **Plasma cell dyscrasias: Image C.** Multiple plasma cells in multiple myeloma. [Image] Mehrotra R, Singh M, Singh PA, et al. Should fine needle aspiration biopsy be the first pathological investigation in the diagnosis of a bone lesion? An algorithmic approach with review of literature. *Cytojournal.* 2007;4:9. DOI: 10.1186/1742-6413-4-9.
- 436 **Myelodysplastic syndromes.** Neutrophil with bilobed nuclei. [Image] Ali SF, Sonu RJ, Dwyre DM, et al. Translocation (6;15)(q12;q15): a novel mutation in a patient with therapy-related myelodysplastic syndrome. *Case Rep Hematol.* 2015;2015:318545. DOI: 10.1155/2015/318545.
- 437 **Leukemias: Image A.** [Image] Chiaretti S, Zini G, Bassan R. Diagnosis and subclassification of acute lymphoblastic leukemia. *Mediterr J Hematol Infect Dis.* 2014;6(1):e2014073. DOI: 10.4084/MJHID.2014.073.
- 437 **Leukemias: Image C.** Hairy cell leukemia. [Image] Chan SM, George T, Cherry AM, et al. Complete remission of primary plasma cell leukemia with bortezomib, doxorubicin, and dexamethasone: a case report. *Cases J.* 2009;2:121. DOI: 10.1186/1757-1626-2-121.
- 438 **Myeloproliferative neoplasms: Image A.** Erythromelalgia in polycythemia vera. [Image] Fred H, van Dijk H. Images of memorable cases: case 151. Connexions Web site. December 4, 2008. Available at <http://cnx.org/content/m14932/1.3/>.
- 439 **Langerhans cell histiocytosis: Image A.** Birbeck granules. [Image] Bubolz A, Weissinger SE, Stenzinger A, et al. Potential clinical implications of BRAF mutations in histiocytic proliferations. *Oncotarget.* 2014;5:4060-4070.
- 441 **Warfarin.** [Image] Bakoyiannis C, Karaolanis G, Patelis N. Dabigatran in the treatment of warfarin-induced skin necrosis: A new hope. *Case Rep Dermatol Med.* 2016;2016:3121469. DOI: 10.1155/2016/3121469.
- Musculoskeletal, Skin, and Connective Tissue**
- 451 **Rotator cuff muscles.** Glenohumeral instability. [Image] Koike Y, Sano H, Imamura I, et al. Changes with time in skin temperature of the shoulders in healthy controls and a patient with shoulder-hand syndrome. *Ups J Med Sci* 2010;115:260-265. DOI: 10.3109/03009734.2010.503354.
- 452 **Brachial plexus lesions: Image A.** Cervical rib. [Image] Dahlin LB, Backman C, Duppe H, et al. Compression of the lower trunk of the brachial plexus by a cervical rib in two adolescent girls: case reports and surgical treatment. *J Brachial Plex Peripher Nerve Inj.* 2009;4:14. DOI: 10.1186/1749-7221-4-14.
- 452 **Brachial plexus lesions: Image B.** Winged scapula. [Image] Boussouga M, Jaafar A, et al. Stabilisation dynamique d'un winging scapula (à propos d'un cas avec revue de la littérature). *Pan Afr Med J.* 2014;19:331. DOI: 10.11604/pamj.2014.19.331.3429.
- 453 **Wrist region: Image B.** Anatomic snuff box. [Image] Rhemrev SJ, Ootes D, Beeres FJP, et al. Current methods of diagnosis and treatment of scaphoid fractures. *Int J Emerg Med.* 2011;4:4. DOI: 10.1186/1865-1380-4-4.
- 459 **Motoneuron action potential to muscle contraction.** Two muscle sarcomeres in parallel. [Image] Ottenheijm CAC, Heunks LMA, Dekhuijzen RPN. Diaphragm adaptations in patients with COPD. *Respir Res.* 2008;9(1):12. DOI: 10.1186/1465-9921-9-12.
- 463 **Clavicle fractures.** X-ray of clavicle fracture. [Image] Tagliapietra J, Belluzzi E, Biz C, et al. Midshaft clavicle fractures treated nonoperatively using figure-of-eight bandage: are fracture type, shortening, and displacement radiographic predictors of failure? *Diagnostics (Basel).* 2020 Oct 5;10(10):788. DOI: 10.3390/diagnostics10100788.
- 463 **Wrist and hand injuries.** Metacarpal neck fracture. [Image] Bohr S, Pallua N. Early functional treatment and modern cast making for indications in hand surgery. *Adv Orthop.* 2016;2016:5726979. DOI: 10.1155/2016/5726979.
- 463 **Psoas abscess.** Destruction of sacroiliac joint. Kramer L, Geib V, Evison J, et al. Tuberculous sacroiliitis with secondary psoas abscess in an older patient: a case report. *J Med Case Reports.* 2018;12:237. DOI: 10.1186/s13256-018-1754-4.
- 464 **Common knee conditions: Image A.** ACL tear. [Image] Chang MJ, Chang CB, Choi J-Y, et al. Can magnetic resonance imaging findings predict the degree of knee joint laxity in patients undergoing anterior cruciate ligament reconstruction? *BMC Musculoskelet Disord.* 2014;15:214. DOI: 10.1186/1471-2474-15-214.
- 464 **Common knee conditions: Images B and C.** Prepatellar bursitis (B) and Baker cyst (C). [Image] Hirji Z, Hunhun JS, Choudur HN. Imaging of the bursae. *J Clin Imaging Sci.* 2011;1:22. DOI: 10.4103/2156-7514.80374.
- 466 **Childhood musculoskeletal conditions.** Slipped capital femoral epiphysis. [Image] Marquez D, Harb E, Vilchis H. Slipped capital femoral epiphysis and hypothyroidism in a young adult: a case report. *J Med Case Rep.* 2014;8(1):336. DOI: 10.1186/1752-1947-8-336.
- 467 **Common pediatric fractures: Image A.** Greenstick fracture. [Image] Randsborg PH, Sivertsen EA. Classification of distal radius fractures in children: good inter- and intraobserver reliability, which improves with clinical experience. *BMC Musculoskelet Disord.* 2013;13:6. DOI: 10.1186/1471-2474-13-6.
- 467 **Common pediatric fractures: Image B.** Torus (buckle) fracture. [Image] Aksel Seyahi, et al. Tibial torus and toddler's fractures misdiagnosed as transient synovitis: a case series. *J Med Case Reports.* 2011;5:305. DOI: 10.1186/1752-1947-5-305.
- 467 **Osteoporosis.** Vertebral compression fractures of spine. [Image] Luo Y, Jiang T, Guo H, et al. Osteoporotic vertebral compression fracture accompanied with thoracolumbar fascial injury: risk factors and the association with residual pain after percutaneous vertebroplasty. *BMC Musculoskelet Disord.* 2022 Apr 11;23(1):343. DOI: 10.1186/s12891-022-05308-7.
- 468 **Osteopetrosis.** [Image] Kant P, Sharda N, Bhowate RR. Clinical and radiological findings of autosomal dominant osteopetrosis type II: a case report. *Case Rep Dent.* 2013;2013:707343. DOI: 10.1155/2013/707343.

- 468 **Osteomalacia/rickets: Image A.** Clinical photo and x-ray of leg deformity in rickets.  Linglart A, Biosse-Duplan M, Briot K, et al. Therapeutic management of hypophosphatemic rickets from infancy to adulthood. *Endocr Connect.* 2014;3:R13-R30. DOI: 10.1530/EC-13-0103.
- 468 **Osteomalacia/rickets: Image B.** Rachitic rosary on chest x-ray.  Ayadi ID, Hamida EB, Rebeh RB, et al. Perinatal lethal type II osteogenesis imperfecta: a case report. *Pan Afr Med J.* 2015;21:11. DOI: 10.11604/pamj.2015.21.11.6834.
- 468 **Osteitis deformans.** Thickened calvarium.  Pons Escoda A., Naval Baudin P, Mora P, et al. Imaging of skull vault tumors in adults. *Insights Imaging.* 2020;11, 23. DOI: 10.1186/s13244-019-0820-9.
- 469 **Avascular necrosis of bone.** Bilateral necrosis of femoral head.  Ding H, Chen S-B, Lin S, et al. The effect of postoperative corticosteroid administration on free vascularized fibular grafting for treating osteonecrosis of the femoral head. *Sci World J.* 2013;708014. DOI: 10.1155/2013/708014.
- 471 **Primary bone tumors: Image B.** Osteoid osteoma.  Iwai T, Oebisu N, Hoshi M, et al. Finite element analysis could predict and prevent a pathological femoral shaft fracture after en bloc resection of a large osteoid osteoma. *Children (Basel).* 2022 Jan 26;9(2):158. DOI: 10.3390/children9020158.
- 471 **Primary bone tumors: Image C.** Giant cell tumor. Reproduced, with permission, from Dr. Frank Gaillard and www.radiopaedia.org.
- 471 **Primary bone tumors: Image D.** Codman triangle in osteosarcoma.  Xu SF, Yu XC, Zu M, et al. Limb function and quality of life after various reconstruction methods according to tumor location following resection of osteosarcoma in distal femur. *BMC Musculoskelet Disord.* 2014;15:453. DOI: 10.1186/1471-2474-15-453.
- 471 **Primary bone tumors: Image E.** Starburst pattern in osteosarcoma.  Ding H, Yu G, Tu Q, et al. Computer-aided resection and endoprosthesis design for the management of malignant bone tumors around the knee: outcomes of 12 cases. *BMC Musculoskelet Disord.* 2013;14:331. DOI: 10.1186/1471-2474-14-331.
- 472 **Osteoarthritis vs rheumatoid arthritis: Image A.** Osteoarthritis.  Visser J, Busch VJF, de Kievit-van der Heijden IM, et al. Non-Hodgkin's lymphoma of the synovium discovered in total knee arthroplasty: a case report. *BMC Res Notes.* 2012;5:449. DOI: 10.1186/1756-0500-5-449.
- 472 **Osteoarthritis vs rheumatoid arthritis: Image B.** Rheumatoid arthritis.  Clement ND, Breusch SJ, Biant LC. Lower limb joint replacement in rheumatoid arthritis. *J Orthop Surg Res.* 2012;7:27. DOI: 10.1186/1749-799X-7-27.
- 472 **Osteoarthritis vs rheumatoid arthritis: Image C.** Histology of rheumatoid nodule.  Gomez-Rivera F, El-Naggar AK, Guha-Thakurta N, et al. Rheumatoid arthritis mimicking metastatic squamous cell carcinoma. *Head Neck Oncol.* 2011;3:26. DOI: 10.1186/1758-3284-3-26.
- 473 **Gout: Image A.** Uric acid crystals under polarized light.  Zhang Y, Lee SY, Zhang Y, et al. Wide-field imaging of birefringent synovial fluid crystals using lens-free polarized microscopy for gout diagnosis. *Sci Rep.* 2016;Jun 30. DOI:10.1038/srep28793.
- 473 **Gout: Image B.** Podagra.  Roddy E. Revisiting the pathogenesis of podagra: why does gout target the foot? *J Foot Ankle Res.* 2011;4:13. DOI: 10.1186/1757-1146-4-13.
- 473 **Calcium pyrophosphate deposition disease.** Calcium phosphate crystals.  Reproduced with permission from The National Aeronautics and Space Administration.
- 474 **Sjögren syndrome.** Dry tongue.  Negrato CA, Tärzia O. Buccal alterations in diabetes mellitus. *Diabetol Metab Syndr.* 2010;2:3. DOI: 10.1186/1758-5996-2-3.
- 474 **Septic arthritis.** Redness and swelling of skin localizing to the sternoclavicular joint.  Tanaka Y, Kato H, Shirai K, et al. Sternoclavicular joint septic arthritis with chest wall abscess in a healthy adult: a case report. *J Med Case Rep.* 2016 Mar 26;10:69. DOI: 10.1186/s13256-016-0856-0.
- 475 **Seronegative spondyloarthropathies: Image C.** Bamboo spine.  Manoj E, Ragunathan M. Disease flare of ankylosing spondylitis presenting as reactive arthritis with seropositivity: a case report. *J Med Case Rep.* 2012;6:60. DOI: 10.1186/1752-1947-6-60.
- 477 **Polymyositis/dermatomyositis: Image A.** Groton papules of dermatomyositis.  Lamquami S, Errarhay S, Mamouni N, et al. Dermatomyositis revealing breast cancer: report of a case. *Pan Afr Med J.* 2015;21:89. DOI: 10.11604/pamj.2015.21.89.6971.
- 477 **Polymyositis/dermatomyositis: Image D.** Thickening and cracking of skin in dermatomyositis.  Sohara E, Saraya T, Sato S, et al. Mechanic's hands revisited: is this sign still useful for diagnosis in patients with lung involvement of collagen vascular diseases? *BMC Res Notes.* 2014;7:303. DOI: 10.1186/1756-0500-7-303.
- 479 **Vasculitides: Image A.** Arthritic swelling in right knee.  Guardado, K, Sergeant, S. Pediatric unilateral knee swelling: a case report of a complicated differential diagnosis and often overlooked cause. *Journal of Osteopathic Medicine.* 2022;122:2;105-109. DOI: 10.1515/jom-2020-0332.
- 479 **Vasculitides: Image D.** Strawberry tongue in patient with Kawasaki disease.  The Department of Health and Human Services.
- 479 **Vasculitides: Image E.** Coronary artery aneurysm in Kawasaki disease.  Kawamura Y, Miura H, Matsumoto Y, et al. A case of Epstein-Barr virus-associated hemophagocytic lymphohistiocytosis with severe cardiac complications. *BMC Pediatr.* 2016 Oct 28;16(1):172. DOI: 10.1186/s12887-016-0718-3.
- 479 **Vasculitides: Image F.** Polyarteritis nodosa. Reproduced, with permission, from Dr. Frank Gaillard and www.radiopaedia.org.
- 479 **Vasculitides: Image G.** Panda R, Krieger T, Hopf L, et al. Neutrophil extracellular traps contain selected antigens of anti-neutrophil cytoplasmic antibodies. *Front Immunol.* 2017 Apr 13;8:439. DOI: 10.3389/fimmu.2017.00439.
- 479 **Vasculitides: Image H.** Churg-Strauss syndrome histology.  Helliwell TR. Non-infectious inflammatory lesions of the sinonasal tract. *Head Neck Pathol.* 2016 Mar;10(1):32-39. DOI: 10.1007/s12105-016-0689-6.
- 479 **Vasculitides: Image I.** Granulomatosis with polyangiitis and PR3-ANCA/c-ANCA.  Panda R, Krieger T, Hopf L, et al. Neutrophil extracellular traps contain selected antigens of anti-neutrophil cytoplasmic antibodies. *Front Immunol.* 2017 Apr 13;8:439. DOI: 10.3389/fimmu.2017.00439.
- 479 **Vasculitides: Image J.** Henoch-Schönlein purpura.  Oshikata C, Tsurikisawa N, Takigawa M, et al. An adult patient with Henoch-Schönlein purpura and non-occlusive mesenteric ischemia. *BMC Res Notes.* 2013 Jan 23;6:26. DOI: 10.1186/1756-0500-6-26.
- 480 **Raynaud phenomenon.**  Dixit S, Kalkur C, Sattur AP, et al. Scleroderma and dentistry: two case reports. *J Med Case Rep.* 2016 Oct 24;10(1):297. DOI: 10.1186/s13256-016-1086-1.
- 482 **Epithelial cell junctions: Image A.** Tight junction.  Tang VW. Proteomic and bioinformatic analysis of epithelial tight junction reveals an unexpected cluster of synaptic molecules. *Biol Direct.* 2006;1:37. DOI: 10.1186/1745-6150-1-37.
- 482 **Epithelial cell junctions: Image B.** Large, electron-dense actin structures within adherens junction.  Taylor RR, Jagger DJ, Saeed SR, et al. Characterizing human vestibular sensory epithelia for experimental studies: new hair bundles on old tissue and implications for therapeutic interventions in ageing. *Neurobiol Aging.* 2015 Jun;36(6):2068–2084. DOI: 10.1016/j.neurobiolaging.2015.02.013.

- 482 **Epithelial cell junctions: Image C.** Desmosome.  Massa F, Devader C, Lacas-Gervais S, et al. Impairment of HT29 cancer cells cohesion by the soluble form of neurotensin receptor-3. *Genes Cancer*. 2014 Jul;5(7-8):240–249. DOI: 10.18632/genesandcancer.22.
 - 482 **Epithelial cell junctions: Image D.** Gap junction.  Shu X, Lev-Ram V, Deerinck TJ. A genetically encoded tag for correlated light and electron microscopy of intact cells, tissues, and organisms. *PLoS Biol*. 2011 Apr;9(4):e1001041. DOI: 10.1371/journal.pbio.1001041.
 - 482 **Epithelial cell junctions: Image E.** Hemidesmosome.  Nguyen NM, Pulkkinen L, Schlueter JA, et al. Lung development in laminin gamma2 deficiency: abnormal tracheal hemidesmosomes with normal branching morphogenesis and epithelial differentiation. *Respir Res*. 2006 Feb 16;7:28. DOI: 10.1186/1465-9921-7-28.
 - 484 **Seborrheic dermatitis.**  Savoia P, Cavaliere G, Zavattaro E, et al. Inflammatory cutaneous diseases in renal transplant recipients. *Int J Mol Sci*. 2016 Aug 19;17(8):1362. DOI: 10.3390/ijms17081362.
 - 485 **Common skin disorders: Image F.** Keratosis pilaris.  Siegfried EC, Hebert AA. Diagnosis of atopic dermatitis: mimics, overlaps, and complications. *J. Clin. Med*. 2015;4(5):884-917.
 - 485 **Common skin disorders: Image O.** Urticaria.  Cugno M, Tedeschi A, Borghi A, et al. Activation of blood coagulation in two prototypic autoimmune skin diseases: a possible link with thrombotic risk. *PLoS One*. 2015 Jun 9;10(6):e0129456. DOI: 10.1371/journal.pone.0129456.
 - 486 **Vascular tumors of skin: Image C.** Glomus tumor under fingernail.  Suzuki R, Hashimoto H, Okamoto O. Solitary subungual neurofibroma with glomus tumor-like appearance: a case report. *Case Reports Plast Surg Hand Surg*. 2020 Apr 14;7(1):43-45. DOI: 10.1080/23320885.2020.1750018.
 - 487 **Skin infections: Image C.** Erysipelas.  The US Department of Health and Human Services and Dr. Thomas F. Sellers.
 - 488 **Cutaneous mycoses: Image G.** Pityriasis.  The US Department of Health and Human Services and Dr. Gavin Hart.
 - 489 **Autoimmune blistering skin disorders: Image D.** Bullous pemphigoid on immunofluorescence.  Si X, Ge L, Xin H, et al. Erythrodermic psoriasis with bullous pemphigoid: combination treatment with methotrexate and compound glycyrrhizin. *Diagn Pathol*. 2014;9:102. <https://doi.org/10.1186/1746-1596-9-102>.
 - 491 **Cutaneous ulcers: Image B.** Arterial ulcer.  Kalinchenko S, Zemlyanoy A, Gooren L. Improvement of the diabetic foot upon testosterone administration to hypogonadal men with peripheral arterial disease. Report of three cases. *Cardiovasc Diabetol*. 2009;8:19. DOI: 10.1186/1475-2840-8-19.
 - 492 **Miscellaneous skin disorders: Image G.** Pityriasis rosea, herald patch.  The US Department of Health and Human Services and Dr. Gavin Hart.
 - 493 **Estimation of body surface area: Images A and B.** 18 hours (A) 11 days (B) after inhalational injury.  Bai C, Huang H, Yao X, et al. Application of flexible bronchoscopy in inhalation lung injury. *Diagn Pathol*. 2013;8:174. DOI: 10.1186/1746-1596-8-174.
- ### Neurology and Special Senses
- 501 **Brain malformations: Image A.** Holoprosencephaly.  Pallangyo P, Lyimo F, Nicholas P, et al. Semilobar holoprosencephaly in a 12-month-old baby boy born to a primigravida patient with type 1 diabetes mellitus: a case report. *J Med Case Rep*. 2016;10:358. <https://doi.org/10.1186/s13256-016-1141-y>.
 - 501 **Brain malformations: Image B.** Lissencephaly.  Tian G, Cristancho AG, Dubbs HA, et al. A patient with lissencephaly, developmental delay, and infantile spasms, due to de novo heterozygous mutation of KIF2A. *Mol Genet Genomic Med*. 2016 Nov;4(6):599–603. DOI: 10.1002/mgg3.236.
 - 502 **Posterior fossa malformations: Image A.** Chiari I malformation.  Toldo I, De Carlo D, Mardari R, et al. Short lasting activity-related headaches with sudden onset in children: a case-based reasoning on classification and diagnosis. *J Headache Pain*. 2013;14(1):3. DOI: 10.1186/1129-2377-14-3.
 - 502 **Posterior fossa malformations: Image B.** Dandy-Walker malformation.  Krupa K, Bekiesinska-Figatowska M. Congenital and acquired abnormalities of the corpus callosum: a pictorial essay. *Biomed Res Int*. 2013;2013:265619. DOI: 10.1155/2013/265619.
 - 502 **Syringomyelia.** Reproduced, with permission, from Dr. Frank Gaillard and www.radiopaedia.org.
 - 509 **Limbic system.**  Schopf V, Fischmeister FP, Windischberger C, et al. Effects of individual glucose levels on the neuronal correlates of emotions. *Front Hum Neurosci*. 2013 May 21;7:212. DOI: 10.3389/fnhum.2013.00212.
 - 510 **Cerebellum.**  Jarius S, Wandinger KP, Horn S, et al. A new Purkinje cell antibody (anti-Ca) associated with subacute cerebellar ataxia: immunological characterization. *J Neuroinflammation*. 2010;7:21. DOI: 10.1186/1742-2094-7-21.
 - 511 **Basal ganglia.**  Rudger P, Jaunmuktane Z, Adlard P, et al. Iatrogenic CJD due to pituitary-derived growth hormone with genetically determined incubation times of up to 40 years. *Brain*. 2015 Nov;138(11):3386–3399. DOI: 10.1093/brain/awv235.
 - 513 **Cerebral arteries—cortical distribution.** Cortical watershed areas.  Isabel C, Lecler A, Turc G, et al. Relationship between watershed infarcts and recent intra plaque haemorrhage in carotid atherosclerotic plaque. *PLoS One*. 2014;9(10):e108712. DOI: 10.1371/journal.pone.0108712.
 - 514 **Dural venous sinuses.**  Cikla U, Aagaard-Kienitz B, Turski PA, et al. Familial perimesencephalic subarachnoid hemorrhage: two case reports. *J Med Case Rep*. 2014;8:380. DOI: 10.1186/1752-1947-8-380.
 - 525 **Cerebral edema: Image A.** Vasogenic edema.  Ahmad A, Ginnebaugh KR, Sethi S, et al. miR-20b is up-regulated in brain metastases from primary breast cancers. *Oncotarget*. 2015 May 20;6(14):12188-95. DOI: 10.18632/oncotarget.3664.
 - 527 **Effects of strokes: Image A.** Large abnormality of the left middle cerebral artery territory.  Hakimelahi R, Yoo AJ, He J, et al. Rapid identification of a major diffusion/perfusion mismatch in distal internal carotid artery or middle cerebral artery ischemic stroke. *BMC Neurol*. 2012 Nov 5;12:132. DOI: 10.1186/1471-2377-12-132.
 - 527 **Effects of strokes: Image B.** Lacunar infarct of lenticulostriate artery.  Zhou L, Ni J, Yao M, et al. High-resolution MRI findings in patients with capsular warning syndrome. *BMC Neurol*. 2014;14:16. DOI: 10.1186/1471-2377-14-16.
 - 527 **Effects of strokes: Image C.** Infarction of posterior cerebellar artery.  Nouh A, Remke J, Ruland S. Ischemic posterior circulation stroke: a review of anatomy, clinical presentations, diagnosis, and current management. *Front Neurol*. 2014 Apr 7;5:30. DOI: 10.3389/fneur.2014.00030.
 - 527 **Effects of strokes: Image D.** MRI showing hyperintensity in various brain areas consistent with an acute stroke in the left medullary restiform body and left cerebellar hemisphere.  Alsaad AA, Austin CO, Robinson MT, Phillips MB. Pacemaker placement in patients with stroke-mediated autonomic dysregulation. *Case Rep Med*. 2017;2017:6301430. DOI: 10.1155/2017/6301430.
 - 528 **Intracranial hemorrhage: Images A and B.** Epidural hematoma.  Al-Mahfoudh R, Clark S, Kandasamy J, May P. A neurosurgical golf injury. *Clin Med Case Rep*. 2008 May 22;1:77-9. DOI: 10.4137/ccrep.s736.
 - 528 **Intracranial hemorrhage: Image C.** Fronto-temporal subdural haematoma over the left hemisphere.  Rasmussen M, Björk Werner J, Dolk M, Christensson B. Lactococcus garvieae endocarditis presenting with subdural haematoma. *BMC Cardiovasc Disord*. 2014;14:13. DOI: 10.1186/1471-2261-14-13.

- 528 **Intracranial hemorrhage: Image E.** Subarachnoid hemorrhage.  Hakan T, Turk CC, Celik H. Intra-operative real time intracranial subarachnoid haemorrhage during glial tumour resection: a case report. *Cases J.* 2008;1:306. DOI: 10.1186/1757-1626-1-306.
- 529 **Diffuse axonal injury.**  Moenninghoff C, Kraff O, Maderwald S, et al. Diffuse axonal injury at ultra-high field MRI. *PLoS One.* 2015;10(3):e0122329. DOI: 10.1371/journal.pone.0122329.
- 530 **Aneurysms. Saccular aneurysm.**  Dolati P, Pittman D, Morrish W F, et al. The Frequency of Subarachnoid Hemorrhage from Very Small Cerebral Aneurysms (< 5 mm): A Population-Based Study. *Cureus.* 2015.7(6): DOI: 10.7759/cureus.279.
- 534 **Neurodegenerative movement disorders: Image A.** Melanized dopaminergic neurons of the substantia nigra.  Mazzio EA, Close F, Soliman KF. The biochemical and cellular basis for nutraceutical strategies to attenuate neurodegeneration in Parkinson's disease. *Int J Mol Sci.* 2011 Jan 17;12(1):506-69. DOI: 10.3390/ijms12010506.
- 534 **Neurodegenerative movement disorders: Image B.** Lewy body in substantia nigra.  Werner CJ, Heyny-von Haussen R, Mall G, et al. Parkinson's disease. *Proteome Sci.* 2008;6:8. DOI: 10.1186/1477-5956-6-8.
- 535 **Dementia: Image C.** Pick bodies in frontotemporal dementia.  Neumann M. Molecular neuropathology of TDP-43 proteinopathies. *Int J Mol Sci.* 2009 Jan;10(1):232–246. DOI: 10.3390/ijms10010232.
- 535 **Dementia: Image D.** Leukoencephalopathy and encephalomalacia foci in vascular dementia.  Wang R, Chen Z, Fu Y, et al. Plasma Cystatin C and high-density lipoprotein are important biomarkers of Alzheimer's disease and vascular dementia: A cross-sectional study. *Front Aging Neurosci.* 2017;9:26. Published 2017 Feb 7. DOI:10.3389/fnagi.2017.00026.
- 535 **Dementia: Image E.** Spongiform changes in brain in Creutzfeld-Jacob disease.  The US Department of Health and Human Services and Sherif Zaki; MD; PhD; Wun-Ju Shieh; MD; PhD; MPH.
- 536 **Hydrocephalus: Image B.** Communicating hydrocephalus.  Torres-Martin M, Pena-Granero C, Carceller F, et al. Homozygous deletion of *TNFRSF4*, *TP73*, *PPAP2B* and *DPYD* at 1p and *PDCD5* at 19q identified by multiplex ligation-dependent probe amplification (MLPA) analysis in pediatric anaplastic glioma with questionable oligodendroglial component. *Mol Cytogenet.* 2014;7:1. DOI: 10.1186/1755-8166-7-1.
- 536 **Hydrocephalus: Image C.** Ex vacuo ventriculomegaly.  Ghetti B, Oblak AL, Boeve BF, et al. Frontotemporal dementia caused by microtubule-associated protein tau gene (*MAPT*) mutations: a chameleon for neuropathology and neuroimaging. *Neuropathol Appl Neurobiol.* 2015 Feb;41(1):24-46. DOI: 10.1111/nan.12213.
- 537 **Multiple sclerosis.** Periventricular plaques.  Dooley MC, Foroozan R. Optic neuritis. *J Ophthalmic Vis Res.* 2010 Jul;5(3):182–187.
- 538 **Other demyelinated and dysmyelinating disorders: Image A.** Central pontine myelinolysis.  Chang KY, Lee IH, Kim GJ, et al. Plasma exchange successfully treats central pontine myelinolysis after acute hyponatremia from intravenous sodium bicarbonate therapy. *BMC Nephrol.* 2014 Apr 4;15:56. DOI: 10.1186/1471-2369-15-56.
- 538 **Other demyelinating and dysmyelinating disorders: Image B.** Progressive multifocal leukoencephalopathy.  Garrote H, de la Fuente A, Ona R, et al. Long-term survival in a patient with progressive multifocal leukoencephalopathy after therapy with rituximab, fludarabine and cyclophosphamide for chronic lymphocytic leukemia. *Exp Hematol Oncol.* 2015;4:8. DOI: 10.1186/s40164-015-0003-4.
- 539 **Neurocutaneous disorders: Image A.** Port wine stain in Sturge-Weber syndrome.  Babaji P, Bansal A, Krishna G, et al. Sturge-Weber syndrome with osteohypertrophy of maxilla. *Case Rep Pediatr.* May 2013;964596. DOI: 10.1155/2013/964596.
- 539 **Neurocutaneous disorders: Image B.** Leptomenigeal angioma in Sturge-Weber syndrome. Reproduced, with permission, from Dr. Frank Gaillard and www.radiopaedia.org.
- 539 **Neurocutaneous disorders: Image C.** Angiomas in tuberous sclerosis.  Fred H, van Dijk H. Images of memorable cases: case 143. Connexions Web site. December 4, 2008. Available at: <http://cnx.org/content/m14923/1.3/>.
- 539 **Neurocutaneous disorders: Image D.** Ash leaf spots in tuberous sclerosis.  Falsafi P, Taghavi-Zenouz A, Khorshidi-Khiyavi R, et al. A case of tuberous sclerosis without multiorgan involvement. *Glob J Health Sci.* 2015 Feb 24;7(5):124-31. DOI: 10.5539/gjhs.v7n5p124.
- 539 **Neurocutaneous disorders: Image E.** Angiomyolipoma in tuberous sclerosis.  Coskuner ER, Ozkan B, Yalcin V. The role of partial nephrectomy without arterial embolization in giant renal angiomyolipoma. *Case Rep Med.* 2012;2012:365762. DOI: 10.1155/2012/365762.
- 539 **Neurocutaneous disorders: Image F.** Café-au-lait spots in neurofibromatosis type I.  Nishi T, Kawabata Y, Hari Y, et al. A case of pancreatic neuroendocrine tumor in a patient with neurofibromatosis-1. *World J Surg Oncol.* 2012 Jul 23;10:153. DOI: 10.1186/1477-7819-10-153.
- 539 **Neurocutaneous disorders: Image H.** Cutaneous neurofibromas in neurofibromatosis type I.  Kim BK, Choi YS, Gwoo S, et al. Neurofibromatosis type 1 associated with papillary thyroid carcinoma incidentally detected by thyroid ultrasonography: a case report. *J Med Case Rep.* 2012;6:179. DOI: 10.1186/1752-1947-6-179.
- 539 **Neurocutaneous disorders: Image I.**  Zywicke H, Palmer C, Vaphiades M, et al. Optic nerve hemangioblastoma: a case report. *Case Rep Pathol.* 2012;2012:915408. DOI:10.1155/2012/915408.
- 539 **Neurocutaneous disorders: Image J.** Brainstem and spinal cord hemangioblastomas in von Hippel-Lindau disease.  Park DM, Zhuang Z, Chen L, et al. von Hippel-Lindau disease-associated hemangioblastomas are derived from embryologic multipotent cells. *PLoS Med.* 2007 Feb;4(2):e60. DOI: 10.1371/journal.pmed.0040060.
- 541 **Adult primary brain tumors: Image A.** Butterfly glioma.  Rossmesl JH, Clapp K, Pancotto TE. Canine butterfly glioblastomas: A neuroradiological review. *Front Vet Sci.* 2016;3:40. DOI: 10.3389/fvets.2016.00040.
- 541 **Adult primary brain tumors: Image B.** Classical histologic findings of glioblastoma.  Lim SM, Choi J, Chang JH, et al. Lack of *ROS1* gene rearrangement in glioblastoma multiforme. *PLoS One.* 2015;10(9):e0137678. DOI: 10.1371/journal.pone.0137678.
- 541 **Adult primary brain tumors: Image C.** Left frontal astrocytoma grade II.  Smits A, Zetterling M, Lundin M, et al. Neurological impairment linked with cortico-subcortical infiltration of diffuse low-grade gliomas at initial diagnosis supports early brain plasticity. *Front Neurol.* 2015;6:137. DOI: 10.3389/fneur.2015.00137.
- 541 **Adult primary brain tumors: Image E.** Meningioma with dural tail.  Hunt CM, Thomas V, Alexander J. Glioblastoma multiforme survivor with radiation-induced consequences: a case report. *Cureus.* 2022;4(9):e29397. DOI:10.7759/cureus.29397.
- 541 **Adult primary brain tumors: Image G.** Cerebellar hemangioblastoma.  Park DM, Zhengping Z, Chen L, et al. von Hippel-Lindau disease-associated hemangioblastomas are derived from embryologic multipotent cells. *PLoS Med.* 2007 Feb;4(2):e60. DOI: 10.1371/journal.pmed.0040060.
- 541 **Adult primary brain tumors: Image H.** Lipidized stromal cells.  Zywicke H, Palmer CA, Vaphiades MS, Riley KO. Optic nerve hemangioblastoma: a case report. *Case Rep Pathol.* 2012;2012:915408. DOI: 10.1155/2012/915408.

- 541 **Adult primary brain tumors: Image J.** Prolactinoma. Wang CS, Yeh TC, Wu TC, et al. Pituitary macroadenoma co-existent with supraclinoid internal carotid artery cerebral aneurysm: a case report and review of the literature. *Cases J.* 2009;2:6459. DOI: 10.4076/1757-1626-2-6459.
- 542 **Childhood primary brain tumors: Image A.** MRI of pilocytic astrocytoma. Hafez RFA. Stereotaxic gamma knife surgery in treatment of critically located pilocytic astrocytoma: preliminary result. *World J Surg Oncol.* 2007;5:39. DOI: 10.1186/1477-7819-5-39.
- 542 **Childhood primary brain tumors: Image B.** Rosenthal fibers in pilocytic astrocytoma. Pečina-Šlaus N, Gotovac K, Kafka A, et al. Genetic changes observed in a case of adult pilocytic astrocytoma revealed by array CGH analysis. *Mol Cytogenet.* 2014;7:95. DOI: 10.1186/s13039-014-0095-2.
- 542 **Childhood primary brain tumors: Image C.** CT of medulloblastoma. Łastowska M, Jurkiewicz E, Trubicka J, et al. Contrast enhancement pattern predicts poor survival for patients with non-WNT/SHH medulloblastoma tumours. *J Neurooncol.* 2015;123:65–73. DOI: 10.1007/s11060-015-1779-0.
- 542 **Childhood primary brain tumors: Image E.** MRI of ependymoma. Nobori C, Kimura K, Ohira G, et al. Giant duodenal ulcers after neurosurgery for brainstem tumors that required reoperation for gastric disconnection: a report of two cases. *BMC Surg.* 2016 Nov 17;16(1):75. DOI: 10.1186/s12893-016-0189-3.
- 542 **Childhood primary brain tumors: Image F.** Ependymoma histology. Bettegowda C, Agrawal N, Jiao Y, et al. Exomic Sequencing of Four Rare Central Nervous System Tumor Types. *Oncotarget.* 2013;4: 572-583. DOI: 10.18632/oncotarget.964.
- 542 **Childhood primary brain tumors: Image G.** CT of craniopharyngioma. Garnet MR, Puget S, Grill J, et al. Craniopharyngioma. *Orphanet J Rare Dis.* 2007;2:18. DOI: 10.1186/1750-1172-2-18.
- 542 **Childhood primary brain tumors: Image H.** Craniopharyngioma histology. El-Bilbeisi H, Ghannam M, Nimri CF, Ahmad AT. Craniopharyngioma in a patient with acromegaly due to a pituitary macroadenoma. *Ann Saudi Med.* 2010 Nov-Dec;30(6):485-8. DOI: 10.4103/0256-4947.70581.
- 545 **Friedreich ataxia.** Kyphoscoliosis. Axelrod FB, Gold-von Simson. Hereditary sensory and autonomic neuropathies: types II, III, and IV. *Orphanet J Rare Dis.* 2007;2:39. DOI: 10.1186/1750-1172-2-39.
- 546 **Facial nerve lesions.** Facial nerve palsy. Socolovsky M, Paez MD, Di Masi G, et al. Bell's palsy and partial hypoglossal to facial nerve transfer: Case presentation and literature review. *Surg Neurol Int.* 2012;3:46. DOI: 10.4103/2152-7806.95391.
- 547 **Otitis externa.** Discharge. Alizadeh Taheri P, Rostami S, Sadeghi M. External otitis: an unusual presentation in neonates. *Case Rep Infect Dis.* 2016;2016:7381564. DOI: 10.1155/2016/7381564.
- 547 **Otitis media.** Erythematous tympanic membrane. Kuruville A, Shaikh N, Hoberman A, et al. Automated diagnosis of otitis media: vocabulary and grammar. *Int J Biomed Imaging.* 2013;2013:327515. DOI: 10.1155/2013/327515.
- 548 **Cholesteatoma.** Kuo CL, Shiao AS, Yung M, et al. Updates and knowledge gaps in cholesteatoma research. *Biomed Res Int.* 2015;2015:854024. DOI: 10.1155/2015/854024.
- 550 **Lens disorders.** Juvenile cataract. Chen C, Yang J, Zhang X, et al. A case report of Werner's syndrome with bilateral juvenile cataracts. *BMC Ophthalmol.* 2018;18:199. DOI: 10.1186/s12886-018-0873-4.
- 551 **Glaucoma: Image C.** Acute angle closure glaucoma. Kaushik S, Sachdev N, Pandav S, et al. Bilateral acute angle closure glaucoma as a presentation of isolated microspherophakia in an adult: case report. *BMC Ophthalmol.* 2006;6:29. DOI: 10.1186/1471-2415-6-29.
- 553 **Retinal disorders: Image B.** Diabetic retinopathy. Sundling V, Gulbrandsen P, Straand J. Sensitivity and specificity of Norwegian optometrists' evaluation of diabetic retinopathy in single-field retinal images – a cross-sectional experimental study. *BMC Health Services Res.* 2013;13:17. DOI: 10.1186/1472-6963-13-17.
- 553 **Retinal disorders: Image C.** Hypertensive retinopathy. Diallo JW, Média N, Tougouma SJB, et al. Intérêts de l'examen du fond d'œil en pratique de ville: bilan de 438 cas. *Pan Afr Med J.* 2015;20:363. DOI: 10.11604/pamj.2015.20.363.6629.
- 553 **Retinal disorders: Image E.** Retinal vein occlusion. Alasil T, Rauser ME. Intravitreal bevacizumab in the treatment of neovascular glaucoma secondary to central retinal vein occlusion: a case report. *Cases J.* 2009;2:176. DOI: 10.1186/1757-1626-2-176.
- 553 **Retinal disorders: Image F.** Retinal detachment. Courtesy of EyeRounds.
- 553 **Retinal disorders: Image G.** Retinitis pigmentosa. Courtesy of EyeRounds.
- 553 **Retinal disorders: Image H.** Retinoblastoma. Aerts I, Lumbroso-Le Rouic L, Gauthier-Villars M, et al. Retinoblastoma. *Orphanet J Rare Dis.* 2006 Aug 25;1:31. DOI: 10.1186/1750-1172-1-31.
- 553 **Papilledema.** Kanonidou E, Chatziralli I, Kanonidou C, et al. Unilateral optic disc edema in a paediatric patient: diagnostic dilemmas and management. *Case Rep Med.* 2010;2010:529081. DOI: 10.1155/2010/529081.
- 553 **Leukocoria.** Aerts I, Lumbroso-Le Rouic L, Gauthier-Villars M, et al. Retinoblastoma. *Orphanet J Rare Dis.* 2006 Aug 25;1:31. DOI: 10.1186/1750-1172-1-31.
- 553 **Uveitis.** Weber AC, Levison AL, Srivastava, et al. A case of *Listeria monocytogenes* endophthalmitis with recurrent inflammation and novel management. *J Ophthalmic Inflamm Infect.* 2015;5(1):28. DOI: 10.1186/s12348-015-0058-8.
- 555 **Ocular motility.** Blowout fracture of orbit with entrapment of superior rectus muscle. Kozakiewicz M, Szymor P. Comparison of pre-bent titanium mesh versus polyethylene implants in patient specific orbital reconstructions. *Head Face Med.* 2013;9:32. DOI:10.1186/1746-160X-9-32.

Psychiatry








- 580 **Trichotillomania.** Zhao X, Wang S, Hong X, et al. A case of trichotillomania with binge eating disorder: combined with N-acetylcysteine synergistic therapy. *Ann Gen Psychiatry.* 2021 Sep 25;20(1):46. DOI: 10.1186/s12991-021-00369-9.

Renal

- 597 **Horseshoe kidney.** Rispoli P, Destefanis P, Garneri P, et al. Inferior vena cava prosthetic replacement in a patient with horseshoe kidney and metastatic testicular tumor: technical considerations and review of the literature. *BMC Urol.* 2014;14:40. DOI: 10.1186/1471-2490-14-40.
- 599 **Course of ureters.** Vaidyanathan S, Soni BM, Oo T, et al. Infection of Brindley sacral anterior root stimulator by *Pseudomonas aeruginosa* requiring removal of the implant: long-term deleterious effects on bowel and urinary bladder function in a spinal cord injury patient with tetraplegia: a case report. *Cases J.* 2009 Dec 21;2:9364. DOI: 10.1186/1757-1626-2-9364.
- 599 **Glomerular filtration barrier.** Feng J, Wei H, Sun Y, et al. Regulation of podocalyxin expression in the kidney of streptozotocin-induced diabetic rats with Chinese herbs (Yishen capsule). *BMC Complement Altern Med.* 2013;13:76. DOI: 10.1186/1472-6882-13-76.
- 612 **Casts in urine: Image C.** Fatty casts. Li S, Wang ZJ, Chang TT. Temperature oscillation modulated self-assembly of periodic concentric layered magnesium carbonate microparticles. *PLoS One.* 2014;9(2):e88648. DOI:10.1371/journal.pone.0088648.




- 612 **Casts in urine: Image D.** Hyaline casts.  Chu-Su Y, Shukuya K, Yokoyama T, et al. Enhancing the detection of dysmorphic red blood cells and renal tubular epithelial cells with a modified urinalysis protocol. *Sci Rep.* 2017;7:40521. DOI: 10.1038/srep40521.
- 615 **Nephritic syndrome: Image A.** Histology of acute poststreptococcal glomerulonephritis.  Miquelstorena-Standley E, Jaulerry C, Machet MC, et al. Clinicopathologic features of infection-related glomerulonephritis with IgA deposits: a French Nationwide study. *Diagn Pathol.* 2020 May 27;15(1):62. DOI: 10.1186/s13000-020-00980-6.
- 615 **Nephritic syndrome: Image B.** Immunofluorescence of acute poststreptococcal glomerulonephritis.  Kiremitci S, Ensari A. The role of nephritis-associated plasmin receptor (naplr) in glomerulonephritis associated with streptococcal infection. *Biomed Biotechnol.* 2012;2012:417675. DOI 10.1155/2012/417675.
- 615 **Nephritic syndrome: Image C.** Histology of rapidly progressive glomerulonephritis.  Mayer U, Schmitz J, Bräsen JH, Pape L. Crescentic glomerulonephritis in children. *Pediatr Nephrol.* 2020 May;35(5):829-842. DOI: 10.1007/s00467-019-04436-y.
- 615 **Nephritic syndrome: Image D.** Lupus nephritis with wire loop appearance in glomerular capillary wall.  Kiremitci S, Ensari A. Classifying lupus nephritis: an ongoing story. *Scientific World J.* 2014;2014:580620. DOI: 10.1155/2014/580620.
- 615 **Nephritic syndrome: Image E.** “Tram tracks” appearance in membranoproliferative glomerulonephritis.  Wu CK, Leu J-G, Yang A-H, et al. Simultaneous occurrence of fibrillary glomerulonephritis and renal lesions in nonmalignant monoclonal IgM gammopathy. *BMC Nephrol.* 2016;17:17. DOI: 10.1186/s12882-015-0198-y.
- 616 **Nephrotic syndrome: Image A.** Effacement of podocyte foot processes in minimal change disease.  Teoh DCY, El-Modir A. Managing a locally advanced malignant thymoma complicated by nephrotic syndrome: a case report. *J Med Case Reports.* 2008;2:89. DOI: 10.1186/1752-1947-2-89.
- 618 **Nephrotic syndrome: Image B.** Histology of focal segmental glomerulosclerosis.  Asinobi AO, Ademola AD, Okolo CA, Yaria JO. Trends in the histopathology of childhood nephrotic syndrome in Ibadan Nigeria: preponderance of idiopathic focal segmental glomerulosclerosis. *BMC Nephrol.* 2015 Dec 15;16:213. DOI: 10.1186/s12882-015-0208-0.
- 616 **Nephrotic syndrome: Image D.** Diabetic glomerulosclerosis with Kimmelstiel-Wilson lesions.  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.
- 617 **Kidney stones: Image A.** Calcium kidney stones.  Nair S, George J, Kumar S, et al. Acute oxalate nephropathy following ingestion of *Averrhoa bilimbi* juice. *Case Rep Nephrol.* 2014;2014. DOI: 10.1155/2014/240936.
- 617 **Kidney stones: Image D.** Cysteine kidney stones.  Cayla Devine.
- 618 **Hydronephrosis.** Hydronephrosis on ultrasound.  Ucar AK, Kurugoglu S. Urinary ultrasound and other imaging for ureteropelvic junction type hydronephrosis (UPJHN). *Front. Pediatr.* 2020;8:546. DOI: 10.3389/fped.2020.00546.
- 619 **Pyelonephritis: Image A.** Acute pyelonephritis with neutrophilic infiltration.  Isling LK, Aalback B, Schröder M, Leifsson PS. Pyelonephritis in slaughter pigs and sows: morphological characterization and aspects of pathogenesis and aetiology. *Acta Vet Scand.* 2010 Aug 12;52(1):48. DOI: 10.1186/1751-0147-52-48.
- 623 **Renal cell carcinoma: Image A.**  Fúñez R, Pereda T, Rodrigo I, et al. Simultaneous chromophobe renal cell carcinoma and squamous renal cell carcinoma. *Diagn Pathol.* 2007 Aug 21;2:30. DOI: 10.1186/1746-1596-2-30.
- 623 **Renal cell carcinoma: Image B.**  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.
- 623 **Renal cell carcinoma: Image C.** CT scan.  Behnes CL, Schlegel C, Shoukier M, et al. Hereditary papillary renal cell carcinoma primarily diagnosed in a cervical lymph node: a case report of a 30-year-old woman with multiple metastases. *BMC Urol.* 2013;13:3. DOI: 10.1186/1471-2490-13-3.
- 624 **Renal oncocytoma: Image A.** CT abdomen.  Qu J, Zhang Q, Song X, et al. CT differentiation of the oncocytoma and renal cell carcinoma based on peripheral tumor parenchyma and central hypodense area characterisation. *BMC Med Imaging.* 2023;23:16.
- 624 **Renal oncocytoma: Image B.** Gross specimen.  Maier TJ, Wang DC, Houjaia AH, Darwish OM. Renal oncocytoma and retroperitoneal ancient schwannoma: a benign mimic of metastatic renal cell carcinoma. *Case Rep Urol.* 2019 Feb 20;2019:2561289. DOI: 10.1155/2019/2561289.
- 624 **Renal oncocytoma: Image C.** Histology.  Algaba F. Renal adenomas: pathological differential diagnosis with malignant tumors. *Adv Urol.* 2008;2008:974848. DOI: 10.1155/2008/974848.
- 624 **Nephroblastoma.**  Dumba M, Jawad N, McHugh K. Neuroblastoma and nephroblastoma: a radiological review. *Cancer Imaging.* 2015 Apr 8;15(1):5. DOI: 10.1186/s40644-015-0040-6.
- 624 **Urothelial carcinoma of the bladder: Image A.**  Geavlete B, Stancescu F, Moldoveanu C, et al. NBI cystoscopy and bipolar electrosurgery in NMIBC management—an overview of daily practice. *J Med Life.* 2013;6:140-145.
- 624 **Urothelial carcinoma of the bladder: Image B.** Transitional cell carcinoma.  Tanaka T, Miyazawa K, Tsukamoto T, et al. Pathobiology and chemoprevention of bladder cancer. *J Oncol.* 2011;2011:528353. DOI: 10.1155/2011/528353.






























Reproductive




- 636 **Umbilical cord: Image A.** Meckel diverticulum.  Mathur P, Gupta R, Simlot A, et al. Congenital pouch colon with double Meckel's diverticulae. *J Neonatal Surg.* 2013 Oct-Dec;2(4):48.
- 640 **Uterine (Müllerian) duct anomalies: Images A and B.** Septate uterus (A), bicornuate uterus (B).  Jayaprakasan K, Ojha K. Diagnosis of Congenital Uterine Abnormalities: Practical Considerations. *Journal of Clin Med.* 2022; 11(5):1251. DOI:10.3390/jcm11051251.
- 655 **Sex chromosome disorders: Image A.** Klinefelter syndrome showing gynecomastia.  Singer-Granick CJ, Reisler T, Granick M. Gynecomastia and Klinefelter syndrome. *Eplasty.* 2015;15:ic61. PMID: 26715949. PMCID: PMC4684628.
- 655 **Sex chromosome disorders: Image B.** Turner syndrome.  Mehri I. Surgical correction of the webbed neck: an alternative lateral approach. *GMS Interdiscip Plastic Reconstr. Surg. DGPW.* 2017; 2;6:Doc04. DOI:10.3205/iprs000106.
- 657 **Placental disorders.** Placenta previa percreta.  Tikkanen M, Stefanovic V, Paavone J. Placenta previa percreta left in situ - management by delayed hysterectomy: a case report. *J Med Case Rep.* 2011;5:418. DOI: 10.1186/1752-1947-5-418.
- 659 **Ectopic pregnancy.**  Li W, Wang G, Lin T, et al. Misdiagnosis of bilateral tubal pregnancy: a case report. *J Med Case Rep.* 2014;8:342. DOI: 10.1186/1752-1947-8-342.
- 659 **Hydatidiform mole: Image A.** Cluster of cluster of grapes appearance in complete hydatidiform mole.  DiBartola K, Smith D, Rood K, et al. Management of Complete Hydatidiform Mole with Co-existing Fetus. *Obstet Gynecol Cases Rev.* 2020; 7:173. DOI: 10.23937/2377-9004/1410173.

- 660 **Choriocarcinoma: Image B.** “Cannonball” metastases.  Lekanidi K, Vlachou PA, Morgan B, et al. Spontaneous regression of metastatic renal cell carcinoma: case report. *J Med Case Rep.* 2007;1:89. DOI: 10.1186/1752-1947-1-89.
- 661 **Vulvar pathology: Image A.** Bartholin cyst.  The US Department of Health and Human Services and Susan Lindsley.
- 661 **Vulvar pathology: Image B.** Lichen sclerosis.  Lambert J. Pruritus in female patients. *Biomed Res Int.* 2014;2014:541867. DOI: 10.1155/2014/541867.
- 661 **Vulvar pathology: Image C.** Vulvar carcinoma.  Ramli I, Hassam B. Carcinome épidermoïde vulvaire: pourquoi surveiller un lichen scléro-atrophique. *Pan Afr Med J.* 2015;21:48. DOI: 10.11604/pamj.2015.21.48.6018.
- 661 **Vulvar pathology: Image D.** Extramallary Paget disease.  Wang X, Yang W, Yang J. Extramammary Paget's disease with the appearance of a nodule: a case report. *BMC Cancer.* 2010;10:405. DOI: 10.1186/1471-2407-10-405.
- 662 **Polycystic ovary syndrome.**  Goncharenko V, Beniuk V, Kalenska, O.V. et al. Predictive diagnosis of endometrial hyperplasia and personalized therapeutic strategy in women of fertile age. *EPMA Journal.* 2013;4:24. DOI: 10.1186/1878-5085-4-24.
- 665 **Ovarian tumors: Image A.** Mucinous cystadenoma.  Kamel RM. A massive ovarian mucinous cystadenoma: a case report. *Reprod Biol Endocrinol.* 2010;8:24. <https://doi.org/10.1186/1477-7827-8-24>.
- 665 **Ovarian tumors: Image C.** Struma ovarii.  Li Z, Wang J. & Chen Q. Struma ovarii and peritoneal strumosis during pregnancy. *BMC Pregnancy Childbirth.* 2021;21:347. <https://doi.org/10.1186/s12884-021-03815-4>.
- 665 **Ovarian tumors: Image D.** Dysgerminoma.  Montesinos L, Acien P, Martinez-Beltran M, et al. Ovarian dysgerminoma and synchronic contralateral tubal pregnancy followed by normal intra-uterine gestation: a case report. *J Med Rep.* 2012;6:399. DOI: 10.1186/1752-1947-6-399.
- 665 **Ovarian tumors: Image E.**  Alami M, Janane A, Abbar M, et al. La tumeur testiculaire du sac vitellin: une entité rare chez l'adulte [Testicular yolk sac tumor: a rare entity in adults]. *Pan Afr Med J.* 2014 May 24;18:80. French. DOI: 10.11604/pamj.2014.
- 665 **Ovarian tumors: Image F.** Call-Exner bodies.  Katoh T, Yasuda M, Hasegawa K, et al. Estrogen-producing endometrioid adenocarcinoma resembling sex cord-stromal tumor of the ovary: a review of four postmenopausal cases. *Diagn Pathol.* 2012;7:164. DOI: 10.1186/1746-1596-7-164.
- 666 **Uterine conditions: Image A.** Endometriosis lesion.  Hastings JM, Fazleabas AT. A baboon model for endometriosis: implications for fertility. *Reprod Biol Endocrinol.* 2006;4(suppl 1):S7. DOI: 10.1186/1477-7827-4-S1-S7.
- 666 **Uterine conditions: Image B.** Endometritis with inflammation of the endometrium.  Montesinos L, Acien P, Martinez-Beltran M, et al. Ovarian dysgerminoma and synchronic contralateral tubal pregnancy followed by normal intra-uterine gestation: a case report. *J Med Rep.* 2012;6:399. DOI: 10.1186/1752-1947-6-399.
- 666 **Uterine conditions: Image C.** Leiomyoma (fibroid), gross specimen  Soliman AA, ElSabaa B, Hassan N, et al. Degenerated huge retroperitoneal leiomyoma presenting with sonographic features mimicking a large uterine leiomyoma in an infertile woman with a history of myomectomy: a case report. *J Med Case Rep.* 2011;5:578. <https://doi.org/10.1186/1752-1947-5-578>
- 666 **Uterine conditions: Image D.** Leiomyoma (fibroid) histology.  Londero AP, Perego P, Mangioni C, et al. Locally relapsed and metastatic uterine leiomyoma: a case report. *J Med Case Rep.* 2008;2:308. DOI: 10.1186/1752-1947-2-308.
- 666 **Uterine conditions: Image E.** Endometrial carcinoma.  Izadi-Mood N, Yarmohammadi M, Ahmadi SA, et al. Reproducibility determination of WHO classification of endometrial hyperplasia/well differentiated adenocarcinoma and comparison with computerized morphometric data in curettage specimens in Iran. *Diagn Pathol.* 2009;4:10. DOI:10.1186/1746-1596-4-10.
- 667 **Benign breast diseases.** Phyllodes cyst on ultrasound.  Crenshaw, S, Roller, M, Chapman, J. Immediate breast reconstruction with a saline implant and AlloDerm, following removal of a Phyllodes tumor. *World J Surg Onc.* 2011;9:34. DOI:10.1186/1477-7819-9-34.
- 668 **Breast cancer: Image A.** Mammography of breast cancer. Molino C, Mocerino C, Braucci A, et al. Pancreatic solitary and synchronous metastasis from breast cancer: a case report and systematic review of controversies in diagnosis and treatment. *World J Surg Oncol.* 2014;12:2. DOI:10.1186/1477-7819-12-2
- 668 **Breast cancer: Image D.** Invasive lobular carcinoma. Franceschini G, Manno A, Mule A, et al. Gastro-intestinal symptoms as clinical manifestation of peritoneal and retroperitoneal spread of an invasive lobular breast cancer: report of a case and review of the literature. *BMC Cancer.* 2006;6:193. DOI: 10.1186/1471-2407-6-193.
- 668 **Breast cancer: Image E.** Peau d'orange of inflammatory breast cancer. Levine PH, Zolfaghari L, Young H, et al. What is inflammatory breast cancer? Revisiting the case definition. *Cancers (Basel).* 2010 Mar 3;2(1):143-52. DOI: 10.3390/cancers2010143.
- 669 **Penile pathology: Image A.** Peyronie disease. Tran VQ, Kim DH, Lesser TF, et al. Review of the surgical approaches for Peyronie's disease: corporeal plication and plaque incision with grafting. *Adv Urol.* Sept 2008;263450. DOI: 10.1155/2008/263450.
- 669 **Cryptorchidism.** Pandey A, Gangopadhyay AN, Kumar V. High anorectal malformation in a five-month-old boy: a case report. *J Med Case Reports.* 2010;4:296. DOI: 10.1186/1752-1947-4-296.
- 669 **Varicocele.** Mak CW, Tzeng WS. Sonography of the scrotum. Available at <https://www.intechopen.com/chapters/27883>.
- 670 **Benign scrotal lesions.** Transillumination of hydrocele. Bryson D. Transillumination of testicular hydrocele. *Clin Med Img Lib.* 2017;3:075. DOI: 10.23937/2474-3682/1510075
- 671 **Testicular tumors.** Seminoma. Thorvaldsen TE, Nødtvedt A, Grotmol T, et al. Morphological and immunohistochemical characterisation of seminomas in Norwegian dogs. *Acta Vet Scand.* 2012;54:52. <https://doi.org/10.1186/1751-0147-54-52>.

Respiratory

- 679 **Alveolar cell types: Image A.** Electron micrograph of type II pneumocyte.  Fehrenbach H, Tews S, Fehrenbach A, et al. Improved lung preservation relates to an increase in tubular myelin-associated surfactant protein A. *Respir Res.* 2005 Jun 21;6:60. DOI: 10.1186/1465-9921-6-60.
- 679 **Alveolar cell types: Image B.** Micrograph of type II pneumocyte.  Dr. Thomas Caceci.
- 679 **Neonatal respiratory distress syndrome.**  Bogdanović R, Minić P, Marković-Lipkovski J, et al. Pulmonary renal syndrome in a child with coexistence of anti-neutrophil cytoplasmic antibodies and anti-glomerular basement membrane disease: case report and literature review. *BMC Nephrol.* 2013 Mar 22;14:66. DOI: 10.1186/1471-2369-14-66.

- 681 **Lung anatomy: Image A.** X-ray of normal lung.  Namkoong H, Fujiwara H, Ishii M, et al. Immune reconstitution inflammatory syndrome due to *Mycobacterium avium* complex successfully followed up using 18 F-fluorodeoxyglucose positron emission tomography-computed tomography in a patient with human immunodeficiency virus infection: A case report. *BMC Med Imaging*. 2015;15:24. DOI: 10.1186/s12880-015-0063-2.
- 681 **Lung anatomy: Image B.** CT scan of the chest.  Wang JF, Wang B, Jansen JA, et al. Primary squamous cell carcinoma of lung in a 13-year-old boy: a case report. *Cases J*. 2008 Aug 22;1(1):123. DOI: 10.1186/1757-1626-1-123.
- 689 **Cyanide vs carbon monoxide poisoning.** MRI of presumed carbon monoxide poisoning.  Dekeyser S, De Kock I, Nikoubashman O, et al. “Unforgettable”: a pictorial essay on anatomy and pathology of the hippocampus. *Insights Imaging*. 2017 Apr;8(2):199-212. DOI: 10.1007/s13244-016-0541-2.
- 690 **Rhinosinusitis.**  Strek P, Zagolski O, Sktadzien J. Fatty tissue within the maxillary sinus: a rare finding. *Head Face Med*. 2006;2:28. DOI: 10.1186/1746-160X-2-28.
- 691 **Pulmonary emboli: Image B.** CT scan.  Lee K, Rincon F. Pulmonary complications in patients with severe brain injury. *Crit Care Res Pract*. 2012;2012:207247. DOI: 10.1155/2012/207247.
- 693 **Obstructive lung diseases: Image A.** Barrel-shaped chest in emphysema.  Solazzo A, D'Auria V, Moccia LG, et al. Posterior mediastinal extramedullary hematopoiesis secondary to hypoxia. *Transl Med UniSa*. 2016 May 16;14:1-4.
- 693 **Obstructive lung diseases: Image B.** Emphysema histology.  Cheng SL, Wang HC, Yu CJ, et al. Prevention of elastase-induced emphysema in placenta growth factor knock-out mice. *Respir Res*. 2009 Nov 23;10(1):115. DOI: 10.1186/1465-9921-10-115.
- 693 **Obstructive lung diseases: Image C.** Centrilobular emphysema.  The US Department of Health and Human Services and Dr. Edwin P. Ewing, Jr.
- 693 **Obstructive lung diseases: Image D.** CT of centriacinar emphysema.  Zhu D, Qiao C, Dai H, et al. Diagnostic efficacy of visual subtypes and low attenuation area based on HRCT in the diagnosis of COPD. *BMC Pulm Med*. 2022 Mar 6;22(1):81. DOI: 10.1186/s12890-022-01875-6.
- 693 **Obstructive lung diseases: Image E.** Mucus plugs in asthma.  Song L, Liu D, Wu C, et al. Antibody to mCLCA3 suppresses symptoms in a mouse model of asthma. *PLoS One*. 2013 Dec 9;8(12):e82367. DOI: 10.1371/journal.pone.0082367.
- 693 **Obstructive lung diseases: Image F.** Curschmann spirals.  Alvarado A. Bronchial mucus: basic research and clinical application. *Clin Res Trials*. 2020;6. DOI: 10.15761/CRT.1000316.
- 693 **Obstructive lung diseases: Image G.** Charcot-Leyden crystals on bronchialverolar lavage.  Gholamnejad M, Rezaie N. Unusual presentation of chronic eosinophilic pneumonia with “reversed halo sign”: a case report. *Iran J Radiol*. 2014 May;11(2):e7891. DOI: 10.5812/iranradiol.7891.
- 693 **Obstructive lung diseases: Image H.** Bronchiectasis in cystic fibrosis.  Alvarado A. Bronchial mucus: basic research and clinical application. *Clin Res Trials* 2020;6. DOI: 10.15761/CRT.1000316.
- 695 **Sarcoidosis: Image A.**  Kajal B, Harvey J, Alowami S, Melkerrson-Rosenthal Syndrome, a rare case report of chronic eyelid swelling. *Diagn Pathol*. 2013;8:188. DOI: 10.1186/1746-1596-8-188.
- 695 **Sarcoidosis: Images B and C.** X-ray (B) and CT (C) of the chest.  Lønborg J, Ward M, Gill A, et al. Utility of cardiac magnetic resonance in assessing right-sided heart failure in sarcoidosis. *BMC Med Imaging*. 2013;13:2. DOI: 10.1186/1471-2342-13-2.
- 696 **Pneumoconioses: Image A.** CT scan of asbestosis.  Miles SE, Sandrini A, Johnson AR, et al. Clinical consequences of asbestos-related diffuse pleural thickening: a review. *J Occup Med Toxicol*. 2008;3:20. DOI: 10.1186/1745-6673-3-20.
- 696 **Pneumoconioses: Image B.** Ferruginous bodies in asbestosis.  The Department of Health and Human Services and Dr. Edwin P Ewing, Jr.
- 696 **Pneumoconioses: Image C.** Noncaseating granuloma.  Rajebi MR, Shahrokni A, Chaisson M. Uncommon osseous involvement in multisystemic sarcoidosis. *Ann Saudi Med*. 2009 Nov-Dec;29(6):485-486. DOI: 10.4103/0256-4947.57175.
- 697 **Acute respiratory distress syndrome: Image A.** Alveolar fluid.  Pires-Neto RC, Del Carlo Bernardi F, de Araujo PA. The expression of water and ion channels in diffuse alveolar damage is not dependent on DAD etiology. *PLoS One*. 2016;11(11):e0166184. DOI: 10.1371/journal.pone.0166184.
- 697 **Acute respiratory distress syndrome: Image B.** Bilateral lung opacities.  Imanaka H, Takahara B, Yamaguchi H, et al. Chest computed tomography of a patient revealing severe hypoxia due to amniotic fluid embolism: a case report. *J Med Case Reports*. 2010;4:55. DOI: 10.1186/1752-1947-4-55.
- 699 **Atelectasis.**  Kayal D, Minkara S, Tleiss F. Early diagnosis of left pulmonary artery sling during first week of life in a term baby boy: a case report. *Cureus*. 2020 Feb 5;12(2):e6889. DOI: 10.7759/cureus.6889.
- 699 **Pleural effusions: Images A and B.** Before (A) and after (B) treatment.  Toshikazu A, Takeoka H, Nishioka K, et al. Successful management of refractory pleural effusion due to systemic immunoglobulin light chain amyloidosis by vincristine adriamycin dexamethasone chemotherapy: a case report. *Med Case Rep*. 2010;4:322. DOI: 10.1186/1752-1947-4-322.
- 700 **Pneumothorax: Image A.** CT scan.  Miura K, Kondo R, Kurai M, et al. Birt-Hogg-Dubé syndrome detected incidentally by asymptomatic bilateral pneumothorax in health screening: a case of a young Japanese woman. *Surg Case Rep*. 2015 Dec;1:17. DOI: 10.1186/s40792-015-0014-8.
- 700 **Pneumothorax: Image B.** Tension pneumothorax.  Rosat A, Diaz C. Reexpansion pulmonary edema after drainage of tension pneumothorax. *Pan Afr Med J*. 2015;22:143. DOI: 10.11604/pamj.2015.22.143.8097.
- 701 **Pneumonia: Image A.** Lobar pneumonia.  Yoon BW, Song YG, Lee SH. Severe community-acquired adenovirus pneumonia treated with oral ribavirin: a case report. *BMC Res Notes*. 2017;10:47. DOI: 10.1186/s13104-016-2370-2.
- 701 **Pneumonia: Image B.** Interstitial pneumonia x-ray.  Abro S, Bikeyeva V, Naqvi WA, et al. Clopidogrel-associated interstitial lung disease: a case report and literature review. *Cureus*. 2022 Aug 25;14(8):e28394. DOI: 10.7759/cureus.28394.
- 702 **Lung abscess.** Gross pathology.  Futami S, Takimoto T, Nakagami F, et al. A lung abscess caused by secondary syphilis—the utility of polymerase chain reaction techniques in transbronchial biopsy: a case report. *BMC Infect Dis*. 2019;19:598. <https://doi.org/10.1186/s12879-019-4236-4>.
- 703 **Lung cancer: Image B.** Adenocarcinoma histology.  Wang JF, Wang B, Jansen JA, et al. Primary squamous cell carcinoma of lung in a 13-year-old boy: a case report. *Cases J*. 2008 Aug 22;1(1):123. doi: 10.1186/1757-1626-1-123.
- 703 **Lung cancer: Image C.** Squamous cell carcinoma.  Chisenga R, Adenwala T, Kim W, et al. Squamous cell carcinoma of the lung presenting as a fungating ulcerated skin lesion: a case report. *J Med Case Rep*. 2022 Apr 26;16(1):172. DOI: 10.1186/s13256-022-03352-4.

- 703 **Lung cancer: Image E.** Large cell lung cancer.  Jala VR, Radde BN, Haribabu B, et al. Enhanced expression of G-protein coupled estrogen receptor (GPER/GPR30) in lung cancer. *BMC Cancer*. 2012;12:624. DOI: 10.1186/1471-2407-12-624.
- 704 **Pancoast tumor.**  Manenti G, Raguso M, D'Onofrio S, et al. Pancoast tumor: the role of magnetic resonance imaging. *Case Rep Radiol*. 2013;2013:479120. DOI: 10.1155/2013/479120.
- 704 **Superior vena cava syndrome: Images A and B.** Blanching of skin with pressure (A) and CT of chest (B) in superior vena cava syndrome.  Shaikh I, Berg K, Kman N. Thrombogenic catheter-associated superior vena cava syndrome. *Case Rep Emerg Med*. 2013;2013:793054. DOI 10.1155/2013/793054.

Index

A

A-a gradient
by age, 685
restrictive lung disease, 694

Abacavir

HIV therapy, 197

Abaloparatide, 497

ABCD1 gene mutation, 46

Abdominal aorta

atherosclerosis in, 305

bifurcation of, 681

branches, **370**

Abdominal aortic aneurysm, 306

Abdominal pain

acute mesenteric ischemia, 393

bacterial peritonitis, 397

electrolyte disturbances, 609

gastric cancer presentation, 386

hyperparathyroidism, 349

irritable bowel syndrome, **390**

Mallory-Weiss syndrome, 384

pancreas divisum, 367

pancreatic cancer, 405

postprandial, 370

renal vein compression, 370

RLQ pain, 390

RUQ pain, 403

with Spigelian hernia, 376

Abdominal wall

caput medusae, 372

hernias, **376**

ventral defects in, **365**

Abducens nerve (CN VI)

damage to, 556

function and type, 519

intracranial hypertension effects, 536

ocular motility, 555

palsy, 558

Abduction

arm, 451

hip, **455**, 457

Abductor digiti minimi muscle, 453

Abductor pollicis brevis muscle, 453

Abetalipoproteinemia, **92**, 420

Abiraterone, 676

Abnormal motor posturing, **524**

Abnormal uterine bleeding, **651**, 660

ABO hemolytic disease, 411

Abortion

antimetabolites for, 444

ethical situations, 272

with antiphospholipid syndrome,
476

Abscesses

brain, 153, **176**

calcification with, 207

cold staphylococcal, 114

Klebsiella spp, 143

liver, 152, 175

lung, **702**, 703

of skin, 487

psoas, **463**

Staphylococcus aureus, 133

treatment of lung, 188

Absence (petit mal) seizures, 531

Absence seizure anticonvulsants, 560

Absolute risk reduction, 258

AB toxin, 130

Abuse

child, **573**

confidentiality exception in, 269

intimate partner violence, 273

Acalculia, 524

Acalculous cholecystitis, 403

Acamprosate, 590

Acanthocytes ("spur cells"), 420

Acanthocytosis, 92

Acantholysis, characteristics/

examples, 483

Acanthosis, characteristics/examples,

483

Acanthosis nigricans

characteristics, 492

paraneoplastic syndrome, 224

Acarbose, 359

Accessory nerve (CN XI)

functions, 519

lesions of, 546

Accommodation (eye), 519

Accountable care organization, 275

Accuracy (validity), 261, 266

Accuracy vs precision (diagnostic
tests), **261**

ACE2 receptor, 163

ACE inhibitors

cough from, 628

for diabetic nephropathy, 628

for hypertension, 628

for proteinuria, 628

heart failure treatment, 316

naming conventions for, 253

Acetaminophen

drug reactions with, 248

free radical injury, 206

hepatotoxicity of, 374

mechanism, use and adverse
effects, **495**

patent ductus arteriosus, 287

toxicity treatment, 247

vs aspirin for pediatric patients, 495

Acetazolamide

glaucoma therapy, 568

idiopathic intracranial

hypertension, 536

mechanism, use and adverse
effects, **626**

Acetoacetate metabolism, 88

Acetylation

chromatin, 32

drug metabolism, 230

histones, 32

posttranslation, 43

Acetylcholine (ACh)

pacemaker action potential and,

297

synthesis and change with diseases,
505

Acetylcholine (ACh) receptors

autoantibodies to, 480

types of, **235**

Acetylcholinesterase (AChE)

inhibitors

naming convention for, 253

toxicity treatment, 247

Acetyl-CoA carboxylase

fatty acid synthesis, 71

vitamin B₇ and, 66

Achalasia

esophageal cancer, 385

etiology, **383**

nitric oxide secretion and, 378

Achilles reflex, 523

Achlorhydria

stomach cancer, 386

VIPomas, 378

Achondroplasia, **467**

chromosome disorder, 62

inheritance, 58

ossification in, 461

Acid-base physiology

type and compensation, **609**

Acidemias

organic, **83**

Acid-fast oocysts, 152, 173

Acid-fast organisms, 123

Acidic amino acids, 79

Acid maltase, 84

Acidosis

cardiac contractility in, 289

metabolic, 83

Acidosis and alkalosis, **610**

Acid phosphatase in neutrophils, 412

Acid suppression therapy, **405**

Acinetobacter spp

healthcare-associated infections,
181

Acne

causes, symptoms and treatment,

485

danazol, 676

lesions characteristics, 483

tetracyclines, 188

Acromegaly

carpal tunnel syndrome, 463

findings, diagnosis and treatment,

343

growth hormone in, 333

octreotide for, 407

Actin

cytoskeleton, 46

muscular dystrophies, 59

Acting out, 570

Actinic keratosis

squamous cell carcinoma, 494

Actinomyces spp vs *Nocardia* spp,
137

Actinomyces israelii

penicillin G, V, 183

pigment production, 126

Action potential

motor neuron, **459**

myocardial, **297**

neurons, **504**

pacemaker, **297**

ventricular, 297

Action/willpower, 586

Activated carriers, **73**

Active errors, 277

Active immunity, 108

Active vs passive immunity, **108**

Acute adrenal insufficiency, 353

Acute angle-closure glaucoma, 551

- Acute chest syndrome, 428
- Acute cholangitis, 402, 403
- Acute cholestatic hepatitis
 - drugs causing, 248
 - macrolides, 189
- Acute coronary syndrome
 - ADP receptor inhibitors for, 442
 - nitrates for, 322
 - treatments, **315**
- Acute cystitis, 612, **619**
- Acute cytokines, 106
- Acute disseminated (postinfectious)
 - encephalomyelitis, 538
- Acute dystonia
 - causes and treatment, 587
 - treatment of, 240
- Acute gastritis, 386
- Acute grief, **572**
- Acute hemolytic transfusion
 - reactions, 112
- Acute hemorrhagic cystitis, 161
- Acute infective endocarditis, 318
- Acute inflammation response, **210**
- Acute inflammatory demyelinating
 - polyneuropathy, 538
- Acute intermittent porphyria, 430
- Acute interstitial nephritis, 251, **620**
- Acute iron poisoning, 431
- Acute kidney injury, **620**
- Acute laryngotracheobronchitis, **167**
- Acute lymphoblastic leukemia/
 - lymphoma characteristics, 437
- Acute lymphoblastic leukemia,
 - oncogenes, 220
- Acute mesenteric ischemia, 393
- Acute myelogenous leukemia
 - antimetabolites for, 444
 - epidemiology and findings, 437
- Acute pancreatitis
 - causes and complications, 404
 - necrosis and, 205
- Acute pericarditis, **319**
- Acute-phase proteins, 106
- Acute phase reactants, **209**
- Acute-phase reaction, **209**
- Acute promyelocytic leukemia,
 - vitamin A for, 64
- Acute pulmonary edema, opioid
 - analgesics, 567
- Acute pyelonephritis, 619
- Acute radiation pneumonitis, 694
- Acute radiation syndrome, 207
- Acute respiratory distress syndrome
 - causes, diagnosis and management, **697**
 - eclampsia and, 660
 - restrictive lung disease, 694
- Acute rhinosinusitis, 690
- Acute stress disorder, 581
- Acute transplant rejection, 117
- Acute tubular necrosis
 - casts in urine, 612
 - etiology, **621**
- Acyclovir
 - mechanism and use, **196**
- Adalimumab
 - for Crohn disease, 389
 - mechanism, use and adverse effects, 498
- Adaptive immunity
 - components and mechanism, **97**
 - lymphocytes in, 415
- Addison disease
 - causes of, 353
 - HLA subtype, 98
- Additive drug effects, 234
- Adduction
 - fingers, 450
 - hip, 455, 456
 - thigh, 456
- Adductor brevis, 455
- Adductor longus, 455, 456
- Adductor magnus, 455
- Adenine
 - in nucleotides, 33
 - Shiga/Shiga-like toxins and, 130
- Adenocarcinomas
 - carcinogens for, 221
 - esophageal, 385
 - gastric, 212, 222, 386
 - lung, 703
 - nomenclature, 216
 - pancreas, **405**
 - paraneoplastic syndromes, 224
 - prostatic, **672**
- Adenohypophysis (anterior pituitary)
 - embryologic derivatives, 631
 - hypothalamus and, 508
 - secretions from, 331
 - sensitivity to TRH, 335
- Adenomas
 - nomenclature, 216
 - thyroid, **346**
- Adenomatous polyps, 394
- Adenomyosis (endometrial), 666
- Adenosine
 - as antiarrhythmic drug, 328
 - pacemaker action potential and, 297
- Adenosine deaminase deficiency, 35
- Adenosine triphosphate (ATP)
 - activated carrier, 73
 - production of, 76
- Adenovirus
 - conjunctivitis with, 549
 - pneumonia, 701
 - structure and medical importance, 161
- Adherens junction, 482
- Adhesive atelectasis, 699
- Adipose tissue
 - adrenergic receptors in, 236
 - estrogen production, 648
 - in starvation, 89
 - lipolysis, 325
- Adjustment disorder, 581
- Adnexal torsion, **643**
- Adoption study, 256
- ADPKD (PKD1), chromosome
 - association, 62
- ADP ribosyltransferases, 130
- Adrenal (Addisonian) crisis, 353
- Adrenal adenomas
 - Cushing syndrome, 352
 - hyperaldosteronism, 354
- Adrenal carcinomas, Li-Fraumeni
 - syndrome, 220
- Adrenal cortex
 - derivation of, **331**
 - progesterone production, 648
 - smooth endoplasmic reticulum, 45
- Adrenal insufficiency
 - acute hemorrhagic, 140
 - adrenoleukodystrophy, 46
 - fludrocortisone for, 360
 - mechanism and types of, **353**
 - vitamin B₅ deficiency, 65
- Adrenal medulla
 - derivation of, **331**
 - innervation of, 234
 - pheochromocytomas in, 354
- Adrenal steroids, deficiency, labs and
 - presentation, **339**
- Adrenal zona fasciculata, 340
- Adrenergic receptors
 - tissue distribution of, **236**
- Adrenocortical insufficiency, drug
 - reaction and, 248
- Adrenocorticotrophic hormone
 - (ACTH)
 - in Cushing syndrome, 224, 352
 - paraneoplastic secretion of, 352
 - secretion of, 331, 332
 - signaling pathways of, 341
- Adrenoleukodystrophy, 46, 538
- Adults
 - cancer incidence and mortality, 218
 - causes of seizures in, 531
 - common meningitis causes by age, 176
 - diaphragmatic hernia in, 377
 - intussusception in, 392
 - primary brain tumors, **540**
- Adult T-cell leukemia, oncogenic
 - microbes, 222
- Adult T-cell lymphoma, 435
- Advance directives, **268**
- Advance directives, written, 268
- Adventitia (digestive tract), 369
- Aedes* mosquitoes
 - arbovirus transmission, **168**
 - yellow fever transmission, 168
 - Zika virus transmission, 168
- Aerobic metabolism, fed state, 89
- Afatinib, 447
- Afferent arteriole, ANP/BNP effect
 - on, 606
- Afferent arteriole constriction, 601
- Aflatoxins, 150
- Aflatoxins carcinogenicity, 221
- African sleeping sickness, 153
- Afterload, approximation of, 289
- Agensis
 - in morphogenesis, 633
 - Müllerian duct, 639
- Age-related macular degeneration, 552
- Aging
 - internal hemorrhoids, 373
 - normal changes, **225**
 - pathology by system, 225
 - pharmacokinetic changes with, 230, **246**
 - sick sinus syndrome, 312
- Agonists
 - indirect cholinomimetic, 239
 - indirect general, 241
 - partial, 233
- Agoraphobia, 580
- Agranulocytosis
 - dapsone, 190
 - drug causing, 249
 - drugs causing, 360
- Agraphia, 524, 526
- AIDS (acquired immunodeficiency
 - syndrome)
 - brain abscess, 176
 - Candida albicans*, 150
 - Cryptosporidium*, 152
 - mycobacteria, **138**
 - Pneumocystis jirovecii*, 151
 - primary CNS lymphoma in, 435
 - retinitis, 162
 - retroviruses, 164
 - sexual transmission of, 179
- Air emboli, 691
- Airway obstruction
 - atelectasis with, **699**
 - choanal atresia, 678
 - Hurler syndrome, 86
- Akathisia, 533, 591
- ALA dehydratase, 425, 430
- Alanine
 - ammonia transport, **80**
 - gluconeogenesis in starvation, 89
 - pyruvate dehydrogenase complex deficiency, 75
- Alanine aminotransferase
 - hepatitis, 170
 - in liver damage, 397
 - pyruvate metabolism, 75
 - toxic shock syndrome, 133
- Alar plate development, 500
- Albendazole, cestodes, 157
- Albinism
 - epistasis in, 54
 - locus heterogeneity, 55
 - mechanism of, 484
 - ocular, 59
- Albright hereditary osteodystrophy, 348
- Albumin
 - as liver marker, 397
 - calcium binding, **337**

- in inflammation, 209
- transfusion therapy, 434
- Albuminocytologic dissociation (CSF), 538
- Albuterol, 241, 704
- Alcohol dehydrogenase, 70
- Alcohol for sterilization/disinfection, 199
- Alcoholic cirrhosis, 398, 403
- Alcoholic hepatitis, 398
- Alcoholic liver disease, **398**
- Alcohol use disorder
 - diagnostic criteria, **590**
 - esophageal cancer, 385
 - gastritis in, **386**
 - Korsakoff syndrome, 575
 - liver serum markers in, 397
 - Mallory-Weiss syndrome in, 384
 - pancreatitis with, 248
 - sideroblastic anemia, 425
 - site of hepatitis from, 374
 - vitamin B₉ deficiency, 67
- Alcohol use/overuse
 - common pneumonia causes, 175
 - cytochrome P-450 interaction, 251
 - cytochrome P-450 interactions, 251
 - effects on ADH secretion, 332
 - gout and, 473
 - head/neck cancer risk, 690
 - hypertension risk with, 304
 - intoxication and withdrawal, 588
 - in utero exposure, 304
 - ketone bodies with, 88
 - Klebsiella* spp in, 143
 - teratogenic effects, 632
- Alcohol withdrawal
 - delirium tremens, 587
 - hallucinations in, 576, 587
- Aldesleukin, 119
- Aldose reductase
 - in diabetes mellitus, 350
 - sorbitol metabolism, 79
- Aldosterone
 - functions of, 606
 - in renal disorders, 605
 - in SIADH, 342
 - secretion of, 354
 - signaling pathways for, 341
- Aldosterone antagonists, 321
- Aldosterone resistance, 611
- Alectinib, 447
- Alemtuzumab, 446
- Alendronate, 496
- Alexia, 526
- Alirocumab, 325
- Aliskiren, **628**
- ALK gene
 - lung adenocarcinoma, 220
- Alkaline phosphatase
 - bone disorder lab values, 469
 - in liver damage, 397
 - osteitis deformans, 468
 - serum tumor marker, 222
 - with hyperparathyroidism, 349
- Alkaptonuria, **82**
- Alkylating agents
 - carcinogenicity of, 221
 - mechanism, use and adverse effects, **445**
 - teratogenicity of, 632
- All-trans retinoic acid, promyelocytic leukemia, 64
- Allantois, 636
- Allantois urachus, 286
- Allelic drift, 55
- Allelic heterogeneity, 55
- Allergic/anaphylactic reaction
 - blood transfusion, 112
- Allergic bronchopulmonary aspergillosis, 150
- Allergic bronchopulmonary aspergillosis (ABPA)
 - in cystic fibrosis, 58
- Allergic contact dermatitis, 485
- Allergic reactions
 - mast cells in, 414
 - Type I hypersensitivity, 110
- Allopurinol
 - DRESS with, 249
 - for gout, 497
 - kidney stones, 617
 - with tumor lysis syndrome, 440
- Alopecia
 - epistasis in, 54
 - tinea capitis, 488
 - trichotillomania comparison, 580
 - vitamin A toxicity, 64
 - vitamin B₅ deficiency, 65
- α_1 -blockers, 236
- α -1, 4-glucosidase; alpha-1, 84, 85
- α_1 -antagonists, 672
- α_1 -antitrypsin
 - elastase inhibition by, 50
- α_1 -antitrypsin deficiency
 - codominance in, 54
- α_1 -antitrypsin deficiency cirrhosis with, **400**
- COPD and, 50
- α_1 -blocker, 253
- α -1-iduronidase, 86
- α_1 selective blockers, 243
- α_2 selective blockers, 243
- α_2 -agonists
 - muscle spasm treatment, 567
 - sympatholytics, 243
 - Tourette syndrome and, 574
- α -agonists, 568
- α -amanitin, 40
- α -amylase, 380
- α -antagonists
 - pheochromocytoma treatment, 355
- α -blockers
 - applications and adverse effects, **243**
 - nonselective, 243
 - phenoxylbenzamine, 243
- α endocrine cells
 - pancreas, 331
 - pancreatic tumors, 357
- α (type I) error, 265
- α -fetoprotein (AFP)
 - in germ cell tumors, 671
 - levels with germ cell tumors, 671
 - yolk sac tumors, 664
- α -fetoprotein, 222
- α -galactosidase A, 86
- α -glucosidase inhibitors, 359
- α -hemolytic bacteria
 - characteristics, 133
 - Staphylococcus saprophyticus*, 134
 - Streptococcus pneumoniae*, 134
- α -hemolytic cocci
 - viridans group streptococci, 134
- α -intercalated cells
 - renal tubular acidosis, 611
- α -ketoglutarate dehydrogenase
 - TCA cycle, 74
 - vitamin B₁ and, 64
- α -ketoglutarate dehydrogenase complex, 75
- α -methyl dopa
 - applications and adverse effects, 243
 - autoimmune hemolytic anemia, 429
 - gestational hypertension, 660
- α -oxidation of branched-chain fatty acids, **46**
- α -thalassemia
 - chromosomal abnormality, 62
 - gene deletions and outcome, **424**
- α -thalassemia minima, 424
- α -thalassemia minor, 424
- Alpha toxin, 131
- α -toxin, 136
- α -tubulin, 46
- Alport syndrome
 - collagen deficiency in, 48
 - nephritic syndrome, 615
- Alprazolam, 562
- Alteplase (tPA), 442
- Alternative hypothesis, 264
- Alternative splicing, 41
- Altitude sickness, 626, 688
- Altruism, 571
- Aluminum hydroxide, 406
- Alveolar cell types
 - pneumocytes, **679**
- Alveolar dead space, 682
- Alveolar gas equation, **685**
- Alveolar hypoxia, effects of, 300
- Alveolar macrophages, 679
- Alveolar PO₂, 685
- Alveolar ventilation, 683
- Alveoli
 - development, 678
- Alzheimer disease
 - amyloidosis in, 208
 - drug therapy for, 239, 564
 - neurotransmitter changes with, 505
 - symptoms and histologic findings, 534
- Amanita phalloides*, effects of, 40
- Amantadine, 563, 587
- Amastigotes, 155
- Amaurosis fugax, 525
- Amblyomma, 147
- Amblyopia, 555
- Amebiasis, 152
- Amenorrhea
 - antiandrogens, 676
 - functional hypothalamic, **663**
 - menopause diagnosis, 653
 - pituitary prolactinomas, 332
- Amifostine, 447
- Amikacin, 187
- Amiloride, 627
- Amine precursor uptake
 - decarboxylase (APUD), 354
- Amine whiff test, 147
- Amino acids
 - blood-brain barrier and, 506
 - branched, 82
 - catabolism of, 46, 80
 - classification of, **79**
 - coding of, 35
 - derivatives of, **81**
 - genetic code for, 35
 - in histones, 32
 - metabolism of, 88
 - purine synthesis, 33
 - tRNA, 42
 - urea cycle, **80**
- Aminoacyl-tRNA, 43
- Aminoacyl-tRNA synthetase, 42
- Aminoglycosides
 - magnesium levels and, 336
 - mechanism and clinical use, **187**
 - pregnancy use, 199
 - protein synthesis inhibitors, 187
 - teratogenicity of, 632
- Aminopenicillins, mechanism and use, 184
- Amiodarone
 - antiarrhythmic effects, 328
 - cytochrome P-450 interaction, 251
 - drug-induced thyroiditis, 346
 - drug reactions with, 248, 249, 250
 - hypothyroidism with, 345
 - lung disease with, 694
- Amitriptyline
 - antidepressant, 593
 - migraine headaches, 532
- Amlodipine, 323
- Ammonia
 - in hepatic encephalopathy, 399
 - ornithine transcarbamylase deficiency, 81
 - transport, **80**
- Ammonium magnesium phosphate (struvite), 617
- Amnesias
 - brain lesions with, 524
 - classification of, **575**
 - dissociative, 575
- Amnionitis, *Listeria monocytogenes*, 137
- Amniotic fluid
 - derivation and disorders, **634**
 - emboli of, 691

- Amoxapine, 593
- Amoxicillin
clinical use, 184
Haemophilus influenzae, 140
Helicobacter pylori, 144
Lyme disease, 144
prophylactic use, 193
- Amphetamines
intoxication and withdrawal, 588
mechanism and use, 241
- Amphotericin B
Blastomyces spp, 194
Cryptococcus neoformans, 150
fungal infections, 150
Leishmania spp, 155
mechanism, use and adverse effects, 194
Naegleria fowleri, 153
systemic mycoses, 149
- Amphotericin B toxicity, 611
- Ampicillin
Clostridioides difficile, 136
drug reactions with, 248
Listeria monocytogenes, 137
mechanism and use, 184
meningitis, 176
prophylactic use, 193
- Ampulla of Vater, 375
- Amygdala
lesion effects, 524
limbic system, 509
- Amylase in pancreatitis, 404
- Amylin analogs, 359
- Amyloid angiopathy,
intraparenchymal
hemorrhage, 528
- Amyloidosis
carpal tunnel syndrome, 463
kidney deposition in, 616
manifestation and types of, **208**
restrictive/infiltrative
cardiomyopathy, 315
- Amyotrophic lateral sclerosis, 544, 564
- Anaerobic infections
clindamycin, 188
lung abscesses, 702
- Anaerobic metabolism
in skeletal muscles, 460
pyruvate metabolism, 75
- Anaerobic organisms
aspiration and, 175
characteristics and examples, **125**
Clostridia (with exotoxins), 136
metronidazole, 191
necrotizing fasciitis, 487
Nocardia vs *Actinomyces*, 137
overgrowth in vagina, 147
- Anal atresia, 631
- Anal cancer, oncogenic microbes
and, 222
- Anal fissures, 373
- Analgesic nephropathy, 611
- Anal wink reflex, 523
- Anaphase, 44
- Anaphylaxis
complement and, 104
cyst rupture, 157
epinephrine for, 241
Type I hypersensitivity, 110
Anaplasma spp
disease and transmission, 147
Gram stain for, 123
transmission, 144
- Anaplasmosis, transmission and
disease, 148
- Anaplastic/undifferentiated thyroid
carcinoma, 347
- Anastrozole, 675
- Anatomic dead space, 682
- Anatomic snuff box, 453
- Anatomy
endocrinal, 331
gastrointestinal, 367
musculoskeletal, skin and
connective tissue, 450
neurological, 503
renal, 598
reproductive, 642
respiratory, 680
“Anchovy paste” exudate, 152
- Ancylostoma*
disease, transmission and
treatment, 156
infection routes, 155
iron deficiency anemia, 158
microcytic anemia, 156
- Andersen disease, 85
- Andexanet alfa, 247
- Androblastoma, 671
- Androgen-binding protein
Sertoli cell secretion, 646
- Androgenetic alopecia, 676
- Androgenic steroid abuse, 653
- Androgen insensitivity syndrome, **656**
- Androgen receptor defect, 656
- Androgen receptor inhibitors,
naming, 253
- Androgens, source and functions, **653**
- Androstenedione, 339, 653
- Anemia
blood oxygen in, 687
blood transfusion therapy, **434**
blood viscosity in, 291
drugs causing, 194
ESR in, 210
G6PD deficiency, 77
HbC disease, 428
hereditary spherocytosis, 428
infections, 429
intrinsic factor and, 379
kwashiorkor, 69
Mentzner index, **423**
orotic aciduria, 426
pernicious anemia, 386
pyruvate kinase deficiency, 428
recombinant cytokines for, 119
reticulocyte index, **423**
sickle cell anemia, 428
sideroblastic, 66, 425
vitamin B₉ deficiency, 66
vitamin B₁₂ deficiency, 67, 426
Weil disease, 145
Wilson disease, 402
- Anemia, classification/taxonomy
aplastic, 427
extrinsic hemolytic, **429**
intrinsic hemolytic, **428**
macrocytic, **426**
megaloblastic, 426
microcytic, hypochromic, 424
nonhemolytic normocytic, **427**
normocytic, normochromic, **427**
pernicious anemia, 379
pure red cell aplasia, 224
sideroblastic, 425
- Anemia, drugs causing
 α -methyl dopa, 429
aplastic anemia, 427
 β -lactams, 429
cephalosporins, 185
chloramphenicol, 187
penicillin G, V, 183
thionamides, 360
- Anemia of chronic disease, 427
- Anemia, organisms causing
Ancylostoma, 156
Babesia spp, 154, 429
Diphyllobothrium latum, 157
Escherichia coli, 143
hookworms, 156
- Anemias
diagram, **422**
- Anencephaly, 501
- Anergy, **101**
- Anesthetics
general, **565**
local, **565**
- Aneuploidy, 54, 597, 655
- Aneurysms
Ehlers-Danlos syndrome, 49
superior vena cava syndrome, 704
types of, **530**
ventricular, 309
- Angelman syndrome
chromosome association, 62
imprinting disorder in, 56
isodisomy in, 55
- Angina
cocaine causing, 589
hydralazine contraindication, 323
manifestations of stable, 308
refractory, 324
types of, 308
unstable, 315, 442
with atherosclerosis, 305
 β -blockers for, 244
- Angina, intestinal, 393
- Angiodysplasia, GI bleeding
association, 387
- Angiodysplasia (intestinal), 393
- Angioedema
hereditary, 105
scombroid poisoning, 246
with ACE inhibitors, 628
- Angiogenesis
in cancer, 217
wound healing, 212
- Angiokeratomas, 86
- Angiomas, spider, 115
- Angiosarcomas
characteristics of, 486
nomenclature, 216
- Angiotensin-converting enzyme
inhibitors
acute coronary syndromes, 315
C1 esterase inhibitor deficiency, **105**
dilated cardiomyopathy, 315
drug reactions with, 250
hypertension treatment, 321
mechanism, use and adverse effects, **628**
preload/afterload effects, 289
teratogenicity of, 632
- Angiotensin converting enzyme,
source and functions, 606
- Angiotensin II
filtration effects of, 601
functions of, 606
signaling pathways for, 341
- Angiotensin II receptor blockers
hypertension treatment, 321
mechanism, use and adverse effects, **628**
naming conventions for, 253
- Angle-closure glaucoma, 551
- Anhidrosis, Horner syndrome, 555
- Anidulafungin, 195
- Anisocytosis, 413
- Anitschkow cells, 319
- Ankle sprains, **458**
- Ankylosing spondylitis
characteristics of, 475
HLA-subtype, 98
- Annular pancreas, 367
- Anopheles* mosquito, disease
transmission, 154
- Anorectal varices, portal circulation,
372
- Anorexia
pancreatic adenocarcinoma, 405
renal failure, 621
- Anorexia nervosa, 584
- Anorexigenic effect, 340
- Anorgasmia, 584
- Anosmia
zinc deficiency, 69
- ANOVA tests, 266
- Anovulatory infertility, 662
- Antacids, **406**
- Antagonistic drug effects, 234
- Antagonists, nonselective, 244
- Anterior cerebral artery
stroke effects, 526
watershed zones, 513

- Anterior circulation strokes, 526
- Anterior communicating artery
 - saccular aneurysm, 530
- Anterior compartment prolapse, 643
- Anterior drawer sign, 454, 457
- Anterior inferior cerebellar artery,
 - stroke effects, 526
- Anterior nucleus (hypothalamus), 508
- Anterior pituitary (adenohypophysis)
 - embryologic derivatives, 631
 - secretions from, 331
 - sensitivity to TRH, 335
- Anterior spinal artery
 - stroke effects, 527
- Anterior spinal artery occlusion, 544
- Anterior talofibular ligament sprain,
 - 458
- Anterograde amnesia, 575
- Anthracois, 696
- Anthracyclines
 - mechanism, use and adverse effects, 444
 - naming conventions for, 252
- Anthrax, 130
- Anthrax toxin
 - Bacillus anthracis* and, 135
- Antiandrogens
 - mechanism, use and adverse effects, **676**
- Antianginal therapy
 - myocardial O₂ consumption for, **323**
- Antiapoptotic molecule
 - oncogene product, 220
- Antiarrhythmic drugs
 - torsades de pointes, 247
- Antiarrhythmics
 - adenosine, 328
 - calcium channel blockers (Class IV), **328**
 - ivabradine, **328**
 - magnesium, 328
 - potassium channel blockers (class III), **328**
 - sodium channel blockers, **326**
 - β -blockers (Class II), **327**
- Antibiotic/antimicrobial resistance
 - mechanisms
 - acyclovir, 196
 - aminoglycosides, 187
 - carbapenems, **186**
 - cephalosporins, **185**
 - chloramphenicol, **188**
 - fluoroquinolones, 191
 - foscarnet, 197
 - ganciclovir, 196
 - isoniazid, 192
 - linezolid, 189
 - macrolides, 189
 - penicillinase-resistant penicillins, 184
 - penicillinase-sensitive penicillins, 184
 - plasmids, 129
 - rifamycin, 192
 - sulfonamides, 190
 - table of, **127**
 - tetracyclines, 188
- Antibiotics
 - acne treatment, 485
 - anaerobic coverage, 188
 - Clostridioides difficile* with, 136
 - healthcare-associated infection risk with, 181
 - hyperammonemia with, 80
 - nucleotide synthesis effects of, 34
 - resistance mechanism, 183
 - torsades de pointes, 247
- Antibodies
 - hepatitis viruses, **171**
 - structure and function, 97, **102**
- Antibody-dependent cell-mediated cytotoxicity, 99
- Antibody-drug conjugates, **443**
- Anticancer monoclonal antibodies, **446**
- Anticancer small molecule inhibitors
 - target, clinical use and adverse effects, **447**
- Anticardiolipin
 - antiphospholipid syndrome, 476
- Anticardiolipin antibody, 113
- Anti-CCP antibody, 113
- Anti-centromere antibodies
 - scleroderma, 481
- Anticentromere autoantibody, 113
- Anti-CGRP monoclonal antibodies,
 - 532
- Anticholinergic drugs
 - delirium with, 575
 - toxicity treatment, 247
- Anticholinesterase poisoning
 - muscarinic and nicotinic effects, **239**
- Anticipation (genetics), 54
- Anticoagulant drugs
 - acute coronary syndromes, 315
 - anticoagulant and reversal agent, 442
 - antiphospholipid syndrome, 476
- Anticoagulation
 - reversal, **442**
 - targets for, 419
- Anticonstipation drugs, **408**
- Anticonvulsants
 - drug reactions with, 249
 - mechanism and adverse effects of, **560**
 - multiple sclerosis treatment, 537
 - osteoporosis, 467
- Antidepressants, **592**
 - fibromyalgia treatment, 477
 - monoamine oxidase inhibitors, **593**
 - torsades de pointes, 247
- Anti-desmoglein (anti-desmosome) autoantibody, 113
- Anti-digoxin Fab fragments
 - for cardiac glycoside toxicity, 326
- Antidiuretic hormone (ADH)
 - antagonists, 360
 - functions of, 331, 332, 606
 - hypothalamus nucleus and, 508
 - hypothalamus synthesis, 508
 - naming conventions for antagonist, 253
 - primary polydipsia and diabetes insipidus, 342
 - signaling pathways of, 341
 - source, function, and regulation, **333**
 - anti-DNase B titers
 - rheumatic fever, 319
- Anti-DNA topoisomerase I autoantibody, 113
- Anti-dsDNA antibody, 113
- Antiemetic drugs
 - mechanism, clinical use and adverse effects, **407**
 - torsades de pointes, 247
- Antiepileptic drugs
 - teratogenicity of, 632
- Antifungal drugs
 - griseofulvin, 46
 - seborrheic dermatitis, 484
 - tinea versicolor, 488
- Antifungal therapy
 - drugs for, **194**
- Antigen-presenting cells, 101
- antigen capture by, 96
- B cells as, 415
- dendritic cells, 414
- macrophages as, 100, 413
- Antigens
 - active immunity, 108
 - chronic mucocutaneous candidiasis, 114
 - cross-presentation by dendritic cells, 414
 - HLA subtypes, 98
 - type and memory, **103**
- Antiglobulin test, **416**
- Anti-glomerular basement membrane autoantibody, 113
- Anti-glutamic acid decarboxylase autoantibody, 113
- Antigout drugs
 - colchicine, 46
- Anti-growth signal, 217
- Anti-helicase autoantibody, 113
- Antihelminthic therapy, **196**
 - mebendazole, 46
 - naming conventions for, 252
- Anti-hemidesmosome autoantibody,
 - 113
- Antihistamines
 - for scombroid poisoning, 246
 - for sedation, 591
 - mechanism, use and adverse effects, 705
- Antihistone autoantibody, 113
- Antihypertensive drugs, 660
 - hypertension in pregnancy, 660
- Anti-IgE monoclonal therapy, 704
- Anti-intrinsic factor autoantibody, 113
- Anti-La/SSB autoantibody, 113, 474
- Antileukotrienes for asthma, 704
- Antimetabolites, **444**
- Antimicrobial drugs
 - antifungal therapy, **194**
 - antiprotozoal therapy, **195**
 - antituberculosis drugs, **192**
 - contraindications in pregnancy, **199**
 - embryotoxic, 199
 - HIV therapy, **197**
 - naming conventions for, 252
 - prophylaxis, **193**
- Antimicrosomal autoantibody, 113
- Anti-mite/lice therapy, **195**
- Antimitochondrial autoantibody, 113
- Antimuscarinic drugs
 - Parkinson disease therapy, 563
 - reactions to, 250
 - toxicity treatment, 247
- Antimycobacterial therapy
 - prophylaxis and treatment, **193**
- Antineoplastic drugs
 - nucleotide synthesis effects of, 34
- Antineoplastics
 - naming conventions for, 252
- Anti-NMDA receptor paraneoplastic syndrome encephalitis, 224
- Antinuclear (ANA) antibody, 113
- Antioxidants
 - free radical elimination, 206
- Antiparasitic drugs
 - naming convention for, 252
- Antiparietal cell autoantibody, 113
- Anti-phospholipase A2 receptor autoantibody, 113
- Antiphospholipid syndrome
 - autoantibodies in, 113
 - findings and treatment, **476**
- Antiplatelet drugs
 - for acute coronary syndromes, 315
 - mechanism, clinical use and adverse effects, **442**
- Anti-postsynaptic ACh receptor,
 - autoantibody, 113
- Anti-presynaptic voltage-gated calcium channel,
 - autoantibody, 113
- Antiprogesterin drugs
 - mechanism and clinical use, **675**
- Antiprotozoal therapy, **195**
- Antipseudomonal drugs
 - fluoroquinolones, 191
 - penicillins, 184
- Antipseudomonal penicillins
 - mechanisms and clinical use, **184**
- Antipsychotics
 - delirium treatment, 575
 - disruptive mood dysregulation disorder, 574
 - dopaminergic pathways affected, 509

- Antipsychotics (*continued*)
 drug reactions with, 250
 drug reactions with, 250
 dystonia with, 587
 mechanism, use and adverse effects, 591
 naming conventions for, 252
 reactions to, 248
 torsades de pointes, 247
 Tourette syndrome, 574
- Antipsychotics (atypical)
 2nd generation, 591
 drug reactions with, 248
 MDD with psychotic features, 578
 mechanism, 591
 naming conventions for, 252
 postpartum psychosis treatment, 579
 schizophrenia treatment, 577
 serotonin 5-HT₂ receptor and, 591
- Antiretroviral therapy (ART) in HIV, 197
- Antiribonucleoprotein antibodies
 Sjögren syndrome, 474
- Anti-Ro/SSA autoantibody, 474
 anti-Saccharomyces cerevisiae antibodies (ASCA), 389
- Anti-Scl-70 autoantibody, 113
- Anti-Smith autoantibody, 113
- Anti-smooth muscle antibody, 113
- Antisocial personality disorder, 582
 early-onset disorder, 574
- Antispasmodics, **567**
- Anti-SRP autoantibody, 113
- Anti-streptolysin O (ASO) titers, 319
- Antithrombin
 coagulation cascade and, 419
 deficiency of, 433
- Anti-TNF therapy
 with granulomatous inflammation, 213
- Antitoxins
 antigenicity of, 129
 as passive immunity, 108
- Anti-TSH receptor autoantibody, 113
- Antituberculous drugs
 mechanism and adverse effects, **192**
- Antitumor antibiotics, **444**
- Anti-U1 RNP antibodies, 113, 476
- Antiviral therapy
 hepatitis C, **199**
- Anti- β_2 glycoprotein
 antiphospholipid syndrome, 476
- Anti- β_2 glycoprotein
 autoantibody, 113
- Anxiety disorders
 characteristics of, **579**
 drug therapy, 562
 generalized, **580**
 neurotransmitter changes with, 505
- Aorta
 abdominal and branches of, **370**
 coarctation of, **304**
 diaphragm, 681
 necrosis and dissection of, 50
 syphilitic heart disease, 319
 traumatic rupture, **307**
 “tree bark” appearance, 319
- Aortic aneurysm
 hypertension, 304
 presentation, risk factors and associations, **306**
 syphilitic heart disease, 319
- Aortic arch
 receptors, 299
- Aortic dissection, 304, **307**
 hypertensive emergency, 304
 Marfan syndrome, 307
- Aortic insufficiency
 syphilis, 319
- Aorticopulmonary septum, 285
 embryologic derivatives, 631
- Aortic regurgitation
 aortic dissection, 307
 heart murmurs with, 296
 pressure-volume loops in, 293
 tertiary syphilis association, 306
- Aortic stenosis
 heart murmur with, **296**
 macroangiopathic anemia, 429
 pressure-volume loops in, 293
 Williams syndrome, 304
- Aortic valve
 cardiac cycle, 292
 embryological development of, 285
- Aortitis
 syphilis, 145, 179
- Aortocaval compression syndrome, 661
- APC gene
 colorectal cancer and, 395
 familial adenomatous polyposis, 394
 gene product and associated condition, **220**
- “Ape hand”, 450
- Apgar score, **652**
- Aphasia
 MCA stroke, 526
 types of, **529**
- Aphthous ulcers, 383
- Apical compartment prolapse, 643
- Apixaban, 247, 441
- Aplasia, 633
- Aplasia cutis
 methimazole, 360
- Aplastic anemia
 chloramphenicol, 188
 description and findings, 427
 drugs causing, 249
 HBV, 171
 NSAIDs and, 496
 pancytopenia with, 427
 thionamides, 360
- Aplastic crisis
 hereditary spherocytosis, 428
 sickle cell anemia, 428
- Apolipoproteins, functions, 91
 apoptosis
 Cytotoxic T cell induction, 100
 in T-cell differentiation, 100
- Apoptosis
 BCL-2 gene, 220
 evasion of, 217
 in atrophy, 202
 malignant tumors, 216
 of keratocytes, 492
 of lower motor neurons, 544
 pathways, **204**
 vs necrosis, 205
- Appendicitis, causes and signs, **390**
- Appetite regulation, **340**
 food intake control, 340
 ghrelin, 378
 “Apple core” lesion (X-ray), 395
- Apraclonidine, 568
- Apraxia, gait, 536
- Aprepitant, 407, 447
- Aquagenic pruritus, 438
- Aquaporin-2, 237
- Aquaporin channels
 in renal collecting duct, 333
- Aqueous humor pathway, **550**
- Arachidonic acid pathways, **495**
- Arachnodactyly, 50
- Arachnoid granulations, 514
- Arachnoid mater
 derivation, 506
 meningioma, 539
- Arboviruses
 Aedes mosquito transmission, **168**
- Area postrema, 407, 506, 508
- Arenaviruses
 structure and medical importance, 164
- Argatroban, 441
- Arginine
 classification, 79
 cystinuria, 83
 kidney stones and, 617
- Argyll Robertson pupils
 in syphilis, 145, 179
 in tabes dorsalis, 544
- Aripiprazole, 591
- Armados (disease vectors), 147
- Arm movements
 abduction, **451**, 452
 adduction, 451
 brachial plexus injury, **452**
 rotator cuff in, 451
- Aromatase, 653
- Aromatase deficiency, **656**
- Aromatase inhibitors
 drug reactions with, 249
 mechanism and use, **675**
 naming conventions for, 253
- Aromatic amines, carcinogenicity of, 221
- Aromatic amino acid metabolism, 82
- Arrhythmias
 amphotericin B, 194
 conduction blocks, **313**
 diphtheria, 137
 drug reactions with and, 245
 electrolyte disturbances, 609
 macrolides, 189
 McArdle disease, 85
 MI complication, 314
 narrow complex tachycardias, 311
 premature beats, **313**
 sleep apnea and, 697
 stimulants and, 588
 thyroid hormones and, 360
 tricyclic antidepressant toxicity, 587
 wide complex tachycardias, **312**
- Arsenic
 angiosarcomas, 486
 carcinogenicity of, 221
 squamous cell carcinoma, 494
 toxicity symptoms, 74
 toxicity treatment, 247
- Arterial smooth muscle
 adrenergic receptors in, 236
- Arterial ulcer (lower extremity), 491
- Arteriosclerosis, **306**
- Arteriovenous malformation, 320
- Arteriovenous shunts
 osteitis deformans, 468
- Artesunate, 154
- Arthralgias
 alkaptonuria, 82
 coccidiomycosis, 149
 hepatitis viruses, 170
 rubella, 166
 serum sickness, 111
 vitamin A toxicity, 64
 with Whipple disease, 388
- Arthritis
 carpal tunnel syndrome and, 463
 celecoxib for, 496
 chlamydiae, 146
 gonorrhea, 140, 179
 immunosuppressants, 118
 inflammatory polyarthritis, 168
 lupus, 475
 Lyme disease, 144
 psoriatic, 475
 reactive, 475
 septic, **474**
 seronegative, 475
 Staphylococcus aureus, 133
 systemic juvenile idiopathic arthritis, **474**
 ulcerative colitis, 389
- Arthropathy, hemochromatosis, 402
- Arthus reaction
 defect, presentation, and findings, 115
 immunosuppression, 119
 Type III hypersensitivity, 111
- Arylsulfatase A
 metachromatic leukodystrophy, 86
- Asbestos, carcinogenicity of, 221
- Asbestos-related disease, 696
- Ascaris spp
 infection route, 155

- Ascaris lumbricoides*
 - disease, transmission and treatment, 156
- Ascending colon, 367
- Ascending lymphangitis, 151
- Aschoff bodies, 319
- Ascites
 - diuretic for, 627
 - spontaneous bacterial peritonitis, 397
- Asenapine, 591
- Aseptic meningitis
 - mumps, 167
 - picornaviruses, 164
- Asherman syndrome, 666
- Ashkenazi Jews, **86**
- Aspart, 358
- Aspartame
 - in phenylketonuria, 82
- Aspartate
 - in nucleotides, 33
- Aspartate aminotransferase
 - hepatitis, 170
 - in liver damage, **397**
 - toxic shock syndrome, 133
- Aspartic acid, 79
- Aspergillosis
 - echinocandins, 195
- Aspergillus* spp
 - aflatoxins carcinogenicity, 221
 - in immunodeficiency, 116
- Aspergillus fumigatus*
 - opportunistic infections, 150
- Aspiration
 - ARDS and, 697
 - lung abscess, 701
 - of meconium-stained amniotic fluid, 304
 - reflux-related, 384
 - tracheoesophageal anomalies and, 366
 - Zenker diverticulum, 391
- Aspiration (chemical) pneumonitis, 701
- Aspiration pneumonia, 701
 - clindamycin, 188
 - healthcare-associated infections, 181
 - lung anatomy and, 681
- Aspirin
 - as weak acid, 231
 - cyclooxygenase, 417
 - hemolysis in G6PD deficiency, 249
 - mechanism and clinical use, 442
 - mechanism, use and adverse effects, **496**
 - Reye syndrome, **495**
 - stroke risk reduction, 525
 - thrombogenesis and, 417
- Asplenia
 - RBC inclusions, 421
 - RBC morphology, 420
- Asterixis, 80, 399, 533
- Asteroid bodies, 695
- Asthma
 - albuterol for, 241
 - diagnosis and mechanisms, 693
 - drug therapy, **704**
 - hypertension in, 321
 - methacholine challenge test, 239
 - pulsus paradoxus, 317
- Astigmatism, 549
- As-treated analysis, 257
- Astrocytes, 503
- Ataxia
 - abetalipoproteinemia, 92
 - in tabes dorsalis, 544
 - lithium toxicity, 587
 - metachromatic leukodystrophy, 86
 - of limbs, 524
 - opsoclonus-myoclonus syndrome, 224
 - prion disease, **174**
 - psychoactive drug intoxication, 588
 - syphilis, 145
 - truncal, 524
 - vitamin E deficiency, 68
 - Wernicke-Korsakoff syndrome, 590
- Ataxia-telangiectasia
 - serum tumor marker, 222
 - transplant rejection, 117
- Atazanavir, 198
- Atelectasis
 - causes of, **699**
 - physical findings, 698
 - pleural effusions and, 699
- Atenolol, 244, 327
- Atezolizumab, 218, 446
- Atherosclerosis
 - familial dyslipidemias, 92
 - homocystinuria, 83
 - in diabetes mellitus, 350
 - location, symptoms and progression, **305**
 - renovascular disease, 623
- Athetosis, 524, 533
- “Athlete’s foot”, 488
- ATM gene, **115–119**
- Atomoxetine, 574
- Atonic seizures, 531
- Atopic dermatitis (eczema), 483, 485
- Atorvastatin, 324
- Atovaquone
 - babesiosis, 154
 - fungal infections, 151
 - malaria, 154
 - prophylaxis with proguanil, 193
- ATP7B* gene, 402
- Atracurium, 566
- Atresia
 - anal, 631
 - biliary, **401**
 - choanal, **678**
 - duodenal, 366
 - esophageal, 366
 - intestinal, **366**
 - jejunal and ileal, 366
 - tricuspid, 285, 302
- Atria
 - depolarization, 298
 - embryologic development of, 284
- Atrial fibrillation
 - description and management, 311
- Atrial flutter
 - description and management, 311
- “Atrial kick”, 292
- Atrial myocytes, 299
- Atrial natriuretic peptide (ANP), **299**
 - in amyloidosis, 208
 - in SIADH, 342
 - signaling pathways for, 341
 - source and functions of, 606
- Atrial septal defect (ASD)
 - congenital disease, 303
 - Down syndrome, 304
 - venous thromboemboli with, 284
- Atrioventricular (AV) block
 - first-degree, 313
 - Lyme disease, 144
 - second-degree, 313
 - third-degree (complete), 313
- Atrioventricular (AV) node
 - action potential, 297
 - antiarrhythmic effects, 327, 328
 - Class IC antiarrhythmics, 326
 - conduction pathway, 298
 - ECG and, 297
 - supraventricular tachycardia, 311
- Atrioventricular canals, 285
- Atrioventricular valves
 - embryologic development of, 284
- Atrophic gastritis
 - gastrin in, 378
- Atrophy
 - changes with, 202
 - motor neuron signs, 543
 - skeletal muscle, 460
- Atropine
 - antimuscarinic effects of, 239
 - β -blocker overdose, 327
 - for anticholinergic toxicity, 239
 - multiorgan drug reactions with, 250
 - organ system and applications, 240
 - toxicity treatment, 247
 - use and adverse effects, **240**
- Attack rate (risk quantification), 259
- Attention-deficit hyperactivity disorder
 - early onset disorder, 574
 - preferred medications for, 590
- Attributable risk, 258
- Atypical antidepressants, 593, **594**
- Atypical pneumonias
 - chlamydiae, 146
 - organisms causing, 175
 - typical organisms, 701
- Atypical venous thrombosis, 105
 - associated disorder, **113**
- Auditory anatomy and physiology, **547**
- Auditory cortex, 508
 - thalamic relay for, 508
- Auerbach (myenteric) nerve plexus, 369, 383, 391
- Auer rods
 - in AML, 437
 - Auramine-rhodamine stain, 123
- Auscultation of heart
 - Hamman sign, 691
 - maneuvers and changes with, **295**
 - murmurs and clinical associations, **296**
- Auspitz sign, 485
- Autism spectrum disorder, 574
 - double Y males and, 655
 - fragile X syndrome, 60
- Autoantibodies
 - interferon-induced, 107
 - self-antigen in, 97
- Autoclaves
 - disinfection/sterilization, 199
 - for spore-forming bacteria, 127
- Autodigestion, 404
- Autoimmune
 - myocarditis, 320
- Autoimmune diseases
 - acute pericarditis with, 319
 - blistering skin disorders, **489**
 - diabetes mellitus Type 1, 351
 - rheumatoid arthritis, 472
 - Sjögren syndrome, 474
 - SLE, 476
- Autoimmune gastritis, 386
- Autoimmune hemolytic anemia
 - causes and findings, 429
 - cephalosporins, 185
 - risk with hepatitis B and C, 171
- Autoimmune hepatitis, **399**
- Autoimmune hypothyroidism
 - risk with hepatitis B and C, 171
- Autoimmune lymphoproliferative syndrome, 204
- autoimmune regulator (AIRE)
 - protein, 100
- Autoimmune thrombocytopenia, 119
 - hyper-IgE syndrome, 114
- Autonomic drugs
 - actions and applications, **238**
 - bladder dysfunction action on, 236
 - cholinomimetic agents, **239**
 - muscarinic antagonist applications, **240**
 - naming conventions for, 253
 - sympatholytics (α_2 -agonists), **243**
 - sympathomimetics, **241**
 - β -blockers, **244**
- Autonomic insufficiency, 241
- Autonomic nervous system
 - delirium tremens, 587
 - dysregulation in inflammatory demyelinating polyradiculopathy, 538
 - in diabetes mellitus, 350
 - in serotonin syndrome, 587
 - limbic system in, 508
 - male sexual response, **645**
- Autonomic receptors, **234**

- Autonomy (ethics), 267
- Autophagy
 - atrophy with, 202
- Autoregulation of blood flow, **300**
- Autosomal dominant diseases
 - achondroplasia, 467
 - acute intermittent porphyria, 430
 - Brugada syndrome, 312
 - Charcot-Marie-Tooth disease, 538
 - defects, presentation, and findings, 114
 - elastin syndrome, 49
 - familial adenomatous polyposis, 394
 - familial dyslipidemias, 92
 - familial hypocalciuric hypercalcemia, 349
 - hereditary hemorrhagic telangiectasia, 320
 - hereditary spherocytosis, 428
 - hereditary thrombophilias, 433
 - hypertrophic cardiomyopathy, 315
 - juvenile polyposis syndrome, 394
 - Liddle syndrome, 604
 - listing of, **58**
 - Lynch syndrome, 395
 - Marfan syndrome, 50
 - multiple endocrine neoplasias, 356
 - neurofibromatosis, 539
 - Peutz-Jeghers syndrome, 394
 - pseudohypoparathyroidism, 348
 - pseudopseudohypoparathyroidism, 348
 - Romano-Ward syndrome, 312
 - tuberous sclerosis, 539
 - von Hippel-Lindau disease, 539
 - von Willebrand disease, 433
- Autosomal dominant hyper-IgE syndrome
 - adenosine deaminase deficiency, 115
 - Chédiak-Higashi syndrome, 115
- Autosomal dominant inheritance, 57
- Autosomal dominant polycystic kidney disease, 622
 - associated disorders, 622
 - chromosome association, 62
 - saccular aneurysms and, 530
- Autosomal dominant tubulointerstitial kidney disease, 622
- Autosomal recessive disease
 - galactokinase deficiency, 78
 - hemochromatosis, 402
 - homocystinuria, 50, 83
 - Jervell and Lange-Nielsen syndrome, 312
 - kidney diseases, 604
- Autosomal recessive diseases
 - 5 α -reductase deficiency, 656
 - abetalipoproteinemia, 92
 - alkaptonuria, 82
 - Bernard-Soulier syndrome, 432
 - cystinuria, 83
 - familial dyslipidemias, 92
 - Friedreich ataxia, 545
 - Glanzmann thrombasthenia, 432
 - hemochromatosis, 402
 - hereditary hyperbilirubinemias, 401
 - Kartagener syndrome, 47
 - listing of, **58**
 - maple syrup urine disease, 82
 - mutations in hepatocyte, 402
 - MUTYH-associated polyposis syndrome, 394
 - pyruvate kinase deficiency, 428
 - SCID, 35
 - autosomal recessive disorder
 - Zellweger syndrome, 46
- Autosomal recessive inheritance, 57
- Autosomal recessive polycystic kidney disease, 622
 - associated disorders, 622
 - Potter sequence, 596
- Autosomal trisomies
 - karyotyping for, 53
 - types and findings with, **61**
- Avanafil, 245
- Avascular necrosis (bone), **469**
 - femoral head, 466
 - Gaucher disease, 86
 - scaphoid bone, 453
 - Sickle cell anemia, 428
- Avelumab, 218, 446
- Aversive stimulus (positive punishment), 570
- Avibactam, 185
- Avoidant personality disorder, 582
- Axilla/lateral thorax, 458
- Axillary nerve
 - injury and presentation, 450
 - neurovascular pairing, 458
- Axonal injury
 - diffuse, **529**
 - neuronal response to, **505**
- Axonal trafficking, 46
- Axonemal dynein, 47
- Azathioprine
 - drug reactions with, 248
 - mechanism, use and adverse effects, 444
 - purine synthesis effects, 34
- Azithromycin, 189
- babesiosis, 154
 - Chlamydia* spp, 146
 - in cystic fibrosis, 58
- Azoles
 - mechanism and clinical use, **195**
 - vaginal infections, 178
- Azotemia
 - leptospirosis, 145
- Aztreonam
 - mechanism and clinical use, **186**
- B**
- B19 virus, 161
- Babesia* spp
 - hematologic infections, 154
 - vector for, 144
- Babesiosis, 154
- Babinski reflex/sign
 - motor neuron lesions, 543
 - upper motor neuron lesions, 523
- Bacillary angiomatosis, 486
 - animal transmission, 147
 - HIV-positive adults, 173
 - Bacillus anthracis*, 130, **135**
 - Bacillus cereus*, **136**
 - food poisoning, 174
- Bacitracin
 - sensitivity to, 134
- Baclofen
 - cerebral palsy treatment, 545
 - mechanism and use, 567
 - multiple sclerosis treatment, 537
- Bacteremia
 - brain abscesses, 176
 - cutaneous anthrax, 135
 - daptomycin, 191
- Bacteria
 - biofilm-producing, **126**
 - Gram stain for, 123
 - hemolytic, 134
 - infections in immunodeficiency, 116
 - normal microbiota, 174
 - phage infection of, 128
 - pigment-producing, **126**
 - spore-forming, **127**
 - structures of, **122**
 - trimethoprim effects in, 34
 - virulence factors, 133, 141
 - with exotoxins, **130**
 - zoonotic, **147**
- Bacterial exotoxin mechanisms
 - cell membrane lysis, 131
 - increase fluid secretion, 130
 - neurotransmitter release inhibition, 130
 - phagocytic ability inhibition, 130
 - protein synthesis inhibition, 130
 - superantigens, 131
- Bacterial genetics, **128**
 - transduction, 128
 - transposition, 129
- Bacterial infections, **487**
 - B-cell deficiencies, 116
 - granulomatous inflammation, 213
 - myocarditis with, 320
- Bacterial peritonitis (spontaneous), **397**
- Bacterial structures, **122**
- Bacterial toxins
 - elongation factor effects of, 43
 - main features of, **129**
- Bacterial vaginosis
 - characteristics of, 155
 - signs and symptoms, 178
 - vs. vaginitis, 147
- Bacterial virulence factors, **127**
- Bacterial virulence factors
 - Escherichia coli*, 143
- Bacteroides* spp
 - alcohol use disorder, 175
 - clindamycin, 188
 - healthcare-associated infections, 181
 - lung abscess, 702
 - metronidazole, 191
- Bacteroides fragilis*
 - neonatal microbiota, 174
- “Bag of worms”, 669
- Baker cyst, 457
- BAK protein, 204
- Balanced translocations, **62**
- Baloxavir
 - mechanism and use, **196**
- Bamboo spine, 475
- Band cells, 412
- B and T cells
 - defect and findings, 115
 - major functions of, **99**
- Barbiturates
 - intoxication and withdrawal, 588
 - mechanism, use and adverse effects, **561**
 - naming convention for, 252
- Bariatric surgery, 381
- Barlow maneuver, 466
- Baroreceptors and chemoreceptors, **299**
- Barr bodies, 32, 655
- Barrett esophagus, **385**
 - dysplasia with, 384
 - esophageal cancer and, 385
 - metaplasia with, **384**
 - progression of, 202
- Bartholin cyst/abscess, 661
- Bartonella* spp
 - bacillary angiomatosis, 486
 - disease and transmission, 147
 - Gram stain for, 123
 - HIV positive adults, 173
- Bartonella quintana*
 - transmission, 158
- Bartter syndrome
 - renal disorder features, 605
 - renal tubular defects, 604
- Basal body (cilium), 47
- Basal cell carcinoma
 - antimetabolites for, 444
 - characteristics of, 494
- Basal ganglia, **511**
 - intraparenchymal hemorrhage, 528
 - lesions of, 524
 - thalamic connections, 508
- Basal lamina, 48
- Basal metabolic rate, 335
- Basal nucleus of Meynert, 505
- Basal plate, 500
- Base excision repair, 37
- Basement membrane
 - blood-brain barrier, 506
 - collagen in, 48
- Basic amino acids, 79
- Basilar artery
 - herniation syndromes, 543
 - stroke effects, 526
- Basiliximab, 118
- Basophilia, 414

- Basophilic stippling, 421
- Basophils, **414**
IgE binding of, 103
- Batson (vertebral) venous plexus, 672
- B-cell lymphomas
HIV-positive adults, 173
risk with hepatitis B and C, 171
- B cells, **415**
activation, 101, 103
adaptive immunity, 97
anergy, 101
cell surface proteins, 108
defect, presentation, and findings, **114**
functions of, 97, 99
infections in immunodeficiency, 116
maturation, 94
neoplasms of, 435, 437
non-Hodgkin lymphoma, 434
spleen, 96
- BCG vaccination, 138
- Bcl-2 protein, 204
- BCL gene
associated neoplasm, 220
mutation in lymphoma, 435
- BCR-ABL gene
associated neoplasm, 220
- Bead-like costochondral junctions, 468
- Becker muscular dystrophy
findings with, 59
inheritance of, 59
- Beck triad, 317
- Beckwith-Wiedemann syndrome, 365
- Bed bugs, 158
- Behavioral therapy, 590
- Behavior disorder, REM sleep, **507**
- Behavior modulation
hypothalamus and, 508
limbic system and, 509
- “Bell clapper” deformity, 669
- Bell-shaped distribution, 264
- Bence Jones proteinuria, 436
- Benzodiazepines, 156
- Bends, 469
- Beneficence (ethics), 267
- Benign capillary hemangioma, 486
- Benign neonatal hyperbilirubinemia, **400**
- Benign prostatic hyperplasia, 236, **672**
urinary symptom treatment, 243
- Benign scrotal lesions, **670**
- Benign tumors, 216
bones, 470
breast, 667
- Benralizumab, 705
- Benzathine penicillin G, 193
- Benzene
drug reactions with, 249
- Benzidine, 221
- Benznidazole, 155
- Benzocaine, 565
- Benzodiazepines
cocaine overdose, 589
- in anxiety disorders, 580
- in psychiatric emergencies, 587
- intoxication and withdrawal, 588
- mechanism, use and adverse effects, **562**
naming convention for, 252
phobia treatment, 580
serotonin syndrome treatment, 587
toxicity treatment, 247
- Benzoyl peroxide, 485
- Benzotropine, 240, 563, 587
- Berger disease (IgA nephropathy), 614
- Berkson bias, 262
- Bernard-Soulier syndrome, 417, 432
- Berry aneurysm, 530
- Berylliosis, 696
- Beryllium carcinogenicity, 221
- β endocrine cells, 331
- β_1 -blockade, 289
- β_2 -microglobulin
MHC I and II and, 98
- β_2 -agonist
naming conventions for, 253
- β_2 -agonists
asthma therapy, 704
- β -adrenergic effects
of T3, 335
- β -amyloid protein, 208
- β -blockers
acute coronary syndromes, 315
adverse effects of, 244
angina, 327
antianginal therapy, 323
anticholinergic toxicity, 239
aortic dissection treatment, 307
applications and actions, **244**
dilated cardiomyopathy, 315
for cocaine intoxication, 241
for pheochromocytomas, 355
for thyroid storm, 346
glaucoma therapy, 244, 568
heart failure therapy, 244, 316
heart failure treatment, 244
hypertrophic cardiomyopathy, 315
migraine headaches, 532
naming convention for, 253
overdose treatment, 327
pheochromocytoma treatment, 355
phobias, 580
selectivity, 244
Starling curves, 290
T3 in peripheral tissues, 335
thyrotoxicosis, 335
toxicity treatment, 247
- β -cell numbers
in Type 2 diabetes mellitus, 351
- β cells
insulin secretion by, 338
pancreatic tumors, 357
Type 1 and Type 2 diabetes, 351
- β -endorphin, 331
- β (Type II) error (statistical testing), 265
- β -globin gene defects, 62
chromosomal abnormalities, 62
- β -glucan, 195
- β -glucuronidase, 412
- β -hemolysis, 131
- β -hemolytic bacteria, **133**
common colonization sites, 133
Streptococcus agalactiae (group B strep), 135
Streptococcus pyogenes (Group A strep), 134
- β -hydroxybutyrate, 88
- β -interferon
multiple sclerosis treatment, 537
- β -lactam antibiotics, 429
- β -lactam antibiotics, 183
- β -lactamase inhibitors, 184, **185**
- Very-long-chain fatty acids (VLCFA), β -oxidation, 46
- β -oxidation of VLCFA
in adrenoleukodystrophy, 46
- β -pleated sheet protein configuration, 208
- β -prophage
Corynebacterium exotoxin
encoding, 137
- β -thalassemia
allelic heterogeneity, 55
chromosome abnormality, 62
mutations and clinical outcome, **425**
- β -tubulin, 46
- Betaxolol, 244, 568
- Bethanechol
action and applications, 239
urinary retention treatment, **236**
- Bevacizumab, 446
- Bias and study errors, **262**
- Bicalutamide, 676
- Bicarbonate
overdose treatment, 231
pancreatic insufficiency, 388
salicylate toxicity, 247
source, action and regulation, 379
tricyclic antidepressant toxicity, 231
- Biceps brachii muscle, 452
- Biceps femoris, 456, 457
- Biceps reflex, 523
- Bicornuate uterus, 640
- Bictegravir, 197
- Bicuspid aortic valve
aortic dissection and, 307
coarctation of aorta and, 304
thoracic aortic aneurysms and, 306
Turner syndrome, 304
- Bifid ureter, 597
- Bilateral renal agenesis
Potter sequence, 596
- Bile
composition and functions of, **382**
secretin effect on, 378
- Bile acid resins, 324
- Bile acids
synthesis of, 46
- Bile canaliculus, 374
- Bile ducts
in gastrointestinal ligaments, 368
in portal triad, 374
obstruction of, 375
- Biliary atresia, **401**
- Biliary cholangitis, primary
autoantibody, 113
- Biliary cirrhosis, 402
- Biliary colic, 403
- Biliary structures, **375**
- Biliary tract disease
Clonorchis sinensis, 157, 158
enterococci infections, 135
gallstones, 375
hyperbilirubinemia with, 400
pathology and epidemiology, **402**
- Bilirubin, **382**
excretion, 382
excretion defect, 400
hereditary hyperbilirubinemias, **401**
liver function marker, 397
toxic shock syndrome, 133
- Biliverdin, 382
- Bimatoprost, 568
- Bimodal distribution, 264
- Binding globulins, 341
- Binge-eating disorder, 584, 590
SSRIs for, 593
- Bioavailability, 229
- Biochemistry
cellular, 44
genetics, 53
laboratory techniques, 50
metabolism, 71
molecular, 32
nutrition, 63–92
- Biochemistry laboratory techniques
blotting procedures, **51**
CRISPR/Cas9, 51
enzyme-linked immunosorbent assay, 52
fluorescence in situ hybridization, 53
gene expression modifications, 54
karyotyping, **53**
microarrays, 52
molecular cloning, **53**
polymerase chain reaction, **50**
RNA interference, 54
- Biofilm-producing bacteria
in vivo, **126**
Pseudomonas aeruginosa, 141
Staphylococcus epidermidis, 133
- Biologic agent naming conventions
interleukin receptor modulators, 254
monoclonal antibodies, 254
small molecule inhibitors, 254
- Bipolar disorder
diagnostic criteria, **578**
lithium for, 592
- Bipolar I, 578
- Bipolar II, 578
- Birbeck granules
Langerhans cell histiocytosis, 439
- Bisacodyl, 408
- Bismuth
mechanism and clinical use, **406**

- Bisoprolol, 244
- Bisphosphonates
- mechanism, use and adverse effects, **496**
 - naming convention for, 253
 - osteogenesis imperfecta treatment, 49
 - osteoporosis treatment, 467
- “Bite cells”, 77, 420, 429
- Bitemporal hemianopia
- optic chiasm compression, 530
 - pituitary adenoma, 540
- Bitot spots, 64
- Bitter almond odor (breath), 689
- Bivalirudin, 441
- Black lung disease, 696
- Bladder
- BPH and, 672
 - carcinogens affecting, 221
 - development of, 636
 - exstrophy, 641
 - genitourinary trauma, 645
 - squamous cell carcinoma, **624**
 - urgency in cystitis, 240
 - urothelial carcinoma, **624**
- Bladder cancer
- cisplatin/carboplatin for, 445
 - hypercalcemia, 224
 - Schistosoma haematobium*, 222
- Bladder outlet obstruction
- common causes of, 597
- “Blast crisis”, 437
- Blastomyces* spp
- treatment, 194
- Blastomycosis
- unique symptoms and features, 149
- Blebbing, 203
- Bleeding
- adenomatous polyps, 394
 - direct factor Xa inhibitors, 441
 - glycoprotein IIb/IIIa inhibitors, 442
 - thrombolytics, 442
 - variceal, 378
- Bleeding time, 432
- Bleomycin
- drug reactions with, 250
 - lung disease with, 694
 - mechanism, use and adverse effects, 444
- Blepharitis, 559
- Blindness
- Chlamydia trachomatis*, 146
 - neonatal, 140
 - Onchocerca volvulus*, 155
- Blistering skin disorders, **489**
- Blood
- carcinogens affecting, 221
 - coagulation and kinin pathways, **418**
 - in placenta, 634
 - oxygen content of, 687
 - viscosity of, 684
- Blood-brain barrier
- at hypothalamus, 508
 - function and mechanism, **506**
- Blood cells
- nomenclature, 216
- Blood flow
- autoregulation by organ/system, **300**
 - exercise response, **688**
 - renal autoregulation mechanisms, **600**
- Blood groups, **411**
- Blood-nerve permeability barrier, 505
- Blood pH
- diuretic effects on, 625
- Blood pressure
- angiotensin II effects, 606
 - antidiuretic hormone regulation of, 333
 - cortisol effect on, 340
 - in antianginal therapy, 323
 - renal disorders and, 605
 - sympathomimetic effect on, 241
- Blood products
- infections from, 181
- Blood-testis barrier, 646
- Blood transfusions
- components for therapy, **434**
 - reactions, **112**
 - risks of, 434
- Blood vessels
- collagen in, 48
 - hereditary hemorrhagic telangiectasia, 320
 - nomenclature, 216
- Blood volume
- regulation, 606
- Bloody diarrhea
- amebiasis, 152
 - Campylobacter* spp, 147
 - Campylobacter jejuni*, 143
 - organisms causing, 175
 - Shigella*, 142
 - ulcerative colitis vs Crohn disease, 389
 - Yersinia enterocolitica*, 142
- Blotting procedures, **51**
- Blown pupil
- CN III damage, 556
 - in herniation syndromes, 543
 - saccular aneurysms, 530
- Blowout fracture, 555
- “Blue babies”, 302
- “Blueberry muffin” rash
- cytomegalovirus, 180
 - rubella, 166, 180
 - Toxoplasma gondii*, 180
- Blue sclerae, 49
- Blue-tinged vision, 250
- Blue toe syndrome, 306
- Blumer shelf, 386
- BMPR2 gene, 698
- Body compartments, 229
- Body dysmorphic disorder, 580
- Body louse, 147
- Body surface area estimation, **493**
- Boerhaave syndrome, 384
- Bombesin, 354
- Bone crises, 86
- Bone disorders
- adult T-cell lymphoma and, 435
 - Burkitt lymphoma, 435
 - Langerhans cell histiocytosis, 439
 - lytic lesions of, 436
 - osteogenesis imperfecta, 49
- Bone formation
- cell biology of, **462**
 - estrogen effects, 462
 - ossification, **461**
- Bone marrow
- cytokine stimulation of, 119
 - immune system organs, 94
 - in osteopetrosis, 468
 - myelofibrosis, 438
 - RBC inclusions in, 421
- Bone mineral density scan, 467
- Bone morphogenic protein
- neural development, 500
- Bone pain
- hyperparathyroidism and, 349
- Bones
- collagen in, 48
 - lytic/blastic metastases in, 219
 - renal osteodystrophy, 621
 - resorption, 337, 467
- Bone tumors
- malignant, 471
 - nomenclature, 216
 - primary, **470**
- Boot-shaped heart (chest x-ray), 302
- Bordetella pertussis*
- culture requirements, 124
 - findings and treatment, **141**
 - macrolides, 189
 - toxin production, 130
 - vaccines, 141
- Borderline personality disorder, 582
- Bordet-Gengou agar, 124
- Borrelia* spp
- stains for, 123
- Borrelia burgdorferi*
- coinfection with, 154
 - disease and transmission, 147
 - Lyme disease, 144
 - tetracyclines, 188
- Borrelia recurrentis*
- animal transmission, 147
 - transmission, 158
- Bortezomib, 447
- Bosentan, 706
- Botox injections, 136
- Bottleneck effect (genetics), 55
- Botulinum toxin
- cerebral palsy treatment, 545
 - lysogenic transduction, 128
 - migraine headaches, 532
 - multiple sclerosis treatment, 537
 - symptoms of, 136
 - toxin effects, 130
- Bouchard nodes, 472
- Boutonniere deformity, 472
- Bovine spongiform encephalopathy (BSE), 174
- Bowen disease, 669
- Bowenoid papulosis, 669
- Bow legs (genu varum), 468
- Brachial artery, 458
- Brachial plexus
- divisions of, **452**
- Brachial plexus lesions/injury
- deficits and presentation, **452**
 - Pancoast tumor, 704
- Brachiocephalic syndrome, 704
- Brachiocephalic vein, 704
- Brachioradialis reflex, 523
- Bradford Hill criteria, **257**
- Bradycardia
- amiodarone and, 328
 - atropine for, 240
 - electrolyte disturbances, 609
 - in Cushing reflex, 299
 - β -blockers and, 244
- Bradykinin
- angiotensin-converting enzyme inhibitor effects, 628
 - C1 esterase inhibitor deficiency, 105
- BRAF gene
- associated neoplasm, 220
 - melanomas and, 494
 - papillary thyroid carcinoma and, 347
 - serrated polyps and, 394
- BRAF inhibitor
- naming conventions for, 254
- Brain
- bilirubin deposition in, 401
 - blood flow autoregulation, 300
 - common lesions and complications, **524–568**
 - copper accumulation in, 402
 - embryologic derivation, 631
 - immune privilege of, 97
 - ischemia of, 206
 - ischemic disease/stroke, **525**
 - malformations of, **501**
 - metastasis, 513
 - thyroid hormone effects on, 335
 - tumor metastasis, 219
 - Zika virus effects, 168
- Brain abscesses
- otitis media, 176
 - Staphylococcus aureus*, 176
 - Toxoplasma gondii*, 173
 - Viridans streptococci, 176
- Brain cysts, 158
- Brain death, 272, 512
- Brain injury
- arterial supply and stroke effects, **526**
 - central diabetes insipidus with, 342
 - gastritis with, 386
- Brain natriuretic peptide (BNP)
- in SIADH, 342
 - signaling pathways for, 341
 - source and functions, 606
- Brain stem
- dorsal view, **515**
 - ventral view, **515**

- Brainstem
 - cross sections of, **516**
 - in herniation syndromes, 543
- Brain stem/cerebellar syndromes, 537
- multiple sclerosis, 537
- Brain tumors
 - adult primary, **540**
 - childhood primary, **542**
 - hallucinations with, 576
- Branched-chain ketoacid
 - dehydrogenase
 - vitamin B₁ and, 64
- Branchial clefts, arches and pouches, 637
- Branch retinal vein occlusion, 552
- BRCA1* gene
 - chromosome association, 62
- BRCA1/BRCA2* genes
 - DNA repair in, 37
 - gene product and associated condition, 220
- Breast
 - carcinogens affecting, 221
- Breast cancer
 - aromatase inhibitors for, 675
 - carcinogens for, 221
 - hypercalcemia, 224
 - incidence/mortality of, 218
 - invasive carcinomas, 668
 - noninvasive carcinomas, 668
 - oncogenes and, 220
 - paclitaxel for, 445
 - paraneoplastic cerebellar degeneration and, 224
 - serum tumor marker, 222
 - trastuzumab for, 446
 - types and characteristics, **668**
- Breast diseases
 - benign, **667**
- Breast milk
 - prolactin and, 332
- Breast/ovarian cancer
 - BRCA2* mutation, 62
 - incomplete penetrance, 54
- Breast pathology, **667**
- Breathing
 - respiratory muscle weakness, 694
 - work of, **682**
- Breath odor
 - bitter almond, 689
 - fruity, 351
- Breath sounds
 - bronchial, 698
 - diminished, 700
 - physical findings, 698
- Brenner tumor, 664
- Breslow thickness, 494
- Brief psychotic disorder, 577
- Brimonidine, 568
- Brittle bone disease
 - gene defects in, 49
- “broad collar” rash, 65
- Broad ligament, 643
- Broad spectrum anticonvulsants, 560
- Broca area, 529
 - MCA stroke, 526
- Broca (expressive) aphasia, 529
- Brodalumab, 498
- Bromocriptine, 334, 540, 563
- Bronchi, 680
- Bronchial carcinoid tumor, 703
- Bronchiectasis
 - Aspergillus fumigatus*, 150
 - diagnosis and pathophysiology, 693
 - Kartagener syndrome, 47
- Bronchioles
 - adrenergic receptors in, 236
- Bronchiolitis obliterans, 117, 701
- Bronchitis
 - Haemophilus influenzae*, 140
- Bronchitis, chronic
 - diagnosis and mechanisms, 692
- Bronchoconstriction, 704
- Bronchodilation
 - methylxanthines, 704
 - sympathetic receptors and, 237
- Bronchogenic carcinomas
 - asbestosis and, 696
 - carcinogens for, 221
- Bronchogenic cysts, 679
- Bronchopneumonia, 701
- Bronchopulmonary dysplasia
 - free radical injury, 206
- Bronchospasm
 - scombroid poisoning, 246
 - “Bronze diabetes”, 431
 - “Bronze diabetes”, 402
- Brown-Séquard syndrome, **545**
 - Horner syndrome, 545
- “Brown tumor” (bone), 349, 469
- Brucella* spp
 - culture requirements, 124
 - disease and transmission, 147
 - transmission and treatment, **141**
- Brucellosis, 147
- Brugada syndrome, 312
- Brugia malayi*
 - disease, transmission and treatment, 156
- Bruising
 - scurvy, 67
- Brunner glands
 - bicarbonate production, 379
 - duodenum, 369
- Bruton agammaglobulinemia
 - inheritance mode, 59
- Bruxism, 589, 590
- BTK* gene, 114
- B-type (brain) natriuretic peptide, **299**
- Buboes, 146, 179
- Budd-Chiari syndrome
 - findings and etiology, **397**
- Budesonide, 704
- Bulbar palsy, 544
- Bulbus cordis, 286
- Bulimia nervosa, 584
 - Mallory-Weiss syndrome in, 384
 - SSRIs for, 593
- Bulk-forming laxatives, 408
- Bullae
 - characteristics/examples, 483
 - dermatitis herpetiformis, 490
 - impetigo, 487
- Bull neck lymphadenopathy, 130
- Bullous impetigo, 487
- Bullous pemphigoid, 483
 - autoantibodies in, 113, 482
 - pathophysiology and morphology, 489
- Bulls-eye erythema, 144
- “Bull’s neck” appearance, 137
- Bumetanide, 626
- BUN (blood urea nitrogen)
 - ornithine transcarbamylase deficiency, 81
- Bundle branch block, 313
- Bundled payment, 276
- Bundle of His, 298
- Bunyaviruses
 - structure and medical importance, 164
- Bupivacaine, 565
- Buprenorphine
 - analgesic effects, 567
 - mechanism, use and toxicity, 588
 - morphine and, 233
 - opioid relapse prevention, 594
- Bupropion
 - depressive disorders, 578
 - drug reactions with, 250
 - mechanism, use and toxicity, 594
- Burkholderia cepacia*
 - cystic fibrosis, 175
- Burkholderia cepacia* complex
 - lab algorithm, **140**
- Burkitt lymphoma
 - chromosomal translocations and, 439
 - EBV, 162
 - occurrence and genetics, 435
 - oncogenes, 220
 - oncogenic microbes, 222
- Burn classification, **493**
- Burning feet syndrome, 65
- Burnout, medical errors from, 277
- “Burr cells”, 420
- Bursitis
 - prepatellar, 464
- Burton line, 425
- Buspirone
 - mechanism and use, **592**
- Busulfan
 - lung disease with, 694
 - mechanism, use and adverse effects, 445
- Butorphanol, 567, **568**
- “Butterfly glioma”, 540
- C**
- C1 esterase inhibitor deficiency, 105
- CA 15-3/CA27-29 (tumor markers), 222
- CA 19-9 (tumor marker), 222, 405
- CA 125 (tumor marker), 222
- CAAT box, 40
- Cabergoline, 343
 - clinical use of, 540
 - effects of, 334
- Cachexia
 - TNF- α , 106
- Café-au-lait spots
 - McCune-Albright syndrome, 55
 - neurofibromatosis, 539
- Caffeine intoxication and withdrawal, 589
- Calcification
 - intracranial, 180
 - types of, **207**
- Calcineurin, 118
- Calcinosis cutis, 481
- Calcitonin
 - amyloidosis, 208
 - source, function, and regulation, **337**
 - tumor marker, 222
- Calcitonin gene-related peptide, 532
- Calcitriol, 607
- Calcium
 - in bone disorders, 469
 - in osteomalacia/rickets, 468
 - kidney stones and, 67, 617
 - lab values with hypocalcemic disorders, **348**
 - low vs high serum concentration effects, 609
- Calcium carbonate, 406
- Calcium channel blockers
 - angina, 323
 - antiarrhythmic drugs, **328**
 - drug reactions with, 249
 - hypertension, 323
 - hypertension treatment, 321
 - hypertrophic cardiomyopathy, 315
 - mechanism, use and adverse effects, **323**
 - Raynaud phenomenon, 480
- Calcium channels
 - Lambert-Eaton myasthenic syndrome, 224
 - myocardial action potential, 297
 - pacemaker action potential, 297
- Calcium homeostasis, **337**
- Calcium pyrophosphate deposition disease, **473**
- Calcium saponification, 205
- Calcium-sensing receptor (CaSR), 361
- Calculous cholecystitis, 403
- Caliciviruses
 - structure and medical importance, 164
- California encephalitis, 164
- Calluses (dermatology), 483
- Calor, 209
- Calretinin, 695
- Calymatobacterium, 179
 - cAMP (cyclic adenosine monophosphate)

- Calymmatobacterium (*continued*)
 - endocrine hormone messenger, 341
 - heat-labile/heat-stable toxin effects, 130
 - hyperparathyroidism, 349
 - Vibrio cholerae*, 144
- CAMP factor, 135
- Campylobacter* spp
 - bloody diarrhea, 175
 - disease and transmission, 147
 - reactive arthritis, 475
- Campylobacter jejuni*
 - clinical significance, **143**
 - Guillain-Barré syndrome, 143
- Canagliflozin, 359
- Cancer
 - carcinogens, **221**
 - common metastases, **219**
 - ESR with, 210
 - GI bleeding, 387
 - hallmarks and mechanism, **217**
 - hypertrophy progression, 202
 - immune evasion in, 217
 - incidence and mortality of, **218**
 - mortality, 218
 - oncogenic microbes, **222**
 - pneumococci, 696
- Cancer therapy
 - alkylating agents, **445**
 - antibody-drug conjugates, **443**
 - anticancer monoclonal antibodies, **446**
 - antimetabolites, **444**
 - antitumor antibiotics, **444**
 - microtubule inhibitors, **445**
 - platinum compounds, **445**
 - targets, **443**
 - topoisomerase inhibitors, **445**
- Candesartan, 628
- Candida* spp
 - echinocandins, 195
 - esophagitis, 384
 - infections in immunodeficiency, 116
 - in immunodeficiencies, 114
 - osteomyelitis, 176
 - treatment, 194
 - vulvovaginitis, 178
- Candida albicans*
 - HIV-positive adults, 173
 - opportunistic infections, 150
 - skin infections, 114
- Candidate identification number (CIN), 5
- Candidiasis
 - Candida albicans*, 150
 - cortisol and, 340
 - nystatin, 194
- Cannabis/cannabinoids
 - intoxication and withdrawal, 589
- Cannibalism, 174
- “Cannonball” metastases, 660
- Capacity-limited elimination, 230
- Capecitabine
 - 5-F-dUMP, 34
- Capillary fluid exchange, **301**
- Capitate bone, 453
- Capitation, 276
- Caplan syndrome, 472, 696
- Capping (of RNA), 40
- Capsaicin, **568**
- Capsular polysaccharide
 - bacterial virulence factors, 127
- Capsule (bacterial), 122
- Captain’s wheel formation
 - Paracoccidioidomycosis, 149
- Captopril, 628
- Caput medusae, 372
- Caput succedaneum, 527
- Carbachol, 568
 - action and applications, 239
- Carbamazepine
 - cytochrome P-450 interaction, 251
 - DRESS with, 249
 - drug reactions with, 249
 - eosinophilia and systemic symptoms with, 249
 - mechanism and adverse effects, 560
 - SIADH with, 342
- Carbamoyl phosphate, 81
- Carbamoyl phosphate synthetase I
 - urea cycle, 71
- Carbamoyl phosphate synthetase II, 71
- Carbapenems
 - mechanism and use, **186**
 - Pseudomonas aeruginosa*, 141
- Carbidopa/levodopa
 - mechanism, use and adverse effects, **564**
- Carbohydrate absorption, **381**
- Carbohydrate breath test, 393
- Carbol fuchsin, 123
- Carbon dioxide (CO₂)
 - retention, 697
 - transport, **686**
- Carbonic anhydrase inhibitors, 625
- Carbon monoxide
 - blood oxygen in poisoning, 687
 - poisoning vs cyanide toxicity, **689**
 - toxicity treatment, 247
- Carbon tetrachloride
 - free radical injury, 206
- Carboplatin
 - mechanism, use and adverse effects, 445
- Carboxylases, 71
- Carcinoembryonic antigen (CEA)
 - (tumor marker), 222
- Carcinogens
 - griseofulvin, 195
 - toxins, organs, and impacts, **221**
- Carcinoid syndrome
 - bronchial carcinoid tumors, 703
 - drugs used for, 360
 - somatostatin in treatment, 378
- Carcinoid tumors
 - histology and treatment, **357**
 - immunohistochemical stains for, 223
 - octreotide for, 407
 - serum tumor marker, 222
 - stomach, 386
- Carcinoma in situ
 - ductal, 668
 - dysplasia and, 202
 - neoplastic progression, 215
 - penis, 669
- Carcinomas
 - invasive, 215
 - metastases of, 215
 - metastasis, 219
 - nomenclature of, 216
 - thyroid, 347
 - vulvar, 661
- Cardiac abnormalities
 - gene associations with, 62
- Cardiac and vascular function curves, **291**
- Cardiac arrest
 - antacid adverse effects, 406
 - hypermagnesemia, 609
- Cardiac arrhythmia, 314
- “Cardiac cirrhosis”, 316
- Cardiac contractility
 - sodium-potassium pump in, 47
- Cardiac cycle
 - cardiac and vascular function curves, **291**
 - pressure-volume loops, **292**
- Cardiac depression, 323
- Cardiac looping, **284**
- Cardiac muscle
 - adrenergic receptors in, 236
- Cardiac output
 - cardiac and vascular function curves, **291**
 - equations, **290**
 - exercise and, 685
 - resistance, pressure, flow, **291**
 - Starling curves, **290**
 - variables, **289**
 - V/Q mismatch and, 685
- Cardiac oxygen demand, 289
- Cardiac pressures, normal resting, **300**
- Cardiac syncope, 318
- Cardiac tamponade
 - aortic dissection and, 307
 - jugular venous pulse in, 292
 - mechanism and treatment, **317**
- Cardiac tumors, **320**
- Cardinal ligament, 643
- Cardinal veins
 - embryological derivatives of, 286
- Cardiogenic shock, 317
- Cardiomyopathies
 - Chagas disease, 155
 - dilated, 315
 - hypertrophic, 315
- Pompe disease, 85
- restrictive/infiltrative, 315
- types, causes and treatment, **315**
- β-blockers, 244
- Cardiotoxicity
 - methylxanthines, 704
 - tricyclic antidepressant adverse effects, 593
- Cardiovascular agents and molecular targets, **322**
- Cardiovascular drugs
 - naming conventions for, 253
 - reactions to, **247**
- Cardiovascular system
 - aging effects on, 225
 - anatomy, 288
 - cardiac output variables, **289**
 - embryology, **286**
 - pathology, **302**
 - pharmacology, **321**
 - physiology, 289
 - systemic sclerosis and, 481
- Carditis
 - Lyme disease, 144
- Carfilzomib, 447
- Carina (trachea), 681
- Carmustine
 - drug reactions with, 250
 - mechanism, use and adverse effects, 445
- Carnitine acyltransferase, fatty acid oxidation, 71
- Carnitine deficiency, systemic primary, 87
- Carotid artery
 - atherosclerosis in, 305
- Carotid-cavernous fistula, 557
- Carotid sinus
 - in syncope, 318
 - receptors in, 299
- Carpal bones, 453
- Carpal tunnel syndrome, 463
 - lunate dislocation, 453
 - nerve injury, 450
- Carteolol, 568
- Cartilage
 - collagen in, 48
 - fluoroquinolone damage to, 249
- Cartilage damage, 199, 249
- Carvedilol, 244, 327
- Casal necklace, 65
- Caseating granulomas, 213
 - in tuberculosis, 138
- Case-control study, 256
- Case fatality rate, 258
- Caseous necrosis, 205
- Case series study, 256
- Caspases, 204
- Caspofungin, 195
- Casts in urine, **612**
- catabolite activator protein (CAP)
 - transcription, 39
- Catalase-positive organisms, **126**
- Cataplexy, 585

- Cataracts
 - diabetes mellitus and, 350
 - muscular dystrophy, 59
 - risk factors and disease associations for, 550
 - rubella, 180
 - sorbitol, 79
- Catecholamine (hypertensive) crisis, 243
- Catecholamines
 - amphetamines and, 241
 - ephedrine and, 241
 - metabolites of, 354
 - pacemaker action potential, 297
 - pheochromocytoma and, 355
- Catecholamine synthesis/tyrosine catabolism
 - homocystinuria, 83
 - phenylketonuria, **81**
- Cation exchange resins, **361**
- Cat scratch disease, 147
- Cats (disease vectors)
 - Campylobacter jejuni*, 143
 - Cat scratch disease, 147
 - Pasteurella multocida*, 147
 - Tinea corporis, 488
 - Toxoplasma gondii*, 153, 180
- Cattle/sheep amniotic fluid, 147, 148
- Cauda equina, 520
- Cauda equina syndrome, **520**
- Caudate
 - basal ganglia, 508
- Cavernous sinus, **557**
- Cavernous sinus syndrome, **557**, 690
- Cavernous sinus thrombosis, 150, 557
- CCR5 protein
 - viral receptor, 163
- CD1a protein, 439
- CD41 cell count
 - disease associations by levels, 173
 - prophylaxis for protozoal infection, **153**
 - prophylaxis initiation, 151
- CD41 T cells
 - functions, 99
- CD41 Th
 - acute inflammation, 210
- CD4 protein, 98
 - viral receptor, 163
- CD5 protein in CLL, 437
- CD81 T cells
 - functions, 99
- CD8 protein, 98
- CD16 protein, 99
- CD20 protein in CLL, 437
- CD21 protein, viral receptor, 163
- CD23 protein
 - in CLL, 437
- CD25 protein
 - cell surface protein, 108
- CD34 protein, 108
- CD40 protein, 101
- CDKN2A gene
 - product and associated condition, 220
- CEA tumor marker, 395
- Cefazolin
 - mechanism and use, 185
 - prophylactic use, 193
- Cefepime, 185
- Cefotetan, 185
- Cefoxitin, 185
- Ceftaroline, 185
- Ceftazidime
 - mechanism and use, 185
 - Pseudomonas aeruginosa*, 141
- Ceftriaxone, 176
 - Chlamydia* spp, 144
 - for *Haemophilus influenzae*, 140
 - for gonococci, 140
 - gonococci treatment, 140
 - mechanism and use, 185
 - meningococci, 140
 - prophylaxis use, 193
 - Salmonella typhi*, 142
- Celecoxib
 - mechanism, use and adverse effects, **496**
- Celiac artery/trunk
 - branches of, **371**
 - structures supplied, 371
- Celiac disease
 - autoantibody, 113
 - dermatitis herpetiformis
 - association, 490
 - IgA deficiency, 113
 - mechanism and associations, 388
- Celiac sprue, 388
- Cell cycle phases
 - regulation of, **44**
- Cell death pathways, 204
- Cell envelope (bacteria), **122**
- Cell-mediated immunity, 99
- Cell membrane, exotoxin lysis of, 131
- Cell surface proteins
 - association and functions, **108**
- Cell trafficking, **45**
- Cell types, 44
- Cellular biochemistry, 44
- Cellular injury
 - axonal injury, **529**, 538
 - cellular adaptations, **202**
 - free radical injury, **206**
 - hypoxia (brain), 525
 - infarcts, **206**
 - types of, **203**
- Cellulitis, 487
 - Pasteurella multocida*, 147
- Cell wall (bacteria), 122
- Cemiplimab, 218, 446
- Central clearing
 - nuclei, 347
 - rash, 488
- Central diabetes insipidus
 - nephrogenic diabetes comparison, 342
- Central/downward transtentorial herniation, 543
- Central nervous system (CNS)
 - antiarrhythmic adverse effects, 326, 327
 - anticholinesterase poisoning, 239
 - brain malformations, **501**
 - cancer epidemiology, 218
 - common brain lesions and complications, **524**
 - damage in Wernicke-Korsakoff syndrome, 64
 - depression, 562
 - drug name conventions for, 252
 - muscarinic antagonist effects, 240
 - nitrosoureas effect on, 445
 - origins of, **500**
 - pathology of infarcts, 205
 - posterior fossa malformations, **502**
 - protozoal infections, **153**
 - SIADH and head trauma, 342
 - Toxocara canis*, 156
- Central nervous system stimulants, **590**
- Central poststroke pain, **529**
- Central precocious puberty, 654
- Central retinal artery occlusion, 552
- Central retinal vein occlusion, 552
- Central sleep apnea, 697
- Central tendency measures, 264
- Central venous pressure
 - in shock, 317
- Central vertigo, 548
- Centrilobular necrosis, 206
- Cephalexin, 185
- Cephalohematoma, 527
- Cephalosporins
 - disulfiram-like reaction with, 250
 - drug reactions with, 248, 249
 - hemolytic anemia with, 429
 - interstitial nephritis with, 250
 - mechanism, use and adverse effects, **185**
 - Pseudomonas aeruginosa*, 141
 - resistance mechanism, 185
- Ceramide trihexoside, 86
- Cerebellar degeneration
 - paraneoplastic, 224
- Cerebellar tonsillar herniation, 543
- Cerebellar vermis, lesions of, 524
- Cerebellum
 - agenesis of vermis, 502
 - brain abscess, 176
 - hemispheric lesions in, 524
 - herniation of, 502
 - input/output of, **510**
 - lesions of vermis, 524
- Cerebral aqueduct of Sylvius, 515
- Cerebral arteries
 - cortical distribution, **513**
- Cerebral cortex
 - arterial distribution, **513**
 - hemineglect, 526
 - regions of, **512**
 - visual field defects, 526
- Cerebral edema, **525**
 - therapeutic hyperventilation, 512
- Cerebral malaria, 154
- Cerebral palsy
 - etiology and presentation, **545**
- Cerebral perfusion, **512**
- Cerebral perfusion pressure (CPP), 512
- Cerebroside sulfate, 86
- Cerebrospinal fluid
 - albuminocytologic dissociation, 538
 - blood-brain barrier and, 506
 - circulation of, 506, 514, 515
 - findings in meningitis, **176**
 - hydrocephalus, 536
 - multiple sclerosis, 537
- Cereulide, 136
- Cervical cancer
 - epidemiology of, 661
 - hydronephrosis with, 618
 - oncogenic microbes, 222
- Cervical rib, 452
- Cervical subluxation, 472
- Cervicitis
 - Chlamydia* spp, 179
- Cervix
 - carcinogens affecting, 221
 - epithelial histology, 644
 - pathology of, **663**
 - punctate hemorrhages, 155
- Cestode infections
 - diseases and treatment, **157**
- Cestodes, 157
- Cetirizine, 705
- Cetuximab, 446
- CF-related diabetes, 58
- CFTR gene
 - cystic fibrosis, 58
- CFTR modulator
 - naming conventions for, 253
 - cGMP (cyclic guanosine monophosphate)
 - endocrine hormone messenger, 341
 - male sexual response, 645
- CH50 test, 104
- Chagas disease
 - achalasia in, 383
 - Trypanosoma cruzi*, 155
- Chalazion, 559
- Chalk-stick fractures, 468
- Chancre, painless, 179
- Chancroid
 - clinical features and organisms, 179
- Chaperone protein, **43**
- Charcoal yeast extract agar, 124
- Charcoal yeast extract culture
 - Legionella pneumophila*, 141
- Charcot-Bouchard microaneurysm, 528, 530
- Charcot joints
 - cutaneous ulcer association, 491
 - in tabes dorsalis, 544
 - syphilis, 145
- Charcot-Marie-Tooth disease, 538
- Charcot triad, 403
- Charging tRNA, 42
- Checkpoints (cell cycle)
 - Cell cycle phases, **44**

- Chédiak-Higashi syndrome
defect, presentation, and findings, 115
- Cheilosis, 65, 424
- Chelation
hemochromatosis, 402
lead poisoning, 425
- Chemical pneumonitis, 701
- Chemokines
late hypersensitivity, 110
secretion of, 106
- Chemoreceptors, 299
- Chemoreceptors and baroreceptors, **299**
- Chemoreceptor trigger zone, 407, 506
- Chemotactic factors, 211
- Chemotherapy
cell types affected by, 44
MDR1 and responsiveness to, 223
neutropenia with, 429
toxicity amelioration, **447**
- Chemotherapy-induced vomiting
treatment, 506
- Chemotoxicity
key toxicities, **448**
- Cherry angioma, 486
- “Cherry red” epiglottis, 140
- Cherry-red skin, 689
- Cherry-red spot (macula/fovea), 86, 552
- Chest pain
pneumothorax, 700
- Chest wall, 50
deformities of, 50
elastic properties, 683
expansion with pneumothorax, 700
in restrictive lungs disease, 694
- Chest X-rays
aortic dissections on, 307
balloon heart on, 315
boot-shaped heart, 302
“egg on a string”, 302
“eggshell” calcification, 696
gasless abdomen on, 366
in cystic fibrosis, 58
widened mediastinum on, 135
- Cheyne-Stokes respirations
sleep apnea, 697
- Chiari malformation, 502
Chickenpox
rash, 177
VZV, 162
- “Chicken-wire” capillary pattern, 540
- Chief cells (parathyroid), 336
- Chief cells (stomach), 379
- Chikungunya virus, 164
diagnosis and treatment, **168**
- Child abuse
osteogenesis imperfecta and, 49
types, signs and epidemiology, **573**
- Childbirth
brachial plexus injury in, 452
clavicle fractures with, 463
- oxytocin and uterine contractions, 332, 653
- peripartum mood disturbances, **579**
- prematurity and cryptorchidism
risk, 669
- progesterone levels after, 648
- Childhood diseases/disorders
hip dysplasia, 466
leukocoria, **553**
musculoskeletal conditions, **466**
pathogens and findings in
unvaccinated, **182**
primary brain tumors, **542**
- Childhood/early-onset behavior
disorders, **574**
- Child neglect
signs, 573
- Children
aspirin use in, 398
benign laryngeal tumors, 690
cancer epidemiology, 218
clavicle fractures, **463**
common cause of blindness, 552
common fractures, **467**
common meningitis causes, 176
common pneumonia causes, 175
diseases of unvaccinated, **182**
growth hormone excess, 333
hemolytic-uremic syndrome, 432
hypophosphatemic rickets, 609
indirect inguinal hernia in, 377
infection-associated
glomerulonephritis, 614
intussusception in, 392
kyphoscoliosis in, 545
leukocoria in, 553
lymphoid hyperplasia, 390
paramyxoviruses in, 166
red rashes and clinical
presentation, **177**
sleep terror disorder, 585
volvulus in, 392
- Chimeric human-mouse monoclonal
antibody naming, 254
- Chi-square (χ^2) test, 266
- Chlamydiae* spp
clinical significance, **146**
macrolides, 189
reactive arthritis, 475
sexually transmitted infection, 179
stains for, 123
tetracyclines, 188
- Chlamydia trachomatis*
eosinophilia, 146
pelvic inflammatory disease, 146, 181
pneumonia, 175
prostatitis, 672
serotypes, **146**
urinary tract infections, 619
- Chlamydomydia pneumoniae*
atypical pneumonia, 146, 701
pneumonia, 175
- Chlamydomydia psittaci*
atypical pneumonia, 146, 701
disease and transmission, 147
- Chloramphenicol
cytochrome P-450 interaction, 251
drug reactions with, 249
mechanism, clinical use and
adverse effects, **188**
pregnancy contraindication, 199
protein synthesis inhibition, 187
- Chlordiazepoxide, 562
- Chlorhexidine for sterilization/
disinfection, 199
- Chlorine, 199
- Chloroprocaine, 565
- Chloroquine
for prophylaxis, 193
mechanism, use and adverse
effects, **195**
Plasmodium, 154
- Chlorpheniramine, 705
- Chlorpromazine, 591
- Chlorpropamide, 359
- Chlorthalidone, 627
- Choanal atresia, **678**
- Chocolate agar
Haemophilus influenzae, 124, 140
- Cholangiocarcinomas
Clonorchis sinensis, 157, 158
location and risk factors, **404**
oncogenic microbes, 222
- Cholangitis, 375, 389, 403
- Cholecystectomy, 403
- Cholecystitis, 403
- Cholecystokinin
source, action and regulation, 378
- Choledocholithiasis, 403
- Cholelithiasis
Crohn disease, 403
octreotide and, 407
stone types and related pathologies, **403**
- Cholera toxin
lysogenic phage infection, 128
mechanism, 130
- Cholescintigraphy (HIDA scan), 403
- Cholestasis serum markers, 397
- Cholesteatoma, **548**
- Cholesterol
atherosclerosis, 305
cholelithiasis and, 403
in bile, 382
lipid-lowering agents, **324**
rate-limiting enzyme for synthesis, 71
synthesis of, 72
- Cholesterol emboli syndrome, **306**
- Cholesteryl ester transfer protein, 91
- Cholestyramine, 324
- Cholinergic agonists
naming conventions for, 253
- Cholinergic effects
cardiac glycosides, 326
- Cholinergic receptors
second messenger functions, 237
- Cholinesterase inhibitors
drug reactions with, 248
neuromuscular blockade reversal, 566
- Cholinomimetic agents
action and applications, **239**
glaucoma therapy, 568
- Chondroblastoma, 470
- Chondrocalcinosis, 473
- Chondrocytes
achondroplasia, 467
bone formation, 461
- Chondrosarcoma
epidemiology and characteristics, 471
- Chorea
orofacial, 591
presentation, 533
- Choriocarcinoma, **660**
antimetabolites for, 444
hormone levels with, 671
metastasis, 219
methotrexate, **660**
serum tumor marker, 222
testicular, 671
- Chorionic villi
hydatidiform moles, 659
placenta, 634
- Chorioretinitis
congenital toxoplasmosis, 180
TORCH infections, 180
Toxoplasma gondii, 153
- Choristomas, 216
- Choroid layer (eye)
inflammation, 549
neovascularization of, 552
- Choroid plexus, 515
- Christmas tree distribution, 492
- Chromaffin cells
pheochromocytomas, 355
- Chromatin
cell injury changes, 203
- Chromatin structure, **32**
- Chromium carcinogenicity, 221
- Chromogranin, 222, 703
tumor identification, 223
- Chromones for asthma, 704
- Chromosomal abnormalities
Robertsonian translocation, 62
visualization of, 53
- Chromosomal instability pathway, 395
- Chromosomal translocations
associated disorders, **439**
- Chromosome 6
hemochromatosis, **402**
- Chromosome 7
 $\Delta F508$ deletion, 58
- Chromosome 11
mutation with β -thalassemia, 425
- Chromosome 13
Wilson disease, 402
- Chromosome 15
Prader-Willi and Angelman
syndromes, 56
- Chromosome 16
mutations with α -thalassemia, 424
- Chromosome abnormalities
Angelman syndrome, 56
by chromosome number, **62**

- Familial adenomatous polyposis, 62
hemochromatosis, 402
hydatidiform mole, 659
karyotyping for, 53
myeloproliferative disorders, 438
neuroblastoma, 624
nondisjunction (meiosis), 61
omphaloceles, 365
polyposis syndrome, 394
Prader-Willi syndrome, 56
renal cell carcinoma, 623
sex chromosomes, **655**
- Chronic bronchitis
diagnosis and mechanisms, 692
- Chronic disease, anemia of
iron study interpretation, 423
- Chronic gastritis
causes of, 386
- Chronic gout drugs (preventive), 497
- Chronic granulomatous disease
defect, presentation, and findings, 115
recombinant cytokines for, 119
respiratory burst in, 107
- Chronic inflammation processes, **212**, 213
- Chronic iron poisoning, 431
- Chronic ischemic heart disease, **308**
- Chronic kidney disease
erythropoietin in, 607
- Chronic lymphocytic leukemia/small lymphocytic lymphoma, 437
- Chronic mesenteric ischemia, 393
- Chronic mucocutaneous candidiasis
defect, presentation, and findings, 114
- Chronic myelogenous leukemia
basophilia in, 414
chromosomal translocations, 439
gene associations, 438
leukemoid reaction comparison, 438
risks for, incidence and presentation, 437
- Chronic obstructive pulmonary disease, 692
- Chronic pancreatitis
pancreatic insufficiency from, 388
risk factors and complications, 404
- Chronic prostatitis, 672
- Chronic pyelonephritis, 619
- Chronic renal failure, 621
- Chronic respiratory diseases
pneumoconioses, 694
- Chronic thromboembolic pulmonary hypertension, 698
- Chronic transplant rejection, 117
- Chvostek sign, 609
hypocalcemia, 609
hypoparathyroidism, 348
- Chylomicrons, 92
lipoprotein lipase in, 91
- Chylothorax, 699
- Chymotrypsin, 380
- Cidofovir
mechanism, use and adverse effects, **197**
- Cilastatin
drug reactions with, 250
imipenem and, 186
- Ciliary dyskinesia, primary, **47**
- Ciliary ganglia, 554
- Cilia structure, **47**
- Ciliospinal center of budge, 554
- Cilostazol, 245, 442
- Cimetidine
cytochrome P-450 and, 251
histamine blockers, 406
inhibitor of cytochrome P-450, 406
reactions to, 248
- Cimex hemipterus*, 158
- Cimex lectularius*, 158
- Cinacalcet, **361**
- Cinchonism
antiarrhythmic causing, 326
neurologic drug reaction, 250
- Cingulate gyrus
limbic system, 509
- Cingulate (subfalcine) herniation, 543
- Ciprofloxacin
cytochrome P-450 interaction, 251
fluoroquinolones, 191
for Crohn disease, 389
meningococci, 140
prophylaxis, 193
- Circadian rhythm
hypothalamic control, 508
suprachiasmatic nucleus, 508
- Circle of Willis, **514**
- Saccular aneurysms, 530
- Circulatory (blood)
fetal circulation, **287**
- Circumoral pallor
group A streptococcal pharyngitis, 134
- Cirrhosis
cardiac, 316
esophageal varices, 384
gynecomastia, 667
high-output heart failure with, 317
hyperbilirubinemia in, 400
portal hypertension and, **396**
systemic changes with, **396**
- Cisatracurium, 566
- Cisplatin
drug reactions with, 250
mechanism, use and adverse effects, **445**, 604
targets of, 445
- Citalopram, 593
c-KIT gene
associated neoplasm, 220
- CK-MB
MI diagnosis, 310
- Cl2/HCO32 antiporter, 413
- Cladribine, 444
for hairy cell leukemia, 437
mechanism, use and adverse effects, 444
- Clarithromycin, 189
cytochrome P-450 interaction, 251
Helicobacter pylori, 144
pregnancy contraindication, 199
- Clasp knife spasticity, 543
- Class IA antiarrhythmics, 326
- Class I antiarrhythmics, **326**
- Class IB antiarrhythmics, 326
- Classical conditioning, **570**
- Class IC antiarrhythmics, 327
- Classic galactosemia, 78
- Class II antiarrhythmics, **327**
- Class III antiarrhythmics, **328**
- Class IV antiarrhythmics, **328**
- Class switching
B cells, 101
thymus-dependent antigens, 103
- Clathrin, 45
- Claudication
with atherosclerosis, 305
- Clavicle fractures, **463**
- Clavulanate
Haemophilus influenzae, 140
- Clavulanic acid, 185
- Clawing (hand), 454
Klumpke palsy, 452
- Claw toes, 491
- Clearance (CL) of drugs, 229
- Clear cell adenocarcinoma, 662
- Cleavage (collagen synthesis), 48
- Cleft lip, 639
Patau syndrome, 61
- Cleft palate, 639
Patau syndrome, 61
- Clevidipine, 323
for hypertensive emergency, 323
- Clindamycin
bacterial vaginosis, 147
- Clostridioides difficile* and, 136
drug reactions with, 248
mechanism, use and adverse effects, **188**
metronidazole vs, 188
vaginal infections, **178**
- Clinical reflexes, **523**
- Clinical therapeutic trial, **257**
- Clinical vignette strategies, 21
- Clinical vs statistical significance, 265
- “Clock-face” chromatin, 415, 436
- Clofazimine
leprous nodules, 139
- Clomiphene
drug reactions with, 248
estrogen receptor modulators, 674
- Clomipramine, 580, 593
- Clonidine, 243, 574
- Clonorchis sinensis*
cholangiocarcinoma, 158, 222
diseases, transmission and treatment, 157
- Clopidogrel
for ischemic stroke, 525
mechanism and clinical use, 442
thrombogenesis and, 417
- Closed-angle glaucoma, 239
- Clostridia, **136**
- Clostridioides difficile*
antibiotic use, 248
healthcare-associated infections, 181
infection risk with proton pump inhibitors, 406
metronidazole, 191
PPI association, 136
toxins and effects of, **136**
vancomycin, 186
watery diarrhea, 175
- Clostridium* spp
exotoxins, 136
- Clostridium botulinum*, **136**
food poisoning, 174
therapeutic uses, 136
toxin production, 130
- Clostridium perfringens*, **136**
clindamycin, 188
exotoxin production, 131
food poisoning, 174
watery diarrhea, 175
- Clostridium tetani*
toxin effects, 136
toxin production, 130
unvaccinated children, 182
- Clotrimazole, 195
- Clotting factors
maturation of, 69
- Clozapine, 249, 591
- Clubbing (digital)
Eisenmenger syndrome, 303
paraneoplastic syndromes, 224
pathophysiology, **698**
pulmonary fibrosis, 694
- Club cells, **679**
- Clue cells
bacterial vaginosis, 147, 178
- Cluster A personality disorders, 582
- Cluster B personality disorders, 582
- Cluster C personality disorders, 582
- Cluster headaches
characteristics and treatment, 532
triptans, 562
- CNS lymphomas
HIV-positive adults, 173
oncogenic microbes, 222
- Coagulation and kinin pathways, **418**
- Coagulation disorders
defect in Chédiak-Higashi syndrome, 115
hemophilia, 431
mixed platelet/coagulation, **433**
tests for, **431**
vitamin K-dependent, **419**
- Coagulative necrosis, 205
with MI, 309
- Coal workers’ pneumoconiosis, 696

- Coarctation of the aorta, **304**
- Cocaine
 - local anesthetic action, 565
 - mechanism and use, 241
 - overdose/intoxication treatment, 589
 - teratogenicity of, 632
- Coccidioides* spp
 - stain for, 123
 - treatment, 194
- Coccidioidomycosis
 - erythema nodosum and, 492
 - unique symptoms and features, 149
- Cochlea
 - collagen in, 48
 - inner ear, 547
 - presbycusis, 548
- Codeine, 567
- Codominance, 54
- Codons
 - amino acid specification by, 35
 - start and stop, **42**
- Coenzyme A (CoA)
 - activated carrier, 73
 - production, 72
 - vitamin B₅ and, 65
- Cofactors
 - biotin, 66
 - copper, 49
 - Menkes disease, 49
 - methionine synthase, 67
 - pantothenic acid, 65
 - pyridoxine, 66
 - pyruvate dehydrogenase complex, 74
 - thiamine, 64
- Cognitive behavioral therapy (CBT), 590
 - anxiety disorders, 580
 - for anxiety disorders, 580
 - for conduct disorder, 574
 - in OCDs, 580
 - major depressive disorder, 578
 - obsessive-compulsive disorder, 580
 - postpartum depression, 578
- Cogwheel rigidity, 250
- Cohort study, 256
- Coin lesion (X-ray), 703
- Colchicine
 - calcium pyrophosphate deposition disease, 473
 - drug reactions with, 248, 249
 - gout, 497
 - in karyotyping, 53
 - microtubules and, 46
- Cold autoimmune hemolytic anemia, 429
- “Cold enrichment”, 137
- Cold staphylococcal abscesses, 114
- Colectomy
 - adenomatous polyposis, 394
 - inflammatory bowel disease, 389
- Colesevelam, 324
- Colestipol, 324
- Colistin, 189
 - Neisseria* spp, 124
 - Pseudomonas aeruginosa*, 189
- Colitis
 - Clostridioides difficile*, 136
 - pseudomembranous, 175, 184
- Collagen
 - decreased/faulty production, 48
 - epithelial cell junctions and, 482
 - osteoblast secretion of, 462
 - polyostotic fibrous dysplasia and, 55
 - scar formation, 214
 - synthesis and structure, **48**
 - types of, **48**
 - vitamin C in synthesis, 67
 - wound healing, 212
- Collarette scale, 492
- Collecting system, duplex, 597
- Collecting tubules
 - potassium-sparing diuretics and, 627
 - vasopressin effects, 237
- Colles fracture, 467
- Colon
 - histology of, 369
 - ischemia of, 206
- Colon cancer, 395
 - adenomatous polyposis and, 394
 - antimetabolites for, 444
 - incidence/mortality in, 218
 - Lynch syndrome, 37
 - S bovis* endocarditis, 135
 - serrated polyps and, 394
 - tumor suppressor genes, 220
- Colonic ischemia, 370, 393
- Colonic polyps, 394
 - histologic types and characteristics, **394**
 - potentially malignant, 394
- Colony stimulating factors, 119
- Color blindness, red-green, 192
- Colorectal cancer
 - adenomatous polyposis progression, 394
 - molecular pathogenesis of, **395**
 - oncogenes, 220
 - risk, presentation, diagnosis, **395**
 - tumor marker for, 222
- Colovesical fistulas, 390
- Coma
 - electrolyte disturbances, 609
 - hepatic encephalopathy, 398
 - herniation syndromes, 543
 - rabies, 169
 - thyroid storm, 346
 - Trypanosoma brucei*, 153
- Comedones, 485
- Commaless genetic code, 35
- Comma-shaped rods, 143
- Common bile duct
 - development of, 364
 - in gastrointestinal ligaments, 368
 - obstruction of, 375
- Common cold, 164
- Common (fibular) peroneal, 457
- Common peroneal nerve, 456
- Common variable immunodeficiency (CVID)
 - defects, presentation, and findings, 114
- Communicating hydrocephalus, 536
- Communicating with patients with disabilities, **274**
- Communication with patient, 268
- Compartment syndrome, 465
- Competitive antagonist, 233
- Competitive inhibitors, 228
- Complement
 - activation pathways and functions, **104**
 - endotoxin activation, 131
 - immunodeficiency infections, 116
 - infections in immunodeficiency, 116
 - innate immunity, 97
 - transplant rejection, 118
- Complementation (viral genetics), 159
- Complement disorders
 - protein deficiencies, **105**
 - regulatory protein deficiencies, 105
- Complex renal cysts vs simple cysts, 622
- Compliance (lung and chest wall), 683
- Comprehensive Basic Science Examination (CBSE), 9
- Comprehensive Basic Science Self-Assessment (CBSSA), 9
- Compressive atelectasis, 699
- Computer-Based Test (CBT)
 - environment of, 3–4
 - exam schedule for, 7–8
 - structure of, 3
- COMT inhibitors, 252
- Conditional expression, 54
- Conduct disorder, 574
- Conducting zone (respiratory tree), 680
- Conduction aphasia, 529
- Conduction blocks, description and treatment, **313**, 314
- Conductive hearing loss, 49, 548
- Condylomata acuminata
 - HPV and, 485
 - sexual transmission, 179
- Condylomata lata
 - syphilis, 145, 179
- Confabulation, 575
- Confidence intervals, **266**
- Confidentiality, 267
 - exceptions to, 269
- Confluence of the sinuses, 514
- Confounding vs effect modification, 263
- Congenital adrenal hyperplasias, **339**
- Congenital cardiac anomaly
 - ventricular septal defect, 285
- Congenital cardiac diseases
 - pulmonary arterial hypertension, 698
- Congenital GI tract anomalies, 391
- Congenital heart diseases
 - defect associations, **304**
 - defect types, **302**
 - diabetes during pregnancy, 304
 - rubella, 180
- Congenital hydrocele, 670
- Congenital hypothyroidism
 - causes and findings, 345
 - GI abnormality association, 365
- Congenital lactase deficiency, 79
- Congenital long QT syndrome, 312
- Congenital lung malformations, **679**
- Congenital megacolon, 391
- Congenital microdeletion, 63
- Congenital penile abnormalities, **641**
- Congenital rubella
 - cardiac defect associations, 304
 - findings, 166
- Congenital solitary functioning kidney, **597**
- Congenital syphilis, 145
- Congenital umbilical hernia, 365
- Congenital Zika syndrome, 168
- Congestion
 - with lobar pneumonia, 702
- Congo red stain
 - amyloidosis, 616
 - medullary carcinoma, thyroid, 347
- Conivaptan, 360
- SIADH, 360
- SIADH treatment, 342
- Conjugated (direct) hyperbilirubinemia, 400
- Conjugate horizontal gaze palsy, 558
- Conjugate vaccines, 109
- Conjugation (bacterial genetics), 128
- Conjunctival suffusion/injection
 - eye disorders, 145
- Conjunctivitis
 - causes of, **549**
 - chlamydia, 179
 - Chlamydia trachomatis*, 146
 - gonococcal prophylaxis, 193
 - Haemophilus influenzae*, 140
 - Loa loa*, 156
 - measles (rubeola) virus, 167, 177
 - reactive arthritis, 475
 - Zika virus, 168
- Connective tissue
 - drug reactions with, **249**
 - tumor nomenclature, 216
- Connective tissue diseases
 - aortic dissection and, 306
 - aortic dissection, 307
 - pulmonary arterial hypertension, 698
 - thoracic aortic aneurysms and, 306
- Connexons (gap junctions), 482
- Conn syndrome, 354
- Conotruncal abnormalities, 285
- Consensual light reflex, 554
- Consensus sequence, 36
- Consent
 - for minors, **268**
 - healthcare proxy, 273

- Consolidation (lung)
 - physical findings, 698
- Constipation
 - anal fissures with, 373
 - drugs causing, 248
 - from loperamide, 407
 - Hirschsprung disease, 391
 - irritable bowel syndrome, 390
 - ranolazine, 324
 - vincristine, 445
- Constitutive expression, 54
- Constriction of ureter, 601
- Constrictive pericarditis, 292, **319**
- Contact dermatitis
 - Type IV hypersensitivity, 111
- Contemplation (change model), 586
- Continuous heart murmurs, 296
- Contraception, **675**
 - parental consent for minors and, 268
- Contractility (heart)
 - factors affecting, 289
 - in antianginal therapy, 323
- Contraction alkalosis, 625
- Contraction (cicatriziation) atelectasis, 699
- Contrast-induced thyroiditis, 346
- Convergence-retraction nystagmus, 542
- Conversion disorder, 583
- Coombs test, 429
- COPD (chronic obstructive pulmonary disease)
 - organisms causing pneumonia, 175
- COPI/COPII proteins, 45
- Copper
 - deficiency, 212, 425
 - impaired absorption, 49
 - toxicity treatment, 247
- Copper metabolism
 - Wilson disease, 402
- Coprolalia, 574
- Copy number variants (CNVs), 52
- Cord factor, 138
- Cori disease, 85
- “Corkscrew” esophagus, 384
- Corkscrew fibers, 542
- “Corkscrew” hair, 67
- Cornea
 - astigmatism, 549
 - clouding of, 45
 - collagen in, 48
 - in Wilson disease, 402
- Corneal arcus
 - familial hypercholesterolemia, 92
 - hyperlipidemia, 305
- Corneal reflex, 519
- Corneal vascularization, 65
- Coronary arteries
 - atherosclerosis in, 305
- Coronary artery disease, **308**
- Coronary blood supply, 288
- Coronary sinus
 - anomalous pulmonary return, 302
 - deoxygenated blood in, 289
- Coronary steal syndrome, **308**
- Coronary vasospasm
 - causal agents, 247
 - triptans and, 562
- Coronaviruses
 - structure and medical importance, 164
- Cor pulmonale
 - heart failure, 316
 - pneumoconioses, 696
 - pulmonary hypertension, 697
- Corpus luteal cyst, 663
- Corpus luteum
 - hCG and, 652
 - progesterone production, 648
- Corrected reticulocyte count, 423
- Correct result (hypothesis testing), 265
- Correlation coefficient (r), **267**
- Corrosive esophagitis, 384
- Cortical signs, 526
- Corticopapillary osmotic gradient, 606
- Corticospinal tract
 - Brown-Séquard syndrome, 545
- Corticospinal tracts, 522
 - functions of, 522
 - in subacute combined degeneration, 544
- Corticotropin-releasing hormone (CRH)
 - cortisol regulation, 340
 - function and clinical notes, 332
 - signaling pathways of, 341
- Cortisol
 - in Cushing syndrome, 352
 - signaling pathways for, 341
 - source, function, and regulation, **340**
- Corynebacterium diphtheriae*, **137**
 - culture requirements, 124
 - exotoxin effects, 137
 - exotoxin production, 130
 - unvaccinated children, 182
- Costochondritis, 465
- Costovertebral angle tenderness, 619
 - acute interstitial nephritis, 620
 - kidney stones, 617
 - urinary catheterization, 181
 - urinary tract infections, 178
- Cotton-wool spots/exudates, 162, 552
- Cough
 - from ACE inhibitors, 250, 628
 - gastroesophageal reflux disease, 384
 - hypersensitivity pneumonitis, 694
 - lung cancer, 703
 - nonproductive, 138
 - seal-like barking, 167
 - staccato, 146
 - whooping, 130, 141
- Cough reflex, 519
- Councilman bodies
 - yellow fever, 168
- Countertransference, **570**
- Courvoisier sign, 375, 405
- Covalent alterations (protein synthesis), 43
- Cowpox, 161
- COX-2 gene
 - colorectal cancer and, 395
- COX-2 inhibitor
 - naming conventions for, 254
- Coxiella burnetii*
 - disease and transmission, 147
 - pneumonia with, 701
 - Q fever, 148
- Coxsackievirus
 - rashes of childhood, 177
 - RNA translation in, 165
- Coxsackievirus A infection, 148
- C-peptide
 - endogenous insulin secretion, 338
 - insulin and, 338
 - with insulinomas, 357
- CpG island methylator phenotype (CIMP), 394
- CPS (carbamoyl phosphate synthetase)
 - location and function of, 34
- Crackles (physical findings), 698
- Cranial dysraphism, 501
- Cranial nerve nuclei
 - location of, **516**
- Cranial nerve palsies
 - CN III, 556
 - CN III, IV, VI, **556**
 - CN IV, 556
 - CN VI, 556
 - osteopetrosis and, 468
 - with Schwannoma, 540
- Cranial nerves
 - acute inflammatory demyelinating polyradiculopathy effects, 538
 - common lesions of, **546**
 - function and type, **519**
 - pharyngeal arch derivation, **637**
 - reflexes of, **519**
 - ventral brain stem view, **515**
- Cranial nerves and arteries, **518**
- Cranial nerves and vessel pathways, **518**
- Craniofacial dysmorphism
 - Zellweger syndrome, 46
- Craniopharyngioma, 631
 - description and histology, 542
- Craniotabes, 468
- C-reactive protein (CRP), 97
 - with inflammation, 209
- Creatine kinase, 197
- Creatinine clearance
 - glomerular filtration rate and, 600
- Cremasteric reflex, 456, 523, 669
- Crepitus
 - necrotizing fasciitis, 487
 - soft tissue, 136
- Crescentic glomerulonephritis, 614
- CREST syndrome
 - autoantibody, 113
 - calcification in, 207
- Raynaud syndrome and, 480
- scleroderma, **481**
- sclerodermal esophageal dysmotility, 384
- Creutzfeldt-Jakob disease
 - prion disease, 174
 - symptoms and histologic findings, 535
- “Crew cut” (skull X-ray), 428
- Cricothyroid muscle, 638
- Cri-du-chat syndrome, **62**
- Crigler-Najjar syndrome, 400, 401
- Crimean-Congo hemorrhagic fever, 164
- CRISPR/Cas9, **51**
- Crizotinib, 447
- Crohn disease
 - azathioprine, 119
 - granulomatous inflammation, 213
 - manifestations of, 389
 - spondyloarthritis association with, 475
 - sulfasalazine for, 407
 - vitamin B₁₂ deficiency, 67
- Cromolyn, 414, 704
- Cross-linking (collagen synthesis), 48
- Crossover clinical trial, 257
- Crossover studies, 263
- Cross-sectional study, 256
- Croup, 166
 - acute laryngotracheobronchitis, **167**
 - pulsus paradoxus in, 317
- Crust (skin)
 - basal cell carcinoma, 494
 - characteristics/examples, 483
 - impetigo, 487
 - varicella zoster virus, 487
- Cryoprecipitate
 - transfusion of, 434
- Cryptococcosis, 150
- Cryptococcus* spp
 - amphotericin B for meningitis, 194
 - in immunodeficiency, 116
 - meningitis in HIV, 176
- Cryptococcus neoformans*
 - HIV-positive adults, 173
 - opportunistic infections, 150
 - stains for, 123
- Cryptogenic organizing pneumonia, 701
- Cryptorchidism, **669**
- Cryptosporidium* spp
 - in HIV positive adults, 173
 - stain for identification, 123
 - transmission, diagnosis and treatment, 152
 - watery diarrhea, 175
- Crypts of Lieberkühn, 369
- C-section deliveries
 - neonatal microbiota, 174
- Culture requirements, **124**
- Curling ulcer, 386
- “Currant jelly” stools, 392, 393
- “Currant jelly” sputum, 143

- Cushing disease, 352
 - hyperpigmentation in, 332
- Cushing reflex, 512
 - components of, **299**
- Cushing syndrome, 224
 - etiology, findings and diagnosis, **352**
- Cutaneous flushing
 - drugs causing, 195, 247
- Cutaneous leishmaniasis, 155
- Cutaneous mycoses, **488**
- Cutaneous paraneoplastic syndromes, 224
- Cutaneous T-cell lymphoma, 435
- Cutaneous ulcers, **491**
- Cutibacterium acnes* colonization, 485
- Cutis aplasia
 - Patau syndrome, 61
- CXCR4/CCR5 protein
 - presence on cells, 108
- Cyanide toxicity
 - blood oxygen in, 687
 - nitroprusside, 323
 - treatment for, 247
 - vs carbon monoxide poisoning, **689**
- Cyanosis
 - congenital heart diseases, 302
 - Eisenmenger syndrome, 303
 - esophageal atresia, 366
 - methemoglobinemia presentation, 688
 - patent ductus arteriosus, 303
- Cyclin-CDK complexes, 44
- Cyclin-dependent kinase inhibitor
 - naming conventions for, 254
- Cyclin-dependent kinases, 44
- Cyclobenzaprine, 567
- Cyclooxygenase inhibition
 - aspirin effect on, 417
 - irreversible, 496
 - reversible, 495
 - selective, 496
- Cyclophosphamide
 - drug reactions with, 248, 250
 - mechanism, use and adverse effects, 445
 - SIADH with, 342
 - transitional cell carcinoma and, 624
- Cycloplegia
 - atropine, 240
- Cyclosporine
 - drug reactions with, 249
 - gout, 249
 - immunosuppression, 118
- Cyclothymic disorder, 578
- Cyproheptadine, 587
- CysLT1 receptor blocker
 - naming conventions for, 253
- Cystathionine
 - vitamin B₆ and, 66
- Cystathionine synthase deficiency, 83
- Cysticercosis, 157
- Cystic fibrosis
 - chromosomal abnormalities, 62
 - clinical findings with, **58**
 - intestinal atresia association, 366
 - meconium ileus and, 393
 - organisms causing pneumonia in, 175
 - pancreatic insufficiency, 388
 - Pseudomonas aeruginosa* pneumonia, 141
 - vitamin deficiencies and, 63
- Cystine
 - kidney stones, 617
- Cystine-tellurite agar, 137
- Cystinuria
 - causes and treatment, **83**
- Cystitis, acute, **619**
- Cystocele, 643
- Cytarabine, 444
 - mechanism, use and adverse effects, 444
- Cytochrome C, 204
- Cytochrome P-450
 - azoles, 195
 - drug interactions with, **251**
 - griseofulvin, 195
 - macrolides, 189
 - universal electron acceptors, 73
- Cytokeratin, 695
 - tumor identification, 223
- Cytokines
 - clinical use, 119
 - Graves disease and, 346
 - immunotherapy, 119
 - macrophage secretion of, 106
 - rejection reactions, 117
 - T cell production, 100, **106**
 - Type IV hypersensitivity, 111
- Cytokinesis, 44
- Cytomegalovirus
 - AIDS retinitis, 162
 - cholecystitis and, 403
 - HIV positive adults, 173
 - immunodeficient patients, 115, 116
 - pneumonia, 701
 - receptors, 163
 - TORCH infection, 180
 - transmission and clinical significance, 162
 - treatment, 196
- Cytopenias
 - autoimmune lymphoproliferative syndrome, 204
- Cytoplasm
 - cell cycle phase, 44
 - cytoskeletal elements, 46
 - glycolysis, 74
 - metabolism in, 72
- Cytoplasmic ANCA (c-ANCA)
 - autoantibody, 113
- Cytoplasmic membrane (bacteria), 122
- Cytoplasmic processing bodies (P-bodies), 40
- Cytosine
 - in nucleotides, 33
- Cytoskeletal elements, **46**
- Cytoskeleton
 - filaments, **46**
 - in atrophy, 202
- Cytotoxic edema (cerebral), 525
- Cytotoxic T cells, **100**
 - cell surface proteins, 108
 - MHC I and II, 98
- Cytotrophoblast, 634
- D**
- Dabigatran, 441
 - reversal of, 442
 - toxicity treatment, 247
- Dabrafenib, 447
- Dacryocytes (“teardrop cells”), 420
- Dactinomycin (actinomycin D)
 - mechanism, use and adverse effects, 444
 - RNA polymerase effects, 40
- Dactylitis
 - seronegative spondyloarthritis, 475
 - sickle cell anemia, 428
- Dalteparin, 440
- Danazol, **676**
 - pseudotumor cerebri, 536
- “Dancing eyes-dancing feet”, 224, 354
- Dandy-Walker malformation, 502
- Dantrolene
 - mechanism and use, 567
 - neuroleptic malignant syndrome treatment, 587
- Dapagliflozin, 359
- Dapsone
 - drug reactions with, 249
 - hemolysis in G6PD deficiency, 249
 - Leprosy treatment, 139
 - mechanism, use and adverse effects, **190**
 - Pneumocystis jirovecii*, 151
- Daptomycin
 - mechanism, use and adverse effects, **191**
- “dark curtain” vision loss, 552
- Darkfield microscopy, *Treponema* spp, 144
- Darunavir, 198
- Dasatinib, 447
- Datura*, 240
- Daunorubicin, 247, 444
- DCC gene
 - product and associated condition, 220
- D cells
 - somatostatin production, 378
- d-dimer test, 321
- Deacetylation, histones, 32
- Deafness, 312
- Deamination, 37
- Deamination reaction
 - of nucleotides, 33
- Death
 - common causes with SLE, 476
 - explaining to children, 273
 - sudden cardiac death, 308
 - thyroid storm, 346
- Death cap mushrooms, 40
- Debranching enzyme
 - glycogen metabolism, 85
- Decay-accelerating factor (DAF), 104, 105
- Deceleration injury, 307
- Decerebrate (extensor) posturing, 524
- Decidua basalis, 634
- Decision-making capacity
 - of patients, **267, 268**
 - surrogate for, 269
- Decorticate (flexor) posturing, 524
- Decubitus ulcers, 181
- Deep brachial artery, 458
- Deeper injury burn, 493
- Deep partial-thickness burn, 493
- Deep peroneal nerve, 457
- Deep venous thrombosis
 - direct factor Xa inhibitors for, 441
 - effects and treatment, **321**
 - glucagonomas and, 357
 - tamoxifen and, 446
- Defense mechanisms
 - mature, 571
- Defensins, 97
- Deferasirox, 247
- Deferiprone, 247
- Deferoxamine, 247
- Deformation (morphogenesis), 633
- Degarelix, **674**
- Degenerate/redundant genetic code, 35
- Degludec, 358
- Degmacytes (“bite cells”), 420
- Dehydration
 - changes in glomerular dynamics, 601
 - gout exacerbation, 473
 - loop diuretics and, 626
- Dehydrogenases, 71
- Delayed hemolytic transfusion reaction, 112
- Delayed puberty, **654**
- Deletions
 - with muscular dystrophies, 59
- Delirium, **575**
 - barbiturate withdrawal, 588
 - phencyclidine, 589
 - thyroid storm, 346
- Delirium tremens
 - alcohol withdrawal, 587
- Delivering bad news, **270**
 - δ endocrine, 331
 - δ cells
 - pancreatic tumors, 357
- Delta virus
 - structure and medical importance, 164

- Deltavirus
 - hepatitis D, 170
- Deltoid muscle
 - Erb palsy, 452
- Delusional disorder, 577
- Delusions
 - types of, 576
- Demeclocycline, 360
 - drug reaction with, 248
 - SIADH treatment, 342
- Dementia
 - HIV-positive adults, 173
 - metachromatic leukodystrophy, 86
 - prion disease, 174
 - types and findings, **534**
 - vitamin B₃ deficiency, 65
- Demographic transition in
 - development, **259**
- Demyelinating/dysmyelinating
 - disorders, **537**
 - metachromatic leukodystrophy, 86
- Dendritic cells, **414**
 - IL-10, 106
 - innate immunity, 97
 - T- and B-cell activation, 97, 101
- Dengue virus, 164
 - diagnosis and treatment, **168**
- Denial, 570
- Denosumab
 - for osteoporosis, 467
- De novo mutations, 59
- De novo pyrimidine/purine synthesis
 - rate-limiting enzymes and regulators, 71
- De novo synthesis
 - pyrimidine and purine, **34**
- Dense deposit disease, 615
- Dental caries, 134
- Dental infection, brain abscess from, 176
- Dental plaque
 - normal microbiota, 174
 - viridans streptococci, 126
- Dentate nucleus, 510
- Dentin
 - collagen in, 48
 - osteogenesis imperfecta, 49
- Dentinogenesis imperfecta, 49
- Denys-Drash syndrome, 624
- Deoxythymidine monophosphate (dTMP)
 - inhibition of, 34
- Dependent personality disorder, 582
- Depersonalization/derealization
 - disorder, 575, 580
- Depolarizing neuromuscular
 - blocking drugs, 566
- Depot medroxyprogesterone acetate
 - drug reactions with, 249
- Depressant intoxication and
 - withdrawal, 588
- Depression
 - atypical features in, **578**
 - benzodiazepine withdrawal, 588
 - drug therapy, 589
 - electroconvulsive therapy, 578
 - neurotransmitter changes with, 505
 - peripartum mood disturbances, **579**
 - seasonal pattern with, 578
 - serotonin-norepinephrine reuptake inhibitors (SNRIs) for, 593
 - SSNRIs for, 593
 - SSRIs for, 593
- De Quervain tenosynovitis, 465
- Dermacentor, 147
- Dermal extramedullary
 - hematopoiesis, 166
- Dermatitis
 - B-complex deficiency, 63
 - radiation dermatitis, 492
 - Type IV hypersensitivity reaction, 111
 - Vitamin B₃ deficiency, 65
 - vitamin B₅ deficiency, 65
 - vitamin B₇ deficiency, 65
- Dermatitis herpetiformis, 388, 490
- Dermatologic terms
 - macroscopic, **483–498**
 - microscopic, **483**
- Dermatome landmarks, **523**
- Dermatomyositis/polymyositis, **477**
 - autoantibody, 113
 - paraneoplastic syndrome, 224
- Dermatophytes, 488
- Dermatophytoses treatment, 195
- Dermis, 481
- Descending colon, 367
- Descent of testes and ovaries, **642**
- Desert bumps, 149
- Desert rheumatism, 149
- Desflurane, 565, 566
- Desipramine, 593
- Desloratadine, 705
- Desmin, 46
 - tumor identification, 223
- Desmopressin
 - central diabetes insipidus, 333
 - clinical use, 360
 - clinical use of, 333
 - diabetes insipidus treatment, 342
 - for hemophilia, 431
 - release of vWF and factor VIII, 417
 - SIADH with, 342
- Desmosome, 482
- Desquamation
 - staphylococcal toxic shock syndrome, 133
- Desvenlafaxine, 593
- Detemir, 358
- Developmental delay
 - renal failure and, 621
- Developmental milestones, 572
- Dexamethasone
 - Cushing syndrome diagnosis, 352
- Dexlansoprazole, 406
- Dextrazoxane, 444, 447
- Dextroamphetamine, 590
- Dextrocardia, 284
- Dextromethorphan, 587, **706**
- Diabetes insipidus
 - causal agents, 248
 - lithium toxicity, 587, 592
 - polydipsia, central and nephrogenic comparison, **342**
 - potassium-sparing diuretics for, 627
 - primary polydipsia comparison, **342**
 - thiazides for, 627
- Diabetes mellitus
 - atherosclerosis and, 305
 - hypertension treatment with, 321
 - hypoglycemia in, **352**
 - manifestations, complications and diagnosis, **350**
 - restless leg syndrome, 533
 - risk for hypertension, 304
 - risk with hepatitis B and C, 171
 - Type 1 vs Type 2, **351**
- Diabetes mellitus therapy
 - decrease glucose absorption, 359
 - drug mechanisms and adverse effects, **358**
 - increase glucose-induced insulin secretion, 359
 - increase insulin secretion, 359
 - increase insulin sensitivity, 359
 - insulin preparations, 358
 - thionamides, **360**
- Diabetes mellitus Type 1
 - autoantibody, 113
 - HLA subtype, 98
 - localized amyloidosis in, 208
- Diabetic glomerulonephropathy, 616
- Diabetic ketoacidosis (DKA)
 - ketone bodies, 88
 - Mucor* and *Rhizopus* infections, 150
 - pathogenesis, signs/symptoms, and treatment, 351
- Diabetic nephropathy
 - ACE inhibitors for, 628
- Diabetic neuropathy
 - SSNRIs for, 593
- Diabetic retinopathy, 552
- Diagnostic criteria, by symptom
 - duration, **581**
- Diagnostic errors, 277
- Diagnostic test evaluation
 - terminology and computations, **260**
- Dialectical behavioral therapy, 590
- Dialysis-related amyloidosis, 208
- Diamond-Blackfan anemia, 426
- Diapedesis (transmigration), 211
- Diaper rash
 - Candida albicans*, 150
 - nystatin, 194
- Diaphoresis
 - acromegaly, 343
 - in MI, 309
- Diaphragm
 - structures penetrating, **681**
- Diaphragmatic hernia, 377
- Diarrhea, 152, 388
 - B-complex deficiency, 63
 - bismuth/sucralfate for, 406
 - Campylobacter jejuni*, 143
 - cholera toxin, 130
 - clindamycin, 188
 - Clostridioides difficile*, 136
 - Cryptosporidium*, 152
 - drugs causing, 248
 - graft-versus-host disease, 117
 - healthcare-associated infections, 181
 - HIV-positive adults, 173
 - inflammatory bowel diseases, 389
 - irritable bowel syndrome, 390
 - lactase deficiency, 79
 - leflunomide, 496
 - loperamide for, 407
 - malabsorption syndromes, 388
 - opioids for, 567
 - organisms causing, **175**
 - organisms causing watery, 175
 - rice-water, 130
 - rotavirus, 164, 165
 - Salmonella*, 142
 - Shigella*, 142
 - thyroid storm and, 344
 - Vibrio cholerae*, 144
 - VIPomas, 378
 - viruses causing, 175
 - vitamin C toxicity, 67
 - watery, 130
 - with antacid use, 406
 - with misoprostol, 406
- Diastole
 - cardiac cycle, 292
 - heart sounds of, 292
- Diastolic dysfunction
 - heart failure with preserved ejection fraction, 316
- Diastolic heart murmurs, 296
- Diazepam, 562
- Diclofenac, 496
- Dicloxacillin
 - mechanism and use, 184
- Dicyclomine, 240
- Diencephalon, 500
- Diethylcarbamazine, 196
 - Loa loa*, 156
- Diethylstilbestrol
 - teratogenicity of, 632
- Differentiation of T cells, **100**
- Diffuse axonal injury, **529**
- Diffuse cortical necrosis, **621**
- Diffuse gastric cancer, 386
- Diffuse glomerular disorders, 612
- Diffuse large B-cell lymphoma, 435
- Diffuse proliferative
 - glomerulonephritis (DPGN), 614
- Diffuse scleroderma, 481
- Diffusion-limited gas exchange, 684
- DiGeorge syndrome, 348
 - chromosome association, 62

- DiGeorge syndrome (*continued*)
 lymph node paracortex in, 94
 lymphopenia with, 429
 thymic aplasia, 114
 thymic shadow in, 96
- Digestion
 bile functions in, 382
 carbohydrate absorption, **381**
 malabsorption syndromes, **388**
 vitamin and mineral absorption, **381**
- Digestive tract
 anatomy, **369**
 basal electric rhythm, 369
 histology, **369**
- Digital clubbing, **698**
- Digoxin
 arrhythmias induced by, 326
 contractility effects of, 290
 mechanism and clinical use, **326**
 toxicity treatment, 247, 328
 visual disturbances, 250
- Dihydroergotamine, 532
- Dihydrofolate reductase inhibition, 34
- Dihydroorotate dehydrogenase
 leflunomide effects, 34
- Dihydropyridine calcium channel blockers, 253
- Dihydropyridine receptor, 459
- Dihydropyridines, 323
- Dihydrorhodamine (flow cytometry) test, 115
- Dihydrotestosterone
 sexual differentiation, 640
 source and function, 653
- Dihydrotestosterone (DHT)
 source and function, 653
- Diiodotyrosine (DIT), 335
- Dilated cardiomyopathy, 315
 balloon heart in, 315
 carnitine deficiency, 87
 doxorubicin, 444
 drugs causing, 247
 heart failure with, 316
 hemochromatosis, 402
 muscular dystrophy, 59
 thyrotoxicosis, 315
- Diltiazem, 323, 328
- Dimenhydrinate, 705
- Dimercaprol
 for arsenic toxicity, 247
 for lead poisoning, 247
 for mercury poisoning, 247
- Dipalmitoylphosphatidylcholine (DPPC), 679
- Diphenhydramine, 587, 705
- Diphenoxylate, **407**, 567
- Diphtheria
Corynebacterium diphtheriae, 137
 exotoxins, 130
 vaccine for, 137
- Diphtheria toxin, 128
- Diphyllbothrium latum*
 disease, transmission and treatment, 157
 vitamin B₁₂ deficiency, 67, 158, 426
- Diplopia
 brain stem/cerebellar syndromes, 537
 central vertigo, 548
 drug-related, 250
 intracranial hypertension, 536
 myasthenia gravis, 480
 osmotic demyelination syndrome, 538
- Dipyridamol
 platelet inhibition, 245
- Dipyridamole
 mechanism, use and adverse effects, 442
- Direct bilirubin, 382
- Direct cell cytotoxicity
 hypersensitivity, 111
- Direct coagulation factor inhibitors
 mechanism, clinical use and adverse effects, **441**
- Direct (conjugated)
 hyperbilirubinemia, 400
- Direct Coombs-positive hemolytic anemia
 drug reactions with, 249
- Direct Coombs test
 Type II hypersensitivity, 110
- Direct (excitatory) pathway, 511
- Direct factor Xa inhibitors
 naming conventions for, 253
 reversal of, 442
 toxicity treatment, 247
- Direct fluorescent antibody (DFA)
 microscopy, 144
- Direct inguinal hernia, 377
- Direct light reflex, 554
- Direct sympathomimetics, 241
- Discolored teeth, 199
- Discounted fee-for-service, 276
- Disease prevention, **275**
- Disease vectors
Aedes mosquitoes, 168
Anopheles mosquito, 154
 armadillos, 147
 birds, 147
 cattle/sheep amniotic fluid, 147
Dermacentor (dog tick), 147
 dogs, 143, 147
 Ebola virus, 169
 fleas, 148
 flies, 142, 147, 156
 for zoonotic bacteria, 147
Ixodes ticks, 144
 kissing bug, 155
 mosquito, 156
 pigs, 143
 rodents, 164
 sandfly, 155
 tick, 148
- ticks, 144, 148
- triatomine insect (kissing bug), 155
- Tsetse fly, 153
- Yersinia enterocolitica*, 142
- Disinfection and sterilization
 methods, **199**
- Disopyramide, 326
- Disorganized thought, 576
- Dispersion measures, 264
- Displacement, 570
- Disruption (morphogenesis), 633
- Disruptive mood dysregulation disorder, 574
- Disseminated candidiasis, 150
- Disseminated gonococcal infection, 474
- Disseminated intravascular coagulation
 acute myelogenous leukemia, 437
 causes, treatment, and labs, 433
 Ebola, 169
 endotoxins, 129
 microangiopathic anemia, 429
- Dissociation, 570
- Dissociative amnesia, 575
- Dissociative disorders, **575**
- Dissociative identity disorder, 575
- Distal esophageal spasm, 384
- Distal humerus, 458
- Distal renal tubular acidosis (RTA type 1), 611
- Distortions of the hand, **454**
- Distributive shock, 317
- Disulfiram
 alcohol use disorder treatment, 590
 ethanol metabolism, 70
- Disulfiram-like reaction
 drugs causing, 250, 359
 griseofulvin, 195
 metronidazole, 191
 procabazine, 445
- Diuresis
 atrial natriuretic peptide, 299
- Diuretics
 dilated cardiomyopathy, 315
 drug reactions with, 248, 250
 effects on electrolyte excretion, **625**
 for SIADH, 342
 glaucoma therapy, 568
 hypertension treatment, 321
 sites of action, **625**
- Diverticula (GI tract), **390**
- Diverticulitis, 390
- Diverticulosis, 390
 GI bleeding association, 387
- Diverticulum
 GI tract, 390
 thyroid, 330
- Dizygotic (“fraternal”) twins, 635
- Dizziness
 calcium channel blockers, 323
 in subclavian steal syndrome, 307
 nitrates, 322
 ranolazine, 324
- sacubitril, 324
- vertigo and, 548
- DMD gene, 59
- DMPK gene, 59
- DNA
 cloning methods, 53
 free radical injury, 206
 laddering in apoptosis, 204
 methylation in, 32
 mutations in, **38**
 plasmid transfer, 128
 repair, **37**
- DNA gyrase (TOP II), 36
- DNA ligase, 36
- DNA polymerase I, 36
- DNA polymerase III, 36
- DNA replication, **36**
- DNA topoisomerases, 36
- DNA viruses, 160
 Herpesviruses, 161
 viral family, **161**
- Dobutamine, 241
- Docetaxel
 mechanism, use and adverse effects, 445
- Docusate, 408
- Dofetilide, 328
- Döhle bodies, 412
- Dolor, 209
- Dolutegravir, 197
- Dominant negative mutations, 55
- Donepezil, 239, 564
- Do not resuscitate (DNR) order, 268
- Donovan bodies, 179
- Dopamine, 593
 kidney functions and, 607
 L-DOPA, 563
 pheochromocytoma secretion, 355
 second messenger functions, 237
 sympathomimetic effects, 241
 synthesis and change with diseases, 505
 vitamin B₆ and, 66
- Dopamine agonists
 acromegaly treatment, 343
 in prolactinoma treatment, 334
 Parkinson disease therapy, 563
 pituitary adenoma, 540
- Dopamine antagonists
 prolactin secretion and, 334
- Dopamine receptors (D2)
 vomiting center input, 506
- Dopaminergic pathways
 nigrostriatal pathway, 511
 Parkinson disease therapy, **563**
 projection, function, and altered activity, **509**
- Dopamine β-hydroxylase
 vitamin C and, **67**
- Doravirine, 197
- Dorsal columns
 Brown-Séquard syndrome, 545
 function, 522

in subacute combined degeneration, 544
in tabes dorsalis, 544
thalamic relay for, 508
tracts in, 522
Dorsal interossei muscle, 453
Dorsal midbrain lesions, 524
Dorsal motor nucleus
function and cranial nerves, 516
Dorsal optic radiation, 557
Dorsiflexion (foot), 457
Dorsocervical fat pad, 352
Double-blinded study, 257
Double duct sign, 375
Double strand DNA repair, 37
Double Y males, 655
“Down-and-out” eye, 556
“Down-and-out” eye”, 530
Down syndrome
ALL and AML in, 437
aneuploidy in, 54
annular pancreas association, 367
cardiac defect association, 303
chromosome association, 62
GI abnormality association, 365
hCG with, 652
Hirschsprung disease and, 391
 α -fetoprotein association, 222
Doxazosin, 243
Doxepin, 593
Doxorubicin, 247
mechanism, use and adverse effects, 444
toxicities, 315
Doxycycline
Lyme disease, 144
lymphogranuloma venereum, 146
Mycoplasma pneumoniae, 148
Plasmodium spp, 154
prophylactic use, 193
ricketsial/vector-borne disease, 148
tetracyclines, 188
Doxylamine, 705
DPP-4 inhibitor
naming conventions for, 253
DPP-4 inhibitors, 359
Dream enactment, 507
DRESS syndrome, 186
with anticonvulsants, 560
Drooling treatment, 240
“Drop metastases”, 542
“Drop” seizures, 531
Drug dosages, 229
calculations, **229**
lethal median, 233
median effective, 233
toxic dose, 233
Drug elimination, **230**
Drug-induced hemolytic anemia, 429
Drug-induced lupus, 249, **323**
autoantibody, 113
Drug-induced thyroiditis, 346
Drug metabolism, **230**

Drug name conventions, **252**
second generation histamine blockers, 705
 α_1 selective blockers, 243
Drug overdoses
of weak acids, 231
of weak bases, 231
Drug reactions
cardiovascular, **247**
endocrine/reproductive, **248**
gastrointestinal, **248**
hematologic, **249**
multiorgan, **250**
musculoskeletal, **249**
neurologic, **250**
pulmonary fibrosis, 250
renal/genitourinary, **250**
respiratory, **250**
Drug reaction with eosinophilia
and systemic symptoms (DRESS), 249
Drug-related myocarditis, 320
Drug resistance
plasmids in, 129
Drugs
body compartment distribution, 229
cholinomimetic agents, **239**
dilated cardiomyopathies and, 315
efficacy vs potency, **232**
modification of effects, **234**
patient difficulty with, 272
therapeutic index, **233**
toxicities and treatments, **247**
urine pH and elimination, **231**
Drug safety
therapeutic index measurement, 233
“Drunken sailor” gait, 524
Drusen, 552
Dry beriberi, 64
Dry mouth
Lambert-Eaton myasthenic syndrome, 480
Dry skin (scaliness)
vitamin A toxicity, 64
D-transposition of great arteries, 302
Dubin-Johnson syndrome, 400, **401**
Duchenne muscular dystrophy
findings with, 59
inheritance, 59
Ductal adenocarcinomas, 375
Ductal carcinoma in situ, 668
Ductal carcinomas (invasive), 668
Ductus arteriosus, 286, 287
Ductus deferens, 639
Ductus venosus, 286, 287
Duloxetine, 593
Dumping syndrome, 381
Duodenal atresia, 366
Duodenal obstruction, 392
Duodenal ulcer
causes of, 387
hemorrhage, 387

Duodenum
embryology of, 364
histology, 369
Duplex collecting system, **597**
Duplication
fluorescence in situ hybridization, 53
Dupuytren contracture, 465
Dural venous sinuses, **514**
Dura mater, 506
Duret hemorrhages, 543
Durvalumab, 218, 446
Duty to protect, 269
Dwarfism
achondroplasia, 467
d-xylose test, 381, 388
Dynein
defect in left-right, **284–328**
movement of, 46
Dynein motors, 169
Dysarthria
brain lesions, 524, 529
osmotic demyelination syndrome, 538
Dysbetalipoproteinemia
familial dyslipidemias, 92
Dyschezia, 661
Dysentery
 α -amanitin, 40
Entamoeba histolytica, 175
Escherichia coli, 143
Shigella spp, 130, 142, 175
Dysgerminoma, 664
Dysgeusia
zinc deficiency, 69
Dyskeratosis
characteristics/examples, 483
Dyskinesias
drugs causing, 250
type and presentation, **533**
Dyslipidemias
familial, **92**
vitamin B₃ effects, 65
Dysmenorrhea
primary, **663**
Dysmetria
central vertigo, 548
with strokes, 526
Dyspareunia
Sjögren syndrome, **474**
Dysphagia
achalasia, 383
aspiration pneumonia, 701
esophageal pathologies and, 384
osmotic demyelination syndrome, 538
pathology location and, 690
Plummer-Vinson syndrome, 424
stroke effects, 527
thyroid cancer, 347
types of, 384
Zenker diverticulum, 391
Dysplasia
bronchopulmonary, 206

changes with, 202
neoplastic progression, 215
Dysplasia and carcinoma in situ, 663
Dysplasia of hip, 466
Dyspnea
heart failure, 316
in α_1 -antitrypsin deficiency, 400
left heart failure, 316
pneumomediastinum, 691
pneumothorax, 700
Dystonia
antipsychotics/antiepileptics, 591
Lesch-Nyhan syndrome, 35
presentation, 533
treatment of, 240
treatment of focal, 136
Dystrophic calcification
psammoma bodies, 207
vs metastatic, 207
Dystrophin (DMD) gene, 59
Dysuria
cystitis, 178
prostatitis, 672
urinary catheterization, 181
urinary tract infections, 619

E

Early complement deficiencies (C1-C4), 105
Early embryonic development, **630**
Ears
low-set, 61
pharyngeal pouch derivation, 637
Eastern equine encephalitis
medical importance, 164
Eating disorders
characteristics and types of, **584**
functional hypothalamic amenorrhea, 663
in OCDs, 580
Eaton agar, 124
Ebola virus
medical importance, **169**
structure and medical importance, 164
Ebstein anomaly, 285, 302
lithium, 592
E-cadherin, 215
mutation in gastric cancer, 386
tissue invasion in cancer, 217
Echinocandins
Aspergillus fumigatus, 150
mechanism, use and adverse effects, **195**
opportunistic fungal infections, 150
Echinococcus granulosus
disease association and treatment, 158
disease, transmission and treatment, 157
Echinocytes (“burr cells”), 420
Echthiophate, 568
Echovirus
RNA translation in, 165
Eclampsia, 304, 660

- Ecological study, 256
- Ecthyma gangrenosum
 - Pseudomonas* spp, 141
- Ectocervix
 - epithelial histology, 644
- Ectoderm
 - derivatives, 631
 - pharyngeal (branchial) clefts, 637
- Ectoparasite infestations, **157**
- Ectopia lentis, 550
- Ectopic beats, 313
- Ectopic pregnancy, **658**
 - antimetabolites for, 444
 - Chlamydia trachomatis*, 146
 - primary ciliary dyskinesia, 47
 - salpingitis, 181
- Ectopic thyroid production, 346
- Eculizumab
 - for paroxysmal nocturnal hemoglobinuria, 428
- Eczema
 - eczematous dermatitis, 483
 - phenylketonuria, 82
 - skin scales in, 483
 - Wiskott-Aldrich syndrome, 115
- Edema
 - Arthus reaction, 111
 - calcium channel blockers, 323
 - capillary fluid exchange and, 301
 - danazol, 676
 - immunosuppressants, 118
 - kwashiorkor, 69
 - loop diuretics for, 626
 - periorbital, 156
 - peripheral, 316
 - pitting, 316
 - pseudoephedrine/phenylephrine, 706
 - vasogenic, 506
 - with fludrocortisone, 360
 - with hyperaldosteronism, 354
- Edinger-Westphal nuclei, 554
- Edoxaban, 441
- Edwards syndrome
 - chromosome association, 62
- Edwards syndrome (Trisomy 18), 61
- Efavirenz, 197
- Effective refractory period
 - Class I antiarrhythmic effect, 326
- Effective renal plasma flow, **600**
- Effect modification vs. confounding, 263
- Efferent arteriole constriction, 601
- Efficacy vs potency of drugs, **232**
- EGFR (ERBB1)* gene
 - associated neoplasm, 220
- EGFR* gene, 703
- “Egg on a string” (chest x-ray), 302
- “Eggshell” calcification, 696
- Eggshell calcification, 157, 477
- Ego defenses
 - immature defenses, **570–594**
 - mature, 571
- Egophony, 698
- Egosyntonic, 582
- Ehlers-Danlos syndrome
 - aneurysm association with, 530
 - collagen deficiency in, 48
 - findings in, **49**
- Ehrlichia* spp
 - Gram stain for, 123
 - rickettsial/vector-borne, 148
- Ehrlichia chaffeensis*, 147
- Ehrlichiosis, 147
 - transmission, 148
- Eisenmenger syndrome, 303
- Ejaculation
 - innervation of, 645
 - sperm pathway, 644
- Ejaculatory ducts
 - embryology of, 639
- Ejection fraction
 - equation for, 290
 - in heart failure, 316
- Ejection time
 - in antianginal therapy, 323
- Elastase
 - secretion of, 380
- Elastic recoil, 683
- Elastin
 - characteristics and functions of, **50**
- Elbasvir, 199
- Elbow injuries
 - childhood, **466**
 - overuse, **462**
- Electrical alternans, 317
- Electrocardiogram
 - abnormality with pulmonary embolus, 691
 - acute pericarditis on, 319
 - components of, **298**
 - electrical alternans on, 317
 - electrolyte disturbances, 609
 - findings with conduction blocks, 313
 - left axis deviation, 302
 - low-voltage, 315
 - MI diagnosis with, 310
 - premature beats on, 313
 - RA hypertrophy, 302
 - sick sinus syndrome, 312
 - STEMI localization, **310**
- Electroconvulsive therapy
 - major depressive disorder, 578
 - MDD with psychotic features, 578
 - use and adverse effects, **579**
- Electrolytes
 - high/low serum concentrations of, **609**
- Electron acceptors (universal), 73
- Electron transport chain
 - oxidative phosphorylation, **76**
- Electrophoresis
 - hemoglobin, **416**
- Elek test, 137
- Elementary bodies (chlamydiae), 146
- Elephantiasis (lymphatic filariasis)
 - Wuchereria bancrofti*, 156
- 11 β -hydroxylase, 339
- 11-deoxycorticosterone, 339
- Elfin facies, 63
- Elimination disorders, **585**
- Elliptocytes, 420
- Elongation (protein synthesis), 43
- Emancipated minors, 268
- EMB agar
 - lactose-fermenting enterics, 142
- Emboli
 - atrial septal defect, 303
 - in infective endocarditis, 318
 - paradoxical, 303
 - types of, 691
- Embolic stroke, 525
- Emboliform nucleus, 510
- Embryogenesis
 - intrinsic pathway, 204
- Embryologic derivatives, **631**
- Embryology
 - early fetal development timeline, **630**
 - embryologic derivatives, **631**
 - erythropoiesis, **410**
 - hematology/oncology, 410
 - morphogenesis errors, **633**
 - neurological, 499, 500
 - pancreas and spleen, **367**
 - renal, 596
 - reproductive, 630
 - respiratory, 678
- Embryonal carcinoma, 671
 - hormone levels with, 671
- Embryonic/developmental age, 651
- Emission
 - innervation of, 645
- Emollient laxatives, 408
- Emotion
 - neural structures and, 509
- Emotional abuse, 573
- Empagliflozin, 359
- Emphysema
 - diagnosis and mechanisms, 692
 - diffusion-limited gas exchange, 684
 - panacinar, 400
- Empty/full can test, 451
- Emtricitabine, 197
- Enalapril, 628
- Encapsulated bacteria
 - examples list, **125**
 - infections with immunodeficiency, 116
- Encephalitis
 - anti-NMDA receptor, 224
 - Cryptococcus neoformans*, 150
 - guanosine analogs, 196
 - herpesviruses, 162, 176
 - HSV identification, 163
 - Lassa fever, 164
 - measles (rubeola) virus, 167
- Encephalomyelitis
 - paraneoplastic syndrome, 224
- Encephalopathy
 - hepatic, 372, 398
 - lead poisoning, 425
 - Lyme disease, 144
 - prion disease, 174
- Encephalotrigeminal angiomatosis, 539
- Encopresis, 585
- Encorafenib, 447
- End-diastolic volume
 - in antianginal therapy, 323
- Endemic typhus, 147
- Endocannabinoids
 - appetite regulation, 340
- Endocardial cushion, 284, 286
- Endocardial fibroelastosis, 315
- Endocervix
 - epithelial histology, 644
- Endochondral ossification, 461
- Endocrine pancreas cell types, **331**
- Endocrine/reproductive drug reactions, **248**
- Endocrine system
 - anatomy, 331
 - embryology, 330
 - extrahepatic manifestations of hepatitis, 171
 - hormones acting on kidney, **608**
 - hormone signaling pathways, **341**
 - paraneoplastic syndrome, 224
 - pathology, 342
 - pharmacology, 358
 - physiology, **332**
 - steroid hormone signaling pathways, **341**
- Endoderm
 - derivatives, 631, 637
 - pharyngeal (branchial) pouch derivation, 637
- Endodermal sinus tumor, 664
- Endolymphatic hydrops, 548
- Endometrial carcinoma, 666
 - epidemiology of, 661
 - estrogens and, 674
 - in Lynch syndrome, 395
- Endometrial conditions, 666
- Endometrial hyperplasia, 666
 - follicular cysts, 662
- Endometrioid carcinoma, 666
- Endometriosis
 - characteristics and treatment, 666
 - treatment, 676
- Endometritis, 666
 - pelvic inflammatory disease, **181**
- Endoneurium, 505
- Endoplasmic reticulum
 - rough, **45**
 - smooth, **45**
- Endosomes, 45
- Endothelial cells
 - immunohistochemical stains, 223
 - in wound healing, 211
 - leukocyte extravasation and, 210
- Endothelin receptor antagonist
 - naming conventions for, 253
 - pulmonary hypertension treatment, 706
- Endotoxins
 - effects of, **131**
 - features of, **129**

- Pseudomonas aeruginosa*, 141
Salmonella typhi, 142
Endotracheal intubation, 181
Enfuvirtide, 197, 198
Enhancer (gene expression), 40
Enoxaparin, 440
Entacapone, 563
Entamoeba histolytica
 bloody diarrhea, 175
 metronidazole, 191
 transmission, diagnosis and treatment, 152
Enteritis
 vitamin B₅ deficiency, 65
 vitamin B₇ deficiency, 65
 vitamin B₁₂ deficiency, 67
Enterobacter aerogenes, 185
Enterochromaffin-like (ECL) cells, 380
Enterobius spp
 diseases association, 158
 infection route, 155
Enterobius vermicularis
 disease, transmission and treatment, 156
Enterococci, **135**
Enterococcus spp, **135**
 penicillins for, 184
 urinary tract infections, 178
 vancomycin, 186
 vancomycin-resistant (VRE), 135
Enterococcus faecalis, 135
 cephalosporins, 185
Enterococcus faecium, 135
Enterocolitis
 necrotizing, 393
 vitamin E excess, 68
Enterohemorrhagic *Escherichia coli*, 130, 175
 toxin, mechanism and presentation, 143
Enteroinvasive *Escherichia coli*
 diarrhea with, 175
 toxin, mechanism and presentation, 143
Enterokinase/enteropeptidase, 380
Enteropathogenic *Escherichia coli*
 toxin, mechanism and presentation, 143
Enterotoxigenic *Escherichia coli*, 130
 diarrhea, 175
 toxin, mechanism and presentation, 143
Enterotoxins, 129
 Shigella spp, 142
 Vibrio cholerae, 144
Enterovesical fistulae, 389
Enteroviral encephalitis, 116
Enterovirus meningitis, 176
Enthesitis, 475
Entorhinal cortex, 509
Entry inhibitors, HIV therapy, 198
Enuresis
 tricyclic antidepressant use for, 593
Envelopes (viral), **160**
Enzyme kinetics, **228**
Enzyme-linked immunosorbent assay, **52**
Enzymes
 lipid transport and, 90, **91**
 rate-determining and regulators, **71**
 terminology for, **71**
Eosin–methylene blue (EMB) agar, 124
Eosinopenia, cell counts and causes, 340, 429
Eosinophilia
 causes of, 414
 Chlamydia trachomatis, 146
 drugs causing, 249
 in immunocompromised patients, 434
 macrolides, 189
Eosinophilic apoptotic globules, 168
Eosinophilic esophagitis, 384
Eosinophilic granuloma, 694
Eosinophilic granulomatosis with polyangiitis, 113
Eosinophils, **414**
 immunity to parasites, 103
Ependymal cells, 503
Ependymoma
 description and histology, 542
Ephedrine, 241
Ephelis, 483
Epicanthal folds
 cri-du-chat syndrome, 62
 Down syndrome, 61
Epidemic typhus, 147
Epidemiology
 biliary tract disease, 402
 cancer incidence and mortality, **218**
 colorectal cancer, 395
 gynecologic tumors, **661**
 peripartum mood disturbances, **579**
Epidemiology and biostatistics, 256–278
Epidermal growth factor (EGF)
 in wound healing, 212
Epidermis, 481
 embryologic derivatives, 631
 hyperplasia, 485
Epidermolysis bullosa, 490
Epidermophyton, 488
Epididymis
 embryology of, 639
Epididymitis, 179, 671
Epididymitis and orchitis, **671**
Epidural hematomas, 528
Epidural space, 506
Epigastric pain
 chronic mesenteric ischemia, 393
 Ménétrier disease, 386
 pancreatitis, 404
Epigastric veins, 372
Epigenetics, 40
Epiglottitis
 Haemophilus influenzae, 140
 unvaccinated children, 182
Epilepsy
 gustatory hallucinations in, 576
 seizures, 531
Epinephrine, 241
 glaucoma treatment, 568
 glycogen regulation by, 84
 pheochromocytoma secretion, 355
 unopposed secretion of, 350
 vitamin B₆ and, 66
Epineurium, 505
Epiphysis
 slipped capital femoral, 466, 469
 testosterone effects on, 676
 widening of, 468
Episcleritis
 inflammatory bowel disease, 389
Epispadias, 641
Epistaxis, 54
Epistaxis, 320, 433, **690**
Epithelial cell junctions, **482**
Epithelial cells
 female reproductive system, **644**
 immunohistochemical stains, 223
 metaplasia, 202
 tumor nomenclature, 216
Epithelial tumors
 ovarian, 664
Eplerenone, 627
Epoetin alfa, 119, 447
 drug reactions with, 249
Epstein-Barr virus (EBV)
 aplastic anemia, 427
 Burkitt lymphoma, 435
 hairy leukoplakia and, 487
 head and neck cancer, 690
 Hodgkin lymphoma, 434
 in HIV positive adults, 173
 in immunodeficient patients, 116
 nasopharyngeal carcinomas, 162
 oncogenicity, 222
 paracortical hyperplasia in, 94
 receptor for, 108
 receptors, 163
Epstein-Barr virus (HHV-4)
 transmission and clinical significance, 162
Eptifibatide, 442
 thrombogenesis and, 417
Erb palsy
 injury and deficits, 452
Erectile dysfunction, 584
 β -blockers, 244
Erection
 autonomic innervation, 645
 ischemic priapism, 669
Ergocalciferol, 68
Ergosterol synthesis inhibitors
 naming conventions for, 252
Ergot alkaloids, 247
Erlotinib, 447
Erosions (gastrointestinal), 369, 386
Erosion (skin)
 characteristics/examples, 483
Errors (medical), **277**
Erysipelas, 487
 Streptococcus pyogenes, 134
 Streptococcus pyogenes, 487
Erythema
 complicated hernias, 376
 in Lyme disease, 144
Erythema infectiosum (fifth disease), 177
Erythema marginatum, 319
Erythema migrans
 in Lyme disease, 144
Erythema multiforme
 causes of, 490
 coccidioidomycosis, 149
Erythema nodosum
 disease associations of, 492
 histoplasmosis, 149
 inflammatory bowel disease, 389
Erythrocyte casts in urine, 612
Erythrocytes, **413**
 hereditary spherocytosis, 428
 transfusion of, 434
Erythrocyte sedimentation rate (ESR)
 fibrinogen and, 209
 inflammation, **210**
 subacute granulomatous thyroiditis, 345
Erythrocytosis, 413
Erythrocytic exotoxin A, 131
Erythrocytic toxin, 134
Erythromelalgia, 438
Erythromycin, 189
 cytochrome P-450 interaction, 251
 prophylaxis, 193
 protein synthesis inhibition, 187
 reactions to, 248
Erythropoiesis
 fetal, **410**
Erythropoietin, 697
 anemia of chronic disease, 427
 clinical use, 119
 high altitude response, 688
 in renal failure, 621
 polycythemia and, 224
 release and function, 607
 signaling pathways for, 341
 with pheochromocytoma, 355
Eschar, 130
 in cutaneous anthrax, 135
 with mucormycosis, 150
Escherichia coli
 cephalosporins, 185
 culture requirements, 124
 healthcare-associated infection, 181
 lac operon, 39
 neonatal microbiome, 174
 O157-H7, 174
 penicillins for, 184
 polymyxins, 189
 prostatitis, 172
 strains of, **143**
 urinary tract infections, 178, 619
Escherichia coli serotype O157-H7
 food poisoning, 174

- Escherichia coli* serotype (*continued*)
 Shiga-like toxin production, 175
 thrombotic microangiopathies
 and, 432
 toxin production, 143
- Escitalopram, 593
- E-selectin, 211
- Esmolol, 244, 327
- Esomeprazole, 406
- Esophageal adenocarcinoma, 385
- Esophageal atresia, 366
- Esophageal cancer
 achalasia and, 383
 location and risk factors, **385**
- Esophageal pathologies, **384**, 481
- Esophageal perforation
 perforation, 384
- Esophageal reflux
 H₂ blockers for, 406
 proton pump inhibitors for, 406
- Esophageal rings, 384
- Esophageal varices, 384
 drug treatment of, 360
 portosystemic anastomoses and,
 372
- Esophageal webs, 384
- Esophagitis, 384
 herpes simplex virus, 162
 HIV-positive adults, 173
 medication-induced, 248
 with bisphosphonates, 496
- Esophagus
 blood supply and innervation, 371
 carcinogens affecting, 221
 diaphragm, 681
 histology, 369
 pathologies of, **384**
 portosystemic anastomosis, 372
- Esotropia, 555
- Essential amino acids, 79
- Essential fatty acids
 characteristics and sources, **63**
- Essential fructosuria, 78
- Essential hypertension risk, 304
- Essential mixed cryoglobulinemia,
 171
- Essential (primary) hypertension, 321
- Essential thrombocythemia, 438
- Essential tremor, 533
- Establishing rapport, **270**
- Estradiol, **648**
- Estriol, 648, 652
- Estrogen, 649, 656
 androgen conversion to, 653
 bone formation, 462
 epiphyseal plate closure, 653
 gynecomastia (males), 667
 in ovulation, **649**
 menopause, 653
 signaling pathways for, 341
 source and function of, **648**
 Turner syndrome, 655
- Estrogen receptor modulators
 (selective), **674**
- Estrone, 648
- Eszopiclone, 562
- Etanercept, 498
- Ethacrynic acid, 626
- Ethambutol, 193
 drug reactions with, 250
 mechanism and adverse effects,
 192
- Ethanol
 carcinogenicity of, 221
 catabolism of, 46
 lactic acidosis and, 70
 metabolism of, **70**
- Ethical and patient scenarios, **272**
- Ethics
 advanced directives, 268
 consent, 268
 core principles of, 267
 religious beliefs and, 273
- Ethinyl estradiol, **674**
- Ethosuximide, 560
- Ethylenediaminetetraacetic (EDTA)
 metal toxicity treatment, 247
- Ethylene glycol toxicity treatment,
 70, 247
- Ethylene oxide sterilization/
 disinfection, 199
- Etomidate, 565
- Etonogestrel, 675
- Etoposide, 445
- Etoposide/teniposide
 topoisomerase effects, 36
- Euchromatin, 32
- Eukaryotes
 DNA replication in, 36
 irinotecan/topotecan effects in, 36
 mRNA start codons, 42
 ribosomes in, 43
 RNA polymerase in, 40
 RNA processing, **40**
- Eukaryotic gene, functional
 organization, **39**
- Eukaryotic initiation factors (eIFs), 43
- Eukaryotic release factors (eRFs), 43
- Eustachian tube
 embryonic derivation, 637
- Eustachian tubes, 47
- Euthyroid sick syndrome, 345
- Evasion of apoptosis, 217
- Eversion (foot), 457
- Evolocumab, 325
- Ewing sarcoma
 dactinomycin for, 444
 epidemiology and characteristics,
 471
- Exanthem subitum
 HHV-6/7, 162, 177
- Excessive daytime sleepiness, 585
- “Excision” event, 128
- Exclusive provider organization, 275
- Exemestane, 675
- Exenatide, 359
- Exercise
 blood flow autoregulation, 300
 peripheral resistance, 291
 respiratory response, **688**
 syncope during, 315
 Tetralogy of Fallot, 302
- Exercise-induced amenorrhea, 663
- Exocrine glands, 235, **482**
- Exocytosis, 48
- Exogenous thyrotoxicosis, 346
- Exons
 deletions in muscular dystrophies,
 59
 vs introns, **41**
- Exotoxin A, 130, 141
- Exotoxin and endotoxin features, **129**
- Exotoxins
 bacteria with, **130**
 features of, **129**
Pseudomonas aeruginosa, 130
Streptococcus pyogenes, 131
- Expiratory reserve volume (ERV), 682
- Expressive (Broca) aphasia, 529
- Extension, hip, 455
- External hemorrhoids, 373
- External rotation, hip, 455
- Extinction (conditioning), 570
- Extracellular volume measurement, 599
- Extracranial injuries (neonatal), **527**
- Extragenital germ cell tumors, **670**
- Extrahepatic manifestations of
 hepatitis B and C, **171**
- Extramammary Paget disease, 661
- Extravascular hemolysis
 autoimmune hemolytic anemia,
 429
 causes and findings with, 427
 HbC disease, 428
 hereditary spherocytosis, 428
 pyruvate kinase deficiency, 428
- Extrinsic (death receptor) pathway
 mechanism and regulation, 204
- Extrinsic hemolytic anemias
 causes and findings, **429**
- Extrinsic pathway
 warfarin and, 441
- Exudate
 “anchovy paste”, 152
 pleural effusion, 699
- Ex vacuo ventriculomegaly, 536
- Eyelid disorders, **559**
- Eye movements
 cranial nerve palsies, **556**
 medial longitudinal fasciculus, 558
 with stroke, 526
- Eyes
 aqueous humor pathway, **550**
 drugs affecting pupil size, **251**
 immune privilege of, 97
 lens disorders, **550**
 misalignment of, 555
 muscarinic antagonist effects, 240
 normal anatomy of, **549**
 ocular anomalies, 168
- Ezetimibe, 248, 324
- F**
- F+ × F− plasmid, 128
- Fab fragment, 102
- Fabry disease, 59
- Facial flushing
 excess niacin, 65
- Facial nerve (CN VII), 546
 function and type, 519
 lesions and causes of, **546**
 palsy with, 144
 pharyngeal arch derivation, 638
- Facial wrinkle reduction, 136
- Facies
 coarse, 45, 114
 congenital syphilis, 145
 elfin, 63
 epicanthal folds, 61
 “facial plethora”, 704
 flat, 61
 in fetal alcohol syndrome, 633
 leonine (lion-like), 139
 moon facies, 352
 Potter sequence, 596
 risus sardonicus, 136
 TORCH infection abnormalities,
 180
 twisted face, 596
 with syphilis, 180
- Facilitated diffusion
 T3/T4, 335
- Factitious disorder, **583**
- Factitious disorders, **583**
- Factor VIII concentrate, 431
- Factor V Leiden, 419
 description of, 433
 venous sinus thrombosis and, 514
- Factor Xa
 inhibitors of, 419
- Factor XI concentrate, 431
- Facultative anaerobes, 125
- Facultative intracellular bacteria, 125
- FADH (flavin adenine dinucleotide)
 activated carrier, 73
- Failure mode and effects analysis, 277
- Failure to thrive
 SCID, 115
- Falciform ligament, 368
- Fallopian tubes
 adnexal torsion, 643
 epithelial histology, 644
 in primary ciliary dyskinesia, 47
- “False” diverticulum, 390
- False-negative rate, 260
- Famciclovir
 herpes zoster, 196
 mechanism and use, **196**
- Familial adenomatous polyposis, 394
 chromosome association, 62
- Familial dyslipidemias, **92**
- Familial hypercholesterolemia, 58, 92
- Familial hypocalciuric
 hypercalcemia, **349**
- Famotidine, 406

- Fanconi anemia, 427
nonhomologous end joining and, 37
- Fanconi syndrome, 604
- Fanconi syndrome, drug-related, 250
- Farsightedness, 549
- Fascia, collagen in, 48
- Fasciculations, 543
- Fas-FasL interaction, 204
- Fasted vs fed state, **88**
- Fastigial nucleus, 510
- Fasting and starvation, 89
- Fasting plasma glucose test
diabetes mellitus diagnosis, 350
- Fasting state, 89
fructose-2,6-bisphosphate in, 74
migrating motor complexes
production in, 378
- Fat
nomenclature, 216
- Fat emboli, 691
- Fatigue
heart failure and, 316
MI signs, 309
- Fatigue, medical errors from, 277
- Fat necrosis, 205, 667
- Fat redistribution, 249
- Fat-soluble vitamins, 63
absorption with orlistat, 407
- Fatty acid oxidation
carnitine acyltransferase in, 71
rate-limiting enzyme for, 71
- Fatty acids
metabolism of, **72**, **87**
oxidation of, 72
synthesis, 70
- Fatty acid synthase
vitamin B₅ and, 65
- Fatty acid synthesis
rate-determining enzyme, 71
- Fatty casts, 612
- Fatty liver disease
nonalcoholic, 398
- Fava beans, 77, 428
- FBN1* gene mutation
dominant negative mutation, 50
- Fear
inappropriate experiences of, 579
panic disorder and, 580
phobias and, 580
- Febrile nonhemolytic transfusion
reaction, 112
- Febrile pharyngitis, 161
- Febrile seizures, 530
- Febuxostat, 497
Lesch-Nyhan syndrome, 35
- Fecal antigen test
Helicobacter pylori diagnosis, 144
- Fecal calprotectin, 389
- Fecal elastase, 388
- Fecal immunochemical testing (FIT), 395
- Fecalolith obstruction, 390
- Fecal microbiota transplant, 136
- Fecal occult blood testing (FOBT), 395
- Fecal retention, 575
- Feces, explosive expulsion of, 391
- Federation of State Medical Boards (FSMB), 2
- Fed state, 89
- Fee-for-service, 276
- “Female athlete triad”, 663
- Female genital embryology, 639
- Female reproductive anatomy
epithelial histology, **644**
ligaments and structure, **643**
- Femoral epiphysis, slipped, 466
- Femoral head
avascular necrosis of, 469
- Femoral hernia, 377
- Femoral neck fracture, 467
- Femoral nerve, 456
- Femoral region, **375**
- Femoral sheath, 375
- Femoral triangle, 375
- Fenestrated capillaries, 506
- Fenofibrate, 325
- Fenoldopam, 241, 323
- Fentanyl, 567
- Ferritin, 427
acute phase reactants, 209
iron deficiency anemia, 424
iron study interpretation, 423
lab values in anemia, 425
- Ferrochelatase, 425, 430
- Fertility
double Y males, 655
- Fertilization, 649, 651
- Fetal alcohol syndrome
developmental effects in, **633**
heart defects in, 304
- Fetal circulation, **287**
umbilical cord, **636**
- Fetal erythropoiesis, **410**
- Fetal lung maturity, 675
- Fetal-postnatal derivatives, **286**
- Fetal tissue
collagen in, 48
fever
measles (rubeola) virus, 167
- Fever
amphotericin B, 194
Bordetella pertussis, 182
clindamycin, 188
complicated hernias, 376
Ebola virus, 169
endotoxins, 129
epiglottitis, 182
exotoxins, 131
genital herpes, 179
high fever, 168
human herpesvirus 6, 177
human herpesviruses, 162
Legionnaires’ disease, 141
low-grade, 141, 168
mononucleosis, 162
- neuroleptic malignant syndrome, 587
- pathophysiology and management, 530
- pulmonary anthrax, 135
recurring, 153
Rickettsia rickettsii, 147
Salmonella spp, 147
severe, irregular pattern, 154
spiking, 155
Tetralogy of Fallot, 302
thyroid storm causing, 346
toxic shock syndrome, 133
undulant, 141
vs heat stroke, 530
Weil disease, 145
with inflammation, 209
with meningococci, 140
- Fexofenadine, 705
- Fibrates, 324, **325**
drug reactions with, 248, 249
- Fibril protein (amyloidosis), 208
- Fibrinogen, 210, 413
ESR and, 209
in cryoprecipitate, 433
- Fibrinoid necrosis, 205, 304
- Fibrinous pericarditis, 309
- Fibroadenoma, 667
- Fibroblast growth factor (FGF)
in wound healing, 212
signaling pathways for, 341
- Fibroblast growth factor receptor (FGFR3), 467
- Fibroblasts
cortisol and, 340
in wound healing, 212
- Fibrocystic breast changes, 667
- “Fibro fog”, 477
- Fibroid (leiomyoma)
leuprolide for, 674
- Fibromas, 216, 665
- Fibromuscular dysplasia, 304
- Fibromyalgia, **477**, 593
- Fibronectin
in cryoprecipitate, 434
thrombocytes, 413
- Fibrosarcomas, 216
- Fibrosis
silicosis, 696
- Fibrous plaque in atherosclerosis, 305
- Fibular neck fracture, 457
- Fick principle, 290
- Fidaxomicin
- Clostridioides difficile*, 136
- Field cancerization, 690
- Field defect (morphogenesis), 633
- Fifth disease rash, 177
- 50S inhibitors, 187
- Filgrastim (G-CSF), 119, 447
- Filoviruses
characteristics and medical importance, 164
- Filtration (renal), **601**
- Fimbria/pilus, 122
- Financial considerations in treatment, 273
- Finasteride, 653, 672, 676
- Finger agnosia, 524
- Finger drop, 450
- Finger movements
adduction, 450
extension, 450
finger drop, 450
- Finkelstein test, 465
- First-degree AV block, 313
- First-order elimination, 229, 230
- First-order kinetics, 229
- Fisher’s exact test, 266
- Fish oil/marine omega-3 fatty acids, 325
- Fitz-Hugh-Curtis syndrome, 140, 181
- 5 α -reductase inhibitors
inhibitors for BPH, 672
- 5 α -reductase, 653
hypospadias, 641
- 5 α -reductase deficiency, **656**
sexual differentiation, 640
- 5 α -reductase inhibitor
naming conventions for, 253
- 5-aminosalicylic acid drugs, 389
- 5-aminosalicylic drugs, 407
- 5-fluorouracil (5-FU)
mechanism, use and adverse effects, 444
pyrimidine synthesis and, 34
- 5-HT
MAO inhibitor effect on, 593
trazodone effects, 594
vilazodone effects, 594
vortioxetine effects, 594
- 5-HT_{1B/1D} agonists, 252
- 5-HT₃ blocker
naming conventions for, 253
- 5-methylcytosine
in nucleotides, 33
- Fixation, 571
- Fixed splitting, 294
- Flaccid paralysis
acute asymmetric, 164
botulinum toxin, 136
motor neuron signs, 543
- Flagellin, 97
- Flagellum, 122
- Flask-shaped ulcers, 152
- Flavin nucleotides, 73
- Flaviviruses
hepatitis C, 170
structure and medical importance, 164
- Flavoxate, 240
- Fleas (disease vectors), 147
- Flecainide, 327
- Flexion
foot, 457
hip, 455
- Flexor digiti minimi muscle, 453
- Flexor pollicis brevis muscle, 453
- Flies (disease vectors)
Shigella spp, 142

- Floppy baby syndrome
Clostridium botulinum, 136
 splicing of pre-mRNA in, 41
- Flow cytometry, **52**
- Flow-volume loops, **692**
- Fluconazole
Cryptococcus neoformans, 150
 cytochrome P-450 interaction, 251
 mechanism and use, 195
 opportunistic fungal infections, 150
 systemic mycoses, 149
- Flucytosine
Cryptococcus neoformans, 150
 mechanism and clinical use, **194**
- Fludrocortisone, **360**
- Fluid compartments, **599**
- Flumazenil
 benzodiazepine overdose, 247,
 562, 588
- Fluorescence in situ hybridization, **53**
- Fluorescent antibody stain, 123
- Fluoroquinolones
 drug reactions with, 248, 249
 mechanism, use and adverse
 effects, **191**
Mycoplasma pneumoniae, 148
 naming conventions for, 252
 pregnancy contraindication, 199
Pseudomonas aeruginosa, 141
Salmonella typhi, 142
 teratogenicity of, 632
 TOP II (DNA gyrase) and TOP IV
 inhibition in prokaryotes,
 36
- Fluoxetine, 593
- Fluphenazine, 591
- Flutamide, 676
 polycystic ovarian syndrome, 662
- Fluticasone, 704
- Fluvoxamine, 593
- FMRI gene, 60
- Foam cells
 in atherosclerosis, 305
 Niemann-Pick disease, 86
- Focal aware seizures, 531
- Focal glomerular disorders, 612
- Focal hepatic necrosis
 drug reactions with, 248
- Focal impaired awareness seizures,
 531
- Focal nodular hyperplasia, 399
- Focal segmental glomerulosclerosis,
 616
- Focal seizures
 types of, 531
- Folate antagonists
 teratogenicity of, 632
- Folate synthesis
 inhibition/block, 190
- Follicles (lymph node), 94
- Follicles (spleen), 96
- Follicle-stimulating hormone (FSH)
 clomiphene effect, 674
 hCG and, 652
 in menstrual cycle, 650
- PCOS, 662
 secretion of, 331
- Follicular carcinoma
 causes and findings, 347
- Follicular cyst (ovary), 663
- Follicular lymphoma
 chromosomal translocations, 439
 occurrence and genetics, 435
- Fomepizole
 methanol or ethylene glycol
 overdose, 70
 methanol or ethylene glycol
 toxicity, 247
- Fondaparinux, 440
- Food-borne illness, 136
- Bacillus cereus*, 136
- Campylobacter jejuni*, 143
- Clostridium perfringens*, 136
 organisms causing, **174**
- Staphylococcus aureus*, 133, 174
 toxic shock syndrome toxin, 131
- Vibrio cholerae*, 144
- Foot drop, 457
- Foot movements
 dorsiflexion, 457
 eversion, 457
 flexion, 457
 inversion, 457
- Foramen cecum, 330
- Foramen of Magendie, 515
- Foramen of Monro, 515
- Foramen ovale, 286
 embryology, 284
 retained patency of, 302
- Foramina of Luschka, 515
- Forced expiratory volume (FEV)
 obstructive lung disease, 692
 restrictive lung disease, 694
- Foregut
 blood supply/innervation of, 371
 development of, 364
- Foreign body inhalation, 681
- Formoterol, 704
- 46,XX DSD, 655
- 46XX/46 XY DSD, 655
- Fosaprepitant, 407, 447
- Foscarnet
 HIV-positive adults, 197
 mechanism, use and adverse
 effects, **197**
 retinitis in immunosuppressed
 patients, 197
- Fossa ovalis, 286
- Founder effect (genetics), 55
- FOXP3 protein, 100
- Fractures
 chalk-stick, 468
 Colles, 467
 common pediatric, **467**
 femoral neck, 467
 pathologic, 471
 scaphoid, 453
 vertebral compression, 467
- Fragile X syndrome
 chromosome abnormality, 62
- diagnostic test, 51
 DNA methylation in, 32
 trinucleotide repeats in, **60**
- Frameshift mutation, 38
 muscular dystrophy and, 59
- Francisella* spp
 culture requirements, 124
- Francisella tularensis*
 disease and transmission, 147
- Frataxin, 545
- Free fatty acids
 fast/starvation states, 89
- Free nerve endings, 504
- Free radical injury
 mechanisms, **206**
 reperfusion, 206
- Fremitus (tactile), 698
- Fresh frozen plasma, 434
- Fresh frozen plasma/prothrombin
 complex
 transfusion of, 434
- “Fried egg” cells, 503, 540, 664
- Friedreich ataxia, **545**
 chromosome association, 62
 trinucleotide repeat in, 60
- Frontal bossing, 343
- Frontal eye fields, 524
- Frontal lobe
 abscess, 150
 stroke effects, 526
- Frontal lobe syndrome, 524
- Frontotemporal dementia
 symptoms and histologic findings,
 535
- Fructose
 absorption of, 381
- Fructose-1,6-bisphosphatase
 gluconeogenesis, 76
 rate-determining enzyme, 71
- Fructose-1,6-bisphosphatase 1
 gluconeogenesis regulation, 71
- Fructose-2,6-bisphosphate, 71
 glycolysis regulation, **74**
- Fructose metabolism
 disorders of, **78**
- Fruity breath odor, 351
- FTA-ABS, 145
- Full-thickness burn, 493
- Fumarate, 82
- Functio laesa, 209
- Functional hyposplenism, 421
- Functional hypothalamic
 amenorrhea, **663**
- Functional liver markers, 397
- Functional neurologic symptom
 disorder, 583
- Functional organization of a
 eukaryotic gene, **39**
- Functional residual capacity (FRC), 682
- Funduscopy examination
 sausage link appearance on, 436
 with glaucoma, 551
 with retinal disorders, 552
- Fungal infections
 dermatophytes, 488
- granulomatous inflammation, 213
- infections with
 immunodeficiencies, 116
 opportunistic, **150**
 T-cell deficiencies, 116
 treatment of systemic, 194
- Fungi
 culture requirements, 124
 immunocompromised patients, 175
 topical infections, 194
- “Funny” current/channels, 297, 328
- Furosemide
 drug reactions with, 248, 249
 mechanism, use and adverse
 effects, 626
- Fusion protein EWS-FLI1, 471
- Fusobacterium* spp
 alcohol use disorder, 175
 healthcare-associated infections, 181
 lung abscesses, 702
- G**
- G1-S progression inhibition, 44
- G20210A gene mutation, 433
- G6PD deficiency
 drugs causing hemolysis with, 249
- GABA_A action
 barbiturates, 561
 benzodiazepine effects, 562
- Gabapentin, 560
- Gabapentinoids, mechanism and
 adverse effects, 560
- GABA (γ-aminobutyric acid)
 basal ganglia and, 511
 multiple sclerosis treatment, 537
 synthesis and change with diseases,
 505
 vitamin B₆ and, 66
- Gag reflex, 519
- Gait disturbance
 Friedreich ataxia, 545
 hydrocephalus, 536
 steppage, 457
 Trendelenburg sign/gait, 457
 waddling, 59
- Galactitol, 78, 79
- Galactocerebrosidase, 86
- Galactocerebroside, 86
- Galactokinase deficiency, 78
- Galactorrhea
 antipsychotic drugs and, 332
- Galactose metabolism
 absorption of, 381
 disorders of, **78**
- Galantamine, 239, 564
- Galant reflex, 523
- Gallbladder
 biliary structures, 375
 blood supply and innervation of,
 371
Salmonella typhi colonization, 142
 with bile duct obstruction, 375
- Gallbladder cancer
 porcelain gallbladder, 403
 sclerosing cholangitis, 402

- Gallstone ileus, 403
 Gambling disorder, **586**
 γ -glutamyl transpeptidase
 in liver damage, 397
 Ganciclovir
 drug reactions with, 249
 mechanism, use and adverse effects, **196**
 Ganglion cyst, 465
 Ganglioneuromatosis, oral/intestinal, 356
 Gangrene
 of toes, 140
 Gangrenous necrosis, 205
 Gap junctions, ciliary movement, 47
 Gap junctions (connexons), 482
Gardnerella vaginalis, **147**, 191
 Gardener's pupil, 240
 Gardner syndrome, 394
 Gartner duct, 639
 Gas gangrene
 alpha toxin, 131
 Clostridium perfringens, 136, 175
 Gastrectomy, 426
 Gastric acid
 histamine receptors and, 237
 secretion, action and regulation, 379
 Gastric bypass surgery
 ghrelin and, 378
 superior mesenteric artery syndrome with, 370
 vitamin B₁₂ deficiency, 67
 Gastric cancer
 carcinogens for, 221
 Helicobacter pylori, 144
 oncogenic microbes, 222
 sign of Leser-Trélat and, 224
 types of, **386**
 Gastric inhibitory peptide (GIP), 357
 Gastric outlet obstruction, 366
 Gastric ulcers
 causes of, 387
 hemorrhage, 387
 NSAID toxicity, 496
 Gastric vessels, 368
 Gastrin
 effects on acid secretion, 380
 signaling pathways for, 341
 somatostatinomas and, 357
 source, action, and regulation of, 378
 Gastrinomas, 378
 drug treatment for, 360
 Gastrin-releasing peptide, 378
 Gastritis, **386**
 gastrin in, 378
 H₂ blockers for, 406
 Helicobacter pylori, 144
 proton pump inhibitors for, 406
 stomach cancer and, 386
 Gastrocolic ligament, 368
 Gastroenteritis
 caliciviruses, 164
 Listeria monocytogenes, 137
 rotavirus, 165
 Gastroepiploic arteries, 368
 Gastroesophageal reflux disease
 Barrett esophagus, **385**
 esophageal cancer, 385
 presentation, 384
 Gastrohepatic ligament, 368
 Gastrointestinal bleeding
 acute, **387**
 Gastrointestinal drug reactions, **248**
 Gastrointestinal infections
 protozoa, **152**
 Gastrointestinal secretory products
 cell locations, **380**
 regulatory substances, **378**
 source and action, **379**
 Gastrointestinal stromal tumors
 gene association, 220
 Gastrointestinal system
 aging effects on, 225
 blood supply and innervation, **371**
 embryology, **364**
 innervation of, 373
 ligaments, **368**
 muscarinic antagonist effects, 240
 pathology, 383
 pharmacology, 405
 physiology, 378
 regulatory substances, **378**
 retroperitoneal structures, **367**
 Salmonella spp vs. *Shigella* spp, 142
 Gastrointestinal tract
 diverticula of, **390**
 intestinal disorders, **393**
 Gastroschisis, 365
 Gastrosplenic ligament, 368
 Gaucher cells, 86
 Gaucher disease, 86, 469
 Gaussian distribution, 264
 Gaze palsy, upward/vertical, 542
 G cells, 378
 Gefitinib, 447
 Gemfibrozil, 325
 Gender- and sexuality-inclusive history taking, **271**
 Gender dysphoria, **584**
 Gene expression
 DNA methylation, 32
 enhancers, 40
 histone deacetylation in, 32
 histone modification, 32
 modifications, **54**
 promoters, 40
 regulation, **40**
 silencer, 40
 Gene promoter (CpG islands), methylation in, 32
 Generalized anxiety disorder, **580**
 buspirone, 592
 SSNRIs for, 593
 SSRIs for, 593
 Generalized seizures
 anticonvulsants for, 560
 types of, 531
 Generalized transduction, 128
 General paresis, 145, 179
 Genetic/antigenic shift/drift, 166
 Genetic code features, **35**
 Genetic drift, 55
 Genetics
 anticipation, 60
 autosomal trisomies, 61
 bacterial, **128**
 chromosome disorders, **62**
 code features, **35**
 CRISPR, **51**
 diabetes mellitus predisposition, 351
 gain of function mutation, 220
 inheritance modes, **57**
 introns vs exons, 41
 loss of function mutation, 220
 muscular dystrophies, 59
 mutations in cancer, 217
 population concepts, **55**
 response to environment, 39
 terms, **54–92**
 trinucleotide repeat expansion diseases, 59
 viral, **159**
 Genitalia
 atypical, 640, 656
 embryology, **639**
 male/female homologs, **641**
 Genital ulcers, 179
 Genital warts, 179
 Genitofemoral nerve, 456
 Genitourinary/renal drug reactions, **250**
 Genitourinary system
 drug reactions with, **250**
 muscarinic antagonist effects, 240
 trauma, **645**
 Gentamicin, 187
 Genu varum, vitamin D and, 68
 Geriatric patients
 age-related pharmacokinetics, 246
 aging-related hearing loss, 548
 aneurysm risk, **530**
 atropine effects in, 240
 causes of seizures, 531
 cholelithiasis, 403
 colorectal cancer, 395
 common causes of pneumonia, 175
 common meningitis causes, 176
 drug dosages, 230
 elder abuse and, 583
 gastroenteritis in, 137
 healthcare-associated infections, 181
 impaired accommodation in, 550
 myeloid neoplasms in, 437
 osteoporosis screening, 467
 prostatitis, 672
 recurrent lobar hemorrhagic stroke, 528
 suicidal/homicidal ideation in, 269
 testicular tumors, 671
 volvulus in, 392
 Germ cell tumors
 cryptorchidism risk for, 669
 extragonadal, **670**
 hormone levels with, 670, **671**
 ovarian, 664
 testicular, 671
 Germinal center, 94
 Germline (gonadal) mosaicism, 55
 Gerstmann syndrome, 524
 Gestational age, **651**
 Gestational diabetes
 glucokinase in, 73
 human placental lactogen, 652
 Gestational hypertension, 660
 Gestational trophoblastic disease
 serum tumor marker, 222
 theca lutein cyst, 663
 GH (growth hormone), 360
 Ghrelin
 appetite regulation, 340
 hypothalamus effects of, 508
 source, action and regulation of, 378
 Giant cell pneumonia, 167
 Giant cell (temporal) arteritis
 ESR with, 210
 polymyalgia rheumatica association, 477
 Giant cell tumor, 470
 Giant roundworm, 156
 Giardiasis
 gastrointestinal infections, 152
 in immunodeficiency, 116
 Giardia spp
 metronidazole, 191
 stain for identification, 123
 watery diarrhea, 175
 Giardia lamblia, transmission, diagnosis, and treatment, 152
 Giemsa stain, 123, 144
 Gifts from patients, accepting, **269**
 Gigantism, 333
 Gilbert syndrome, 400, 401
 Gingival hyperplasia
 cyclosporine, 118
 drugs causing, 249, 323
 inclusion cell disease, 45
 Gingivostomatitis, 162
 Gitelman syndrome
 renal disorder features, 605
 renal tubular defects, 604
 Glanzmann thrombasthenia, 432
 Glargine, 358
 Glatiramer, 537
 Glaucoma
 β -blockers, 244
 drug reaction, 240
 pilocarpine for, 239
 sympathomimetics for, 241
 therapy, **568**
 treatment, 239
 types and treatment, **551**
 Glecaprevir, 199
 Glial cells
 of CNS, 503
 of PNS, 503

- Glial fibrillary acidic protein (GFAP)
 - cytoskeletal elements, 46
 - tumor identification, 223
- Glioblastoma
 - description and histology, 540
 - treatment of multiforme, 445
- Glipizide, 359
- Global aphasia, 529
- Global cognitive deficits, 574
- Global payment, 276
- Globoid cells, 86
- Globose nucleus, 510
- Globotriaosylceramide, 86
- Globus pallidus externus, 511
- Glomerular anatomy, diagram of, **598**
- Glomerular disorders/disease
 - nomenclature, **612**
 - types of, **613**
- Glomerular filtration
 - barrier and components, **599**
 - changes in dynamics, **601**
- Glomerulonephritis
 - azathioprine for, 119
 - infection-associated, 614
 - RBC casts in, 612
 - Streptococcus pyogenes*, 134
- Glomus tumor, 486
- Glossitis
 - B-complex deficiency, 63
 - iron deficiency, 424
 - Plummer-Vinson syndrome
 - association, 384
 - vitamin B₃ deficiency, 65
 - vitamin B₉ deficiency, 66
- Glossopharyngeal nerve (CN IX)
 - function and type, 519
 - pharyngeal arch derivative, 638
- “Glove and stocking” sensation loss, 139, 350
- GLP-1 analogs
 - diabetes therapy, 359
 - naming conventions for, 253
- Glucagon
 - fructose biphosphatase-2, 74
 - glycogen regulation, 84
 - somatostatinomas and, 357
 - source, function and regulation, **337**
 - β-blocker overdose treatment, 327
- Glucagonomas
 - occurrence, 354
 - presentation and treatment, 357
 - treatment for, 360
 - with MEN1, 356
- Glucocerebrosidase, 86
- Glucocerebroside, 86
- Glucocorticoid-binding globulin, 340
- Glucocorticoids
 - apoptosis, 429
 - asthma therapy, 704
 - avascular necrosis of bone, 469
 - calcium pyrophosphate deposition disease, 473
 - Cushing syndrome, 119
 - cytokines, 119
 - drug reactions with, 248, 249
 - eosinophil count with, 429
 - gout, 497
 - immunosuppression, 119
 - non-Hodgkin lymphoma, 119
 - osteoporosis, 119
 - psychosis, 119
 - rheumatoid arthritis, 472
 - T3 in peripheral tissues, 335
- Glucogenic amino acids, 79
- Glucogenic/ketogenic amino acids, 79
- Glucokinase vs hexokinase, **73**
- Gluconeogenesis
 - cortisol and, 340
 - ethanol metabolism and, 70
 - irreversible enzymes, 76
 - metabolic site, 72
 - organic acidemias, **83**
 - rate-determining enzyme for, 71
 - smooth endoplasmic reticulum, 45
 - thyroid hormone and, 335
- Glucose
 - blood-brain barrier and, 506
 - clearance of, **602**
 - glycogen metabolism, 85
 - metabolism of, 39
 - phosphorylation of, 73
- Glucose-6-phosphatase
 - gluconeogenesis, 76
 - Von Gierke disease, 85
- Glucose-6-phosphate dehydrogenase (G6PD)
 - HMP shunt and, 71
- Glucose-6-phosphate dehydrogenase (G6PD) deficiency, **77**
 - causes and findings, 428
 - RBC inclusions, 421
 - RBCs in, 420
 - X-linked recessive disease, 59
- Glucose-dependent insulinotropic peptide (GIP)
 - insulin regulation, 338
 - source, action and regulation, 378
- Glucose intolerance, in Type 1 vs Type 2 diabetes, 351
- Glucosuria, threshold for, 602
- Glutamine, 358
- Glutamic acid, classification of, 79
- Glutamine
 - in nucleotides, 33
- Glutathione
 - glucose-6-phosphate dehydrogenase deficiency, 77
 - Vitamin B₆ in synthesis, 66
- Glutathione peroxidase, 206
- Gluteus maximus, 455, 457
- Gluteus medius, 455
- Gluteus minimus, 455, 457
- GLUT transporters, 338
- Glyburide, 359
- Glycerol, in starvation, 89
- Glycine, in nucleotides, 33
- Glycogen
 - metabolism and storage, 71
 - regulation, **84**
 - stain for, 123
 - tissue metabolism, **84**
- Glycogenesis, 71
- Glycogenolysis
 - rate-determining enzyme for, 71
 - smooth endoplasmic reticulum, 45
 - thyroid hormone and, 335
- Glycogen storage diseases, findings and deficient enzymes, **85**
- Glycogen synthase
 - rate-limiting enzyme, 71
- Glycolysis regulation
 - hexokinase/glucokinase in, 74
 - key enzymes in, **74**
 - metabolic site, 72
 - pyruvate dehydrogenase, **74**
 - rate-determining enzyme, 71
- Glycopyrrolate, 240
- Glycosylation
 - collagen synthesis, 48
 - protein synthesis, 43
- Glycyrrhetic acid, 604
- GNAQ gene mutation, 539
- GNAS gene mutation, 348
- GnRH agonists, drug reactions with, 249
- Goblet cells, 369, 680
- Goiter, causes of, **346**
- Golgi apparatus, cell trafficking, 45
- Golgi tendon organ, 461
- Gonadal (germline) mosaicism, 55
- Gonadotropin-releasing hormone
 - analog
 - mechanism, use and adverse effects, **674**
- Gonadotropin-releasing hormone (GnRH)
 - function and notes, 332
 - neurons producing, 508
 - prolactin and, 332
 - signaling pathways for, 341
- Gonads
 - dysgenesis of, 624
 - smooth endoplasmic reticulum, 45
- Gonococci vs meningococci, 140
- Gonorrhea
 - ceftriaxone, 185
 - Neisseria, 140
 - sexually transmitted infection, 179
- Goodpasture syndrome
 - autoantibody, 113
 - collagen defect in, 48
 - glomerulonephritis with, 614
 - hematuria/hemoptysis, 614
 - type II hypersensitivity, 110
- Good syndrome
 - paraneoplastic syndrome, 224
 - thymoma and, 96
- Goserelin, 674
- Gotttron papules, 224, 477
- Gout
 - acute treatment drugs, 497
 - drugs causing, 249
 - findings, symptoms, and treatment, **473**
 - hypertension in, 321
 - kidney stones and, 617
 - Lesch-Nyhan syndrome, 35
 - loop diuretics and, 626
 - preventive therapy, **497**
 - Von Gierke disease, 85
- Gower maneuver/sign, 59
- G-protein-linked 2nd messengers, **237**
- Gracilis muscle, 456
- Graft-versus-host disease, 111, 117
- Graft-versus-tumor effect, 117
- Gram-negative organisms
 - infections in immunodeficiency, 116
 - lab algorithm, **139**
 - membrane attack complex, **104**
- Gram-positive organisms
 - cephalosporins, 185
 - lab algorithm, **132**
 - vancomycin, 186
- Grand mal (tonic-clonic) seizures, 531
- Granisetron, 407, 447
- Granular casts
 - acute tubular necrosis, 621
 - in urine, 612
 - “muddy brown” in urine, 612
- Granulocyte-colony stimulating factor (G-CSF), 341
- Granulocytes
 - autoantibody, 113
 - morulae, 148
- Granulocytopenia, trimethoprim, 190
- Granuloma inguinale (Donovanosis), 179
- Granulomas
 - in systemic mycoses, 149
 - in tuberculosis, 138
 - macrophages and, 413
 - syphilis, 145
- Granulomatosis infantiseptica, *Listeria monocytogenes*, 137
- Granulomatosis with polyangiitis
 - lung disease with, 694
- Granulomatous disease
 - calcification with, 207
 - excess vitamin D in, 68
 - hypervitaminosis D with, 469
 - infectious vs noninfectious etiology, 213
- Granulomatous inflammation, histology, mechanism and etiologies, **213**
- Granulosa cell tumor, 665
- Granzymes, 99, 100
- Grapefruit juice, cytochrome P-450 interaction, 251
- Graves disease
 - autoantibody, 113
 - causes and findings, 346
 - HLA subtype, 98
 - ophthalmopathy, 344
 - thyroid cellular action in, 335
 - type II hypersensitivity, 110

Gravidity (“gravida”), 651
 Gray baby syndrome, 188, 199
 Gray hepatization, 702
 Grazoprevir, 199
 Greenstick fracture, 467
 Grief, **572**
 Griffith point, 206
 Griseofulvin
 cytochrome P-450 interaction, 251
 disulfiram-like reaction, 250
 mechanism, use and adverse effects, **195**
 microtubules and, 46
 pregnancy contraindication, 199
 “Ground-glass” appearance (X-ray)
 neonatal respiratory distress syndrome, **679**
Pneumocystis jirovecii, 151, 173
 “Ground glass” appearance, 170
 Group A streptococci, **134**
 Group A streptococci, clindamycin
 for invasive infection, 188
 Group B streptococci, **135**, 175
 Growth factors, tumor suppressor
 gene mutations and, 44
 Growth hormone, 333
 Growth hormone (GH)
 drug reactions with, 250
 function and secretion of, **333**
 secretion and diabetes mellitus, 350
 secretion of, 331
 Growth hormone inhibiting hormone
 (GHIH), 332
 Growth hormone–releasing hormone
 (GHRH), function and
 clinical notes, 332, 333
 Growth restriction (fetal), with
 phenylketonuria, 82
 Growth retardation, with renal
 failure, 621
 Growth signal self-sufficiency, 217
 GTP (guanosine triphosphate), 75
 Guanfacine, 243, 574
 Guanine, in nucleotides, 33
 Guanosine analogs, mechanism and
 use, 196
 Guanylate cyclase-C agonists, 408
 Gubernaculum, 642
 Guessing during USMLE Step 1
 exam, 21
 Guide RNA (gRNA), 51
 Guillain-Barré syndrome
 Campylobacter jejuni, 143
 peripheral nerves in, 505
 Zika virus, 168
 Gummas, 145, 179
 Guselkumab, 498
 Gustatory hallucinations, 576
 Gustatory pathway, 508
 Guyon canal syndrome, 453, 463
 Gynecologic tumor epidemiology, **661**
 Gynecomastia
 azoles, 195
 causal agents, 248
 causes of, 667

ketoconazole, 676
 sex hormone–binding globulin
 and, 341
 spironolactone, 676
 testicular choriocarcinoma, 671
 with cimetidine, 406
H
 H₁-blockers
 drug reactions with, 250
 mechanism, use and adverse
 effects, **705**
 naming conventions for, 253
 H₂-antagonist
 cimetidine, 406
 naming conventions for, 253
 H₂-blockers, mechanism, clinical use
 and adverse effects, **406**
Haemophilus ducreyi, sexual
 transmission of, 179
Haemophilus influenzae
 biofilm production, 126
 cephalosporins, 185
 chloramphenicol, 188
 lab algorithm, **140**
 meningitis, 176
 otitis media, **547**
 pneumonia, 175
 pneumonia with, 701
 vaccine, 96, 175
 Hair
 frontal balding, 59
 “kinky”, 49
 vitamin C deficiency, 67
 Hair cell leukemia, 437
 antimetabolites for, 444
 immunohistochemical stains, 223
 oncogene, 220
 Hair leukoplakia
 HIV-positive adults, 173
 skin infection, 487
 Half-life (t_{1/2}), 229
 Halitosis, 391
 Hallmarks of cancer, **217**
 Hallucinations
 alcohol withdrawal, 576
 brain tumors, 576
 cocaine, 589
 delirium, 575
 postpartum psychosis, 579
 schizophrenia, 576
 tricyclic antidepressants, 593
 types of, 576
 Hallucinogen intoxication and
 withdrawal, 589
 Haloperidol, 575, 591
 Hamartin protein, 220, 539
 Hamartomas, 216
 Hamartomatous colonic polyps, 394
 Hamate bone
 fracture of hook, **463**
 fracture of hook, 450, 453
 Hamman sign crepitus, 691
 Hand
 claw deformity, 45

injuries to, **463**
 squamous cell carcinoma, 494
 Hand-foot-mouth disease, 148, 177
 Hand grip, 295
 Hand movements
 lesions and distortions of, **454**
 muscles of, **453**
 “Hand of benediction”, 454
 Hand-wringing (stereotyped), 60
 Hantavirus, hemorrhagic fever, 164
 Haptens
 acute interstitial nephritis, 620
 amidarone as, 328
 Haptoglobin, 209, 427
 Hardy-Weinberg principle, **56**
 Hartnup disease
 amino acids in, 65
 vitamin B₃ deficiency, 65
 Hashimoto thyroiditis, 345
 autoantibody, 113
 HLA subtype, 98
 Hassall corpuscles, 96
 HbA_{1c} test, 350
 HbC disease
 anemia in, 428
 target cells in, 420
 HBV, oncogenicity, 222
 HCV, oncogenicity, 222
 HDL (high-density lipoprotein), 92
 Headaches
 adverse drug effects, 195
 classification and treatment, **532**
 “thunderclap headache”, 530
 “worst headache of my life”, 530
 Head and neck cancer
 types of, **690**
 Healthcare
 medical insurance plans, 275
 payment models, **276**
 Healthcare-associated infections, 141
 Clostridioides difficile, 181
 common pneumonia causes, 175
 Ebola, 169
 enterococci, 135
 legionella, 181
 Pseudomonas aeruginosa, 141
 risk factors, pathogens and
 symptoms, **181**
 Healthcare delivery, 275
 Healthcare payment models, **276**
 Health maintenance organization, 275
 Hearing loss
 aging-related, 548
 Alport syndrome, 615
 CN VIII, 180
 congenital syphilis, 145
 cytomegalovirus, 180
 diagnosis of, **548**
 Jervell and Lange-Nielsen
 syndrome, 312
 osteitis deformans, 468
 osteogenesis imperfecta, 49
 rubella, 180
 sensorineural deafness, 615
 types and common causes, **548**

Heart
 adrenergic receptors in, 236
 anatomy of, **288**
 auscultation of, **295**
 blood flow autoregulation by, 300
 blood supply, 288
 electrocardiograms, **298**
 embryology, **284**, **286**
 ischemia of, 206
 myocardial action potential, **297**
 normal pressures in, 300
 pacemaker action potential, **297**
 septation of chambers, 284
 Heartburn, 384
 Heart disease
 congenital, 61, **302**
 Fabry disease, 86
 Vitamin B₁ deficiency, 64
 with Whipple disease, 388
 Heart failure
 ACE inhibitors for, 628
 findings and treatment, **316**
 high-output, 317
 hypertension treatment, 321
 left heart failure, 316
 right heart, 316
 with reduced ejection fraction
 (HFrEF), 324
 β-blocker use, 244
 Heart failure with reduced ejection
 fraction (HFrEF), 328
 Heart morphogenesis
 chambers, **284**
 fetal-postnatal derivatives, **286**
 outflow tract formation, 285
 valve development, 285
 Heart murmurs, **296**
 continuous, 296
 diastolic, 296
 hypertrophic cardiomyopathy, 315
 systolic, 296
 with dilated cardiomyopathy, 315
 Heart rate
 in antianginal therapy, 323
 sympathomimetic effects, 242
 Heart sounds
 cardiac cycle, 292
 in heart failure, 316
 splitting of S2, **294**
 Heat-labile toxin, *Clostridium*
 botulinum, 136
 Heat shock proteins, 43
 Heat-stable toxin (ST), source and
 effects of, 130
 Heat stroke
 pathophysiology and management,
 530
 vs fever, 530
 Heberden nodes, 472
 Heel pain, 465
 Heinz bodies, 77, 421
 Helicase, 36
Helicobacter pylori
 as oncogenic microbe, 222
 clinical significance, **144**

- Helicobacter pylori* (continued)
 disease association, 386
 gastric cancer, 386
 in gastric vs duodenal ulcer, 387
 metronidazole, 191
 oncogenicity, 222
 penicillins for, 184
 silver stain, 123
 stains for, 123
- Heliotrope rash, 224, 477
- HELLP syndrome
 microangiopathic anemia, 429
 preeclampsia, 660
- “Helmet cells”, 429
- “Helmet” cells”, 420
- Helminthic infections, eosinophils and, 414
- Helper T cells
 cell surface proteins, 108
 cytokine secretion, 106
- Hemagglutinin
 influenza viruses, 166
 parainfluenza viruses, 167
- Hemangioblastoma, characteristics and histology, 540
- Hemangiomas, 216
 pyogenic granuloma, 486
 strawberry, 486
- Hemarthroses, hemophilias, 431
- Hematemesis
 esophageal varices, 384
 GI bleeding, 387
 with Mallory-Weiss syndrome, 384
- Hematin, 140
- Hematochezia
 colorectal cancer, 395
 intestinal disorders, 393
 Meckel diverticulum, 391
 painless, 390
 with angiodysplasia, 393
 with GI bleeding, 387
- Hematologic abnormalities, laboratory techniques for, 52
- Hematologic disorders
 hepatic B and C manifestations, 171
 paraneoplastic syndromes, 224
- Hematologic drug reactions, **249**
- Hematologic infections
Plasmodium spp, 154
 protozoal, **154**
- Hematology/oncology
 anatomy, 412
 pathology, 420
 pharmacology, 440
 physiology, 416
- Hematopoiesis
 extramedullary, 468
 summary, **412**
 with myelodysplastic syndromes, 436
- Hematopoietic stem cells
 cell surface proteins, 108
- Hematopoietic system, aging effects on, 225
- Hematuria
 bladder cancer, 624
 complication of sickle cell, 428
 gross, 370
 hereditary hemorrhagic telangiectasia, 420
 IgA nephropathy, 614
 kidney stones, 617
 painless, 624
 renal papillary necrosis, 621
 transitional cell carcinoma, 624
 urinary tract infections, 178
 with flank pain, 622
- Heme
 chloroquine, 195
 metabolism of, 382
 porphyria and, 430
 synthesis of, **430**
 vitamin B₆ and, 66
- Heme synthesis
 iron deficiency, 424
 lead poisoning, 425
 metabolic site, 72
 porphyrias and, **430**
- Hemianopia, 526
- Hemiballismus, 524, 533
- Hemidesmosome, 482, 489
- Hemineglect, 526
- Hemiparesis, saccular aneurysms, 530
- Hemisection of spinal cord., 545
- Hemispatial neglect syndrome, 524
- Hemochromatosis
 calcium pyrophosphate deposition disease, 473
 cardiomyopathy with, 315
 chromosome association, 62
 findings and presentation, **402**
 free radical injury, 206
 iron study interpretation, 423
 restrictive/infiltrative cardiomyopathy, 315
- Hemoglobin
 development, 410
 electrophoresis, **416**
 structure and oxygen affinity, **687**
- Hemoglobin Barts disease, 424
- Hemoglobin H disease (HbH), 424
- Hemoglobinuria
 acute tubular necrosis and, 621
 G6PD deficiency, 428
 intravascular hemolysis, 428
- Hemolysis
 alpha toxin, 131
Clostridium perfringens, 136
 HELLP syndrome, 660
 in G6PD deficiency, 249
- Hemolytic anemia
 autoimmune, 185
 babesiosis, 154
 direct Coombs-positive, 249
 due to infection, 429
 extrinsic, **429**
 folate deficiency and, 426
 G6PD deficiency, 77
- intravascular and extravascular findings, 427
- intrinsic, **428**
- penicillin G, V, 183
- spherocytes in, 420
- Wilson disease, 402
- Hemolytic bacteria, **133**
- Hemolytic disease of fetus/newborn, 411
 mechanism, presentation and treatment/prevention, **411**
- Type II hypersensitivity, 110
- Hemolytic-uremic syndrome
 epidemiology, presentation and labs, 432
- Hemolytic-uremic syndrome (HUS)
Escherichia coli, 143
 exotoxins, 130
- Hemophilia, 431
 X-linked recessive disorder, 59
- Hemophyllis influenzae*
 culture requirements, 124
 unvaccinated children, 182
- Hemoptysis
 lung cancer, 703
 tuberculosis, 138
- Hemorrhage
 acute pancreatitis, 404
 AIDS retinitis, 162
 delirium caused by, 575
 Ebola virus, 169
 intracranial, **528**
 petechial, 140
 pulmonary, 135
 subarachnoid hemorrhage, 530
 ulcer disease, 387
 ulcers, 387
 Weil disease, 145
- Hemorrhagic cystitis
 adenovirus, 161
 drugs causing, 250
- Hemorrhagic disease of the newborn
 vitamin K administration, 69
- Hemorrhagic fever
 bunyaviruses, 164
 filovirus, 164
 hantavirus, 164
- Hemorrhoids
 GI bleeding association, 387
 internal, 373
- Hemosiderin-laden macrophages (HC cells), 316
- Hemosiderinuria, 427
- Hemostasis
 platelet plug formation, **417**
 thrombocytes (platelets), 413
- Hepadnavirus
 hepatitis B, 170
- Hepadnaviruses
 genome, 160
 structure and medical importance, 161
- Heparan sulfate, 86
- Heparin
 adverse effects of, 440
 deep venous thrombosis, 440
- drug reactions with, 249
 in coagulation cascade, 419
 mechanism, use and adverse effects, **440**
 reversal of, **442**
 toxicity treatment, 247
 warfarin comparison, 441
- Heparin-induced thrombocytopenia (HIT), 440
- Hepatic adenoma, 399
- Hepatic angiosarcoma, 399
 carcinogens for, 221
- Hepatic arteries, 368
- Hepatic ascites, 627
- Hepatic encephalopathy, **399**
 Reye syndrome, 398
- Hepatic fibrosis, 374
- Hepatic hemangioma, 399
- Hepatic lipase
 IDL modification by, 92
 in lipid transport, 91
- Hepatic necrosis, 495
 causal agents for, 248
- Hepatic steatosis, 398
- Hepatic stellate (Ito) cells, 374
- Hepatic subcapsular hematomas, 660
- Hepatic toxicity, Vitamin A, 64
- Hepatitis
 alcoholic, 398
 autoimmune, **399**
 drugs causing, 248
 extrahepatic manifestation of B and C, **171**
 healthcare-associated infections, 181
 hyperbilirubinemia in, 400
 liver zones and, 374
- Hepatitis A
 Anti-HAV (IgG), 171
 Anti-HAV (IgM), 171
- Hepatitis A (HAV)
 characteristics, 170
 picornavirus, 164
 RNA translation in, 165
 serologic markers, 171
- Hepatitis antigens, **171**
- Hepatitis B (HBV)
 Anti-HBs, 171
 characteristics, 170
 extrahepatic manifestations, 171
 HBcAg, 171
 HBeAg, 171
 HBsAg (hepatitis B surface antigen), 171
 medical importance, 161
 passive antibodies for, 108
 serologic marker phases, 171
 sexually transmitted infection, 179
- Hepatitis C (HCV)
 characteristics, 170
 extrahepatic manifestations, 171
 lichen planus, 492
 therapy for, **199**
- Hepatitis C (HVC), Anti-HBc, 171

- Hepatitis D (HDV), characteristics, 170
- Hepatitis E (HEV)
characteristics, 170
picornavirus, 164
- Hepatitis serologic markers
Anti-HBc, 171
Anti-HBe, 171
Anti-HBs, 171
HBeAg, 171
HBsAg, 171
- Hepatitis viruses
presentation and characteristics, **170**
serologic markers for, **171**
- Hepatocellular carcinoma
characteristics of, 399
serum tumor marker, 222
- Hepatocellular carcinoma (HCC)
Aspergillus fumigatus, 150
carcinogens causing, 221
chronic inflammation, 212
hemochromatosis, 402
oncogenic microbes, 222
risk with hepatitis, 170
- Hepatocytes
glycogen in, 84
smooth endoplasmic reticulum, 45
- Hepatoduodenal ligament, 368
- Hepatomegaly
Budd-Chiari syndrome, 397
congestive, 316
glycogen storage diseases, 85
Zellweger syndrome, 46
- Hepatosplenomegaly
autoimmune lymphoproliferative syndrome, 204
Gaucher disease, 86
organ transplant rejection, 117
- Hepatosteatosi, ethanol metabolism and, 70
- Hepatotoxicity
 α -amanitin, 40
amiodarone, 328
bosentan, 706
danazol, 676
isoniazid, 192
leflunomide, 496
methotrexate, 444
pericentral (centrilobular) zone and, 374
pyrazinamide, 192
terbinafine, 195
thionamides, 360
with anticonvulsants, 560
zileuton, 676, 704
- Hepcidin, 209
- Hepcidin, in anemia of chronic disease, 427
- Hepevirus
hepatitis E, 170
structure and medical importance, 164
- HER2 (ERBB2)* gene, associated neoplasms, 220
- “Herald patch” (pityriasis rosea), 492
- Hereditary angioedema
complement disorder and, 105
treatment, 676
- Hereditary elliptocytosis, 420
- Hereditary fructose intolerance, 78
- Hereditary hemorrhagic telangiectasia
autosomal dominance of, 58
findings, **320**
- Hereditary hyperbilirubinemia, **401**
- Hereditary (ion) channelopathies, **312**
- Hereditary motor and sensory neuropathy, 538
- Hereditary spherocytosis
causes and findings, 428
RBCs in, 420
- Hereditary thrombophilias, **433**
- Heritable pulmonary arterial hypertension, **698**
- Hernias
diaphragmatic, 679
gastrointestinal, **376**
- Herniation syndromes, 536, 543
- Herniation syndromes (brain), **543**
- Herpes genitalis, 162, 179, 487
- Herpes labialis, 162, 487
- Herpes simplex virus
CN VII lesions with, 546
envelope, 161
foscarnet, 197
HSV-1/HSV-2, 162, 487
identification, **163**
meningitis caused by, 176
TORCH infection, 180
transport of, 46
- Herpesviruses
cytomegalovirus, 162
Epstein-Barr virus (HHV-4), 162
human herpesviruses, 162
structure and medical importance, 161
transmission and clinical significance, **162**
varicella-zoster virus (HHV-3), 162
- Herpes zoster, dorsal root latency, 162
- Herpes zoster ophthalmicus, 162
- Herpetic whitlow, 162, 487
- Heterochromatin, 32
- Heterodimer, 46
- Heterodisomy, 55
- Heterogeneous nuclear RNA (hnRNA), 40
- Heteroplasmy, 55
- Heterotopic ossification, 477
- Heterozygosity loss, 54
- Hexokinase vs glucokinase, **73**
- “HF” cells (in lungs), 316
- HFE* gene, hemochromatosis and, 402
- Hfr \times F- plasmid, 128
- HGPRT (hypoxanthine guanine phosphoribosyltransferase)
adenosine deaminase deficiency, 35
- Hiatal hernia, 377
- High altitude respiratory response, **688**
- High-frequency recombination (Hfr) cells, 128
- High-output heart failure, **317**
- Hilar lymph node calcification, 696
- Hilar mass (lung), 703
- Hindgut
blood supply and innervation, 371
embryology of, 364
- Hip
developmental dysplasia, 466
nerve injury with dislocation, 456
- Hip movements
muscles and actions of, **455**
- Hippocampus
ischemia effects, 206
lesions of, 524
limbic system, 509
- Hippurate test for *Streptococcus agalactiae*, 135
- Hirschsprung disease, **391**
- Hirsutism
cyclosporine, 118
danazol, 676
in females, 341
menopause, 653
mucopolysaccharidoses, 86
polycystic ovarian syndrome, 662
sex hormone-binding globulin, 341
- Histaminase, production of, 414
- Histamine
cortisol effect on, 340
scombroid poisoning, 246
signaling pathways for, 341
vitamin B₆ and, 66
- Histamine blockers, 406
- Histamine (H₁-receptor), 341
- Histamine receptors (H₁), vomiting center input, 506
- Histamine receptors, second messenger functions, 237
- Histamine (scombroid poisoning), 246
- Histidine, 79
- Histiocytosis (Langerhans cell), **439**
- Histology
adrenal cortex and medulla, 331
adult primary brain tumors, 540–568
carcinoid tumors, 357
childhood primary brain tumors, 542–568
colonic polyps, 394
Crohn disease vs ulcerative colitis, 389
diabetes Type 1 vs Type 2, 351
digestive tract, **369**
endometrial carcinoma, 666
female reproductive epithelial, **644**
glioblastoma, 540
granulomatous inflammation, 213
Graves disease, 346
- hydatidform mole, 659
- idiopathic pulmonary fibrosis, 694
- ischemic brain disease/stroke, 525
- liver tissue architecture, **374**
- Löffler endocarditis, 315
- lung cancer, 703
- mesothelioma, 695
- microscopic colitis, **389**
- myositis ossificans, 477
- myxomas, 320
- necrosis appearance, **205**
- nephritic syndrome, **614**
- rhabdomyosarcoma, 320
- Histones
acetylation, 32
amino acids in, 79
deacetylation, 32
methylation, 32
- Histoplasma* spp, treatment, 194
- Histoplasma capsulatum*
HIV-positive adults, 173
necrosis with, 205
- Histoplasmosis
erythema nodosum, 492
unique symptoms and features, 149
- Histrelin, 674
- Histrionic personality disorder, 582
- HIV-associated dementia
in HIV-positive adults, 173
symptoms and histologic findings, 535
- HIV (human immunodeficiency virus)
aplastic anemia in, 427
characteristics, **172**
diagnosis, **172**
flow cytometry diagnosis, 52
Human herpesvirus 8, 162
in HIV-positive adults, 173
Kaposi sarcoma, 486
lymphopenia, 429
NNRTIs, 197
NRTIs, **197**
pulmonary arterial hypertension, 698
receptors, 163
receptors for, 108
screening for infection, 52
T cells and, 415
TORCH infections, 180
- HIV (human immunodeficiency virus) therapy
antiretroviral therapy, **197**
entry inhibitors, **198**
protease inhibitors, 198
- HIV-positive adults, common diseases in, **173**
- HLA-B8, Graves disease and, 346
- HLA B27, disease associations, 98
- HLA DR3, disease associations, 98
- HLA-DR4, 472
- HLA DR4, disease associations, 98
- HLA genes
disease associations, 346, 475
DM type 1 association, 351
seronegative spondyloarthritis, 475

- HLA subtypes, disease associations, **98**
 HLA system, and diabetes mellitus, 351
 HMG-CoA reductase, cholesterol synthesis, 71
 HMG-CoA reductase inhibitors, naming conventions for, 253
 HMG-CoA synthase, 71
 Hoarseness
 gastroesophageal reflux disease, 384
 lung cancer, 703
 Ortner syndrome, 288
 Pancoast tumor, 703
 thyroid cancer, 347
 Hodgkin lymphoma
 bleomycin for, 444
 paraneoplastic cerebellar degeneration, 224
 subtypes of, **434**
 vinca alkaloids for, 445
 vs non-Hodgkin, **434**
 Holistic medical therapy, 273
 Holoprosencephaly
 characteristics of, 501
 Patau syndrome, 61
 Homatropine, 240
 Homeostasis
 glucagon in, 337
 hypothalamic function in, 508
 Homer-Wright rosettes, 354, 542
 Homocysteine methyltransferase, deficiency in, 83
 Homocysteine, vitamin B₉ deficiency, 66
 Homocystinuria
 causes of, **83**
 Marfan syndrome comparison, 50
 presentation and characteristics, 50
 Homologous recombination repair, 37
 Homunculus, **513**
 “Honeycomb” appearance, 694
 “Honey-crusted” lesions, 134
 Hookworms, 156
 Hordeolum (stye), 559
 Hormonal birth control, 675
 Hormone replacement therapy
 for hypopituitarism, 343
 thrombotic complications, 249
 Hormones
 acting on kidney, **608**
 hypothalamic-pituitary, 332
 Hormone-sensitive lipase, 91
 Horn cysts, 485
 Horner syndrome
 Brown-Séquard syndrome, 545
 cavernous sinus, 557
 headache and, 532
 ipsilateral, 526
 lung cancer, 703
 Pancoast tumor, 703
 sympathetic nervous system and, **555**
 Horseshoe kidney, **597**
 Hospice care (end-of-life care), 276
 Hot flashes, drug reaction and, 248
 Hot tub folliculitis, 141
 “Hourglass stomach”, 377
 Howell-Jolly bodies, 96, 421
 HPV-related vulvar carcinoma, 661
 HTLV-1, oncogenicity, 222
 Human chorionic gonadotropin (hCG)
 ectopic pregnancy, 658
 germ cell tumors, 671
 hydatidiform moles, 659
 secretion of, 630, 634
 serum tumor markers, 222
 signaling pathways, 341
 source and functions of, **652**
 testicular tumors, 671
 theca lutein cyst, 663
 with dysgerminoma, 664
 Human evolution, 55
 Human herpesvirus
 HHV-5, 162
 HHV-6, 177
 HHV-6 and HHV-7, 162
 HHV-8, 162, 173, 486
 Human herpesvirus (HHV-8)
 in HIV-positive adults, 173
 oncogenicity of, 222
 Humanized monoclonal antibodies
 active vs passive immunity, 108
 naming conventions for, 254
 Human metapneumovirus, 166
 Human monoclonal antibody, naming conventions for, 254
 Human papillomavirus (HPV)
 cervical pathology, 663
 HIV-positive adults, 173
 HPV-6, 179
 HPV-11, 179
 HPV-16, 663, 690
 HPV-18, 663
 laryngeal tumors in children, 690
 oncogenicity, 222
 squamous cell carcinoma of penis, 669
 tumor epidemiology, 661
 verrucae, 485
 warts, 161
 Human placental lactogen, 652
 Human placental lactogen, source and function, **652**
 Human protein production, 53
 Humerus fractures
 axillary nerve, 450
 radial nerve, 450
 Humoral immune response, 99, 415
 Humor (ego defense), 571
 Hunger/satiety regulation, 508
 Hunter syndrome
 inheritance, 59
 lysosomal storage disease, 86
 Huntington disease
 chromosomal abnormality, 62
 drug therapy for, 564
 histone deacetylation in, 32
 neurotransmitter changes with, 505
 symptoms and histologic findings, 534
 trinucleotide repeat expansion diseases, 60
 Hurler syndrome, 45
 Hurler syndrome, lysosomal storage disease, 86
 Hürthle cells, 345
 Hyaline arteriosclerosis, 350
 Hyaline arteriosclerosis, 306
 Hyaline casts in urine, 612
 Hydatid cysts, 157, 158
 Hydatidiform mole
 complete vs. partial, **659**
 hCG in, 652
 serum tumor marker, 222
 Hydralazine
 drug reactions with, 249
 in heart failure, 316
 in pregnancy, 660
 mechanism, use and adverse effects, **323**
 Hydrocele (scrotal), congenital, 670
 Hydrocephalus
 childhood tumors, 542
 mimics of, 536
 noncommunicating, 502
 obstructive, 542
 risk for developing, 528
 Toxoplasma gondii, 153, 180
 types and presentation, **536**
 Hydrochlorothiazide (HCTZ)
 drug reactions with, 248
 mechanism and clinical use, 627
 Hydrogen peroxide, 127, 199
 Hydronephrosis
 causes and effects of, **618**
 duplex collecting system, 597
 kidney stones, 617
 prenatal, 596
 with horseshoe kidney, 597
 Hydrophobia, 169
 Hydrops fetalis
 parvovirus B19, 180
 syphilis, 180
 Hydrosalpinx, pelvic inflammatory disease, 181
 Hydroxocobalamin, 247
 Hydroxychloroquine, drug reactions with, 249, 250
 Hydroxylases, 71
 Hydroxylation
 in protein synthesis, 43
 Vitamin C and, 48
 Hydroxyurea
 drug reactions with, 249
 mechanism, use and adverse effects, 444
 polycythemia vera, 438
 purine and pyrimidine synthesis, 34
 sickle cell anemia, 428
 Hyoscyamine, 240
 Hyperacute transplant rejection, 110, 117
 Hyperaldosteronism
 clinical features, **354**
 hypertension with, 304
 potassium-sparing diuretics for, 627
 Hyperammonemia
 causes and management, **80**
 fatty acid metabolism and, 87
 ketone levels, 88
 organic acidemias, 83
 Hyperbilirubinemia
 conjugated (direct), 400, 401
 jaundice with, 401
 unconjugated (indirect), 400
 Hypercalcemia
 acute pancreatitis and, 404
 adult T-cell lymphoma, 435
 bisphosphonates for, 496
 calcification with, 207
 calcium carbonate antacid effects, 406
 familial hypocalciuric hypercalcemia, **349**
 hyperparathyroidism, 349
 lung cancer, 703
 metastatic calcification, 207
 paraneoplastic syndrome, 224
 succinylcholine, 566
 thiazides, 627
 Williams syndrome, 62, 63
 Hypercalciuria
 hyperparathyroidism, 349
 thiazides for, 627
 Hypercapnia, effects of, 684
 Hypercholesterolemia
 corneal arcus with, 305
 familial, 58
 Hyper-cholesterolemia, familial, 92
 Hyper-chylomicronemia, familial dyslipidemias, 92
 Hypercoagulability
 advanced malignancy, 318
 deep venous thrombosis, 321
 dural venous sinus thrombosis, 514
 nonbacterial thrombotic endocarditis, 318
 Hyperemesis gravidarum, treatment, 506
 Hyperemia, pseudoephedrine/phenylephrine use, 706
 Hyper eosinophilic syndrome, 315
 Hyperglycemia
 drugs causing, 248
 pancreatic cell tumors, 357
 protease inhibitors, 198
 thiazides, 627
 vitamin B₃ toxicity, 65
 Hyperglycemic emergencies, **351**
 Hypergonadotropic (1°)
 hypogonadism, 654
 Hypergranulosis, 492

- Hypergranulosis, characteristics/
examples, 483
- Hyperhidrosis, treatment of, 136
- Hyper-IgM syndrome, defect,
presentation, and findings,
115
- Hyperkalemia
 - aldosterone in, 606
 - aliskiren, 628
 - angiotensin II receptor blockers,
628
 - blood transfusion risk, 434
 - cardiac glycosides, 326
 - cation exchange resins for, 361
 - potassium-sparing diuretics, 627
 - tumor lysis syndrome, **440**
- Hyperkalemic tubular acidosis (RTA
type 4), 611
- Hyperkeratosis
 - characteristics/examples, 483
 - verrucae, 485
- Hyperlipidemia
 - immunosuppressants, 118
 - signs of, **305**
 - thiazides, 627
- Hyperopia, 549
- Hyperorality, 524
- Hyperosmolar hyperglycemic state
DM type 2, 350
 - pathogenesis, signs/symptoms and
treatment, 351
- Hyperparathyroidism
 - calcium pyrophosphate deposition
disease, 473
 - cinacalcet for, 361
 - lab values in, 469
 - metastatic calcification, 207
 - types and presentation, **349**
- Hyperphagia
 - brain lesions, 508, 524
 - depression with, 578
 - imprinting disorders, 56
- Hyperphosphatemia
 - calcification with, **207**
 - hypoparathyroidism, 348
 - renal osteodystrophy and, 622
 - tumor lysis syndrome, 440
 - with chronic kidney disease, 349
 - Hyperpigmentation
 - bleomycin, 444
 - busulfan, 445
 - fludrocortisone, 360
 - hemochromatosis, 402
 - Peutz-Jeghers syndrome, 394
 - primary adrenal insufficiency, 353
- Hyperplasia
 - adrenal, 352
 - cellular adaptations, 202
 - of parathyroid, 349
 - parathyroid, 356
- Hyperplastic arteriosclerosis, 306
- Hyperplastic polyps, 394
- Hyperprolactinemia
 - antipsychotics, 591
 - causal agents, 248
 - dopamine, 332
 - drug reactions with, 323
 - effects, 332
 - infertility, 662
 - pituitary adenoma, 540
- Hyperpyrexia, 593
- Hyperreactio luteinalis, 663
- Hyperresonance (chest percussion),
700
- Hypersalivation, 169
- Hypersensitivity pneumonitis, **694**
- Hypersensitivity reactions
 - cephalosporins, 185
 - immune complex-mediated, 111
 - mast cells and, 414
 - organ transplants, 117
 - penicillins, 183
 - piperacillin, 184
 - rheumatic fever, 319
- Hypersensitivity types, **110**
- Hypersexuality, 524
- Hypersomnia, 578
- Hypertension
 - ACE inhibitors for, 628
 - aortic dissection risk with, **307**
 - episodic, 355
 - intracranial hemorrhage with, 528
 - in upper extremities, 304
 - renovascular disease, 623
 - risk factors, features and
predisposition, **304**
 - β -blocker use, 244
- Hypertension treatment
 - in pregnancy, 321
 - types and treatment, **321**
 - with diabetes mellitus, 321
 - with heart failure, 321
- Hypertensive crisis
 - as psychiatric emergency, 587
 - MAO inhibitors, 593
 - phenoxybenzamine, 243
 - with pheochromocytoma, 355
- Hypertensive emergency
 - acute end-organ damage, 304
 - RBC casts in, 612
 - treatment, **323**
- Hypertensive retinopathy, 552
- Hypertensive urgency, 304
- Hyperthermia
 - atropine causing, 240
 - MDMA, 589
 - psychiatric emergencies, 587
- Hyperthyroidism
 - amiodarone and, 328
 - causal agents, 248
 - causes and findings, **346**
 - symptoms with testicular
choriocarcinoma, 671
 - systemic effects of, **344**
 - thionamides for treatment, 360
- Hyperthyroidism/thyroid storm,
 β -blocker use, 244
- Hypertriglyceridemia, acute
 - pancreatitis and, 404
- Hypertriglyceridemia, familial
dyslipidemias, 92
- Hypertrophic cardiomyopathy
 - characteristics of, **315**
 - with Friedreich ataxia, 545
 - β -blocker use, 244
- Hypertrophic osteoarthropathy
 - adenocarcinoma and, 703
 - paraneoplastic syndromes, 224
- Hypertrophic pyloric stenosis, **366**
- Hypertrophic scars, 214
- Hypertrophy
 - cellular adaptations, 202
 - skeletal muscle, 460
- Hyperuricemia
 - drugs causing, 249
 - gout and, 473
 - kidney stones and, 617
 - Lesch-Nyhan syndrome, 35
 - thiazides, 627
 - vitamin B₃ toxicity, 65
- Hyperventilation
 - metabolic acidosis compensatory
response, 609
 - therapeutic, 512
- Hypervitaminosis D, 469
- Hypnagogic hallucinations,
narcolepsy, 576, 585
- Hypnopompic hallucinations,
narcolepsy, 576, 585
- Hypnozoites, 154
- Hypoadosteronism, 611
- Hypocalcemia
 - acute pancreatitis and, 404
 - cinacalcet causing, 361
 - hypoparathyroidism, 348
 - lab values with disorders, **348**
 - magnesium with, 609
 - renal osteodystrophy, **622**
 - secondary hyperparathyroidism,
349
 - thyroidectomy, 347
 - tumor lysis syndrome, 440
- Hypochlorhydria hypergastrinemia,
386
- Hypocomplementemia, 614
- Hypocretin, 585
- Hypodermis, 481
- Hypofibrinogenemia, 210
- Hypogammaglobulinemia, 224
- Hypogastric nerve, 645
- Hypoglossal nerve (CN XII)
function, 519
- lesion in, 546
- with stroke, 527
- Hypoglycemia
 - gluconeogenesis and, 76
 - hypoketotic, 87
 - in diabetes mellitus, **352**
 - in ethanol metabolism, 70
- Von Gierke disease, 85
- with insulinoma, 357
- Hypogonadism
 - causes of, 402
 - diagnosis of, 656
 - disorders of imprinting, 56
 - estrogens for, 674
 - gynecomastia, 667
 - Kallmann syndrome, 656
 - pituitary prolactinomas, 332
 - testosterone/methyltestosterone,
676
 - zinc deficiency, 69
- Hypogonadotropic (2°)
hypogonadism, 654, 656,
662
- Hypohidrosis, 86
- Hypokalemia
 - antacid use and, 406
 - loop diuretics, 626
 - on ECG, 298
 - VIPomas and, 378
- Hypoketosis, 88
- Hypoketotic hypoglycemia, 87
- Hypomanic episode, 578
- Hyponatremia
 - as paraneoplastic syndrome, 224
 - euvolemic, 342
 - MDMA, 589
 - thiazides, 627
- Hypoparathyroidism
 - lab values in, 348
 - types and findings, **348**
- Hypophosphatemia,
hyperparathyroidism, **349**
- Hypophosphatemic rickets, 611
- hypophosphatemic, 609
- Hypopituitarism, causes and
treatment, **343**
- Hypoplasia, 633
- Hypopyon, 553
- Hyporeflexia, magnesium hydroxide
and, 406
- Hypospadias, 641
- Hyposplenism, *Streptococcus*
pneumoniae infections, 134
- Hypotension
 - adrenal insufficiency, 353
 - aliskiren, 628
 - angiotensin II receptor blockers,
628
 - baroreceptors in, 299
 - drugs causing, 194
 - endotoxins, 129
 - ephedrine for, 241
 - hypermagnesemia, 609
 - in pregnancy, 661
 - magnesium hydroxide and, 406
 - midodrine for, 241
 - norepinephrine for, 241
 - orthostatic, 353
 - phenylephrine for, 241
 - scombroid poisoning, 246
 - sympatholytic drugs and, 243
- Hypothalamic/pituitary drugs, clinical
use, **360**

- Hypothalamic–pituitary–gonadal axis
 GnRH analog effects on, 332
- Hypothalamic–pituitary hormones
 adrenal insufficiency, 353
 functions and clinical notes, **332**
- Hypothalamus
 endocannabinoid effects, 340
 functions and nuclei of, **508**
 in narcolepsy, **585**
 nuclei of, 508
 primary polydipsia and, 342
 reproductive hormone control, 674
 secretions from, 331
- Hypothenar muscles, 452, 453
- Hypotheses (statistical) testing, 264
- Hypothyroidism
 amiodarone and, 328
 carpal tunnel syndrome with, 463
 causes and findings, **345**
 drug reaction and, 248
 hormone replacement for, 360
 iodine deficiency or excess, 345
 lithium, 592
 systemic effects of, **344**
- Hypothyroid myopathy, 344
- Hypotonia
 splicing of pre-mRNA in, 41
 Zellweger syndrome, 46
- Hypoventilation
 causes of, 686
 metabolic alkalosis compensatory response, 609
- Hypovolemic shock, 317, 620
- Hypoxanthine, in nucleotides, 33
- Hypoxia and hypoxemia, **686**
 erythropoietin production, 607
 exercise response, **688**
 high altitude response, **688**
 lung diseases, 698
 nocturnal, 697
 susceptible regions, 206
 vasoconstriction, 698
 vasoconstriction/vasodilation and, 300
 with limited oxygen diffusion, 684
- Hypoxia inducible factor 1a, 220
- Hypoxic stroke, 525
- Hypoxic vasoconstriction
 (pulmonary), 684, 688
- I**
- Ibandronate, 496
- IBD-associated arthritis, HLA
 subtype, 98
- Ibuprofen, 287, 496
- Ibutilide, 328
- ICAM-1 protein
 leukocyte extravasation, 211
 viral receptor, 163
- I cells, cholecystokinin secretion, 378
- Ichthyosis vulgaris, 485, 492
- Icterohemorrhagic leptospirosis, 145
- Idarucizumab, 247
- Idealization, 571
- Identification (ego defense), 571
- Idiopathic intracranial hypertension, 536
 acetazolamide for, 626
 associations and findings, **536**
 drugs causing, 250
 with danazol, **676**
- Idiopathic pulmonary fibrosis, **694**
- Idiopathic thrombocytic purpura (ITP), risk with hepatitis B and C, 171
- IDL (intermediate-density lipoprotein), 92
- Iduronate-2, 86
- IFN- α (Interferon- α), 107, 119
- IFN- α (Interferon- α), 249
- IFN- α (Interferon- α), 107, 119
- IFN- α (Interferon- α)
 clinical use, 119
 effects of, 212
 mechanism, use and adverse effects, 100
- Ifosfamide, 604
 drug reactions with, 250
 mechanism, use and adverse effects, 445
- IgA antibodies
 anti-tissue transglutaminase autoantibody, 113
 functions of, 103
 Peyer patches and, 381
- IgA deficiency, ataxia-telangiectasia, 115
- IgA nephropathy (Berger disease)
 nephritic syndrome, 614
- IgA protease, bacterial virulence, 127
- IgD antibodies, B cells and, 103
- IgE antibodies
 allergen-specific, 110
 atopic dermatitis, 485
 functions of, 103
 type I hypersensitivity, 110
- IgE-independent mast cell degranulation, 414
- IgG4-related disease, **477**
- IgG antibodies
 as passive immunity, 108
 bullous pemphigoid, 489
 pemphigus vulgaris, 489
 response to antigen, 103
 type III hypersensitivity reactions, 111
- IgM antibodies
 hepatitis A (HAV), 171
 response to antigen, 103
- IL-12 receptor deficiency, defect, presentation, and findings, 114
- Ileum, histology of, 369
- Ileus
 bacterial peritonitis (spontaneous), 397
 cause and treatment, 393
 treatment of, 239
- Iliacus, 456
- Iliohypogastric nerve, 456
- Iliopsoas, 455
- Iliotibial band syndrome, 465
- Illness anxiety disorder, 583
- Iloperidone, 591
- Imatinib, mechanism, use and adverse effects, 447
- IMG registration timeframe, 6
- Imipenem, drug reactions with, 250
- Imipramine
 name conventions, 252
- Imiquimod, **498**
- Immature ego defenses, 570
- Immature teratoma, 664
- Immune checkpoint interactions (cancer), **218**
- Immune complex
 fibrinoid necrosis, 205
 Type III hypersensitivity, 111
- Immune evasion, in cancer, 217
- Immune privilege organs, 97
- Immune responses
 acute-phase reactants, 97
 antigen type and memory, **103**
 cell surface proteins, 108
 cytokines, 106
 immunoglobulin isotypes, **103**
- Immune system
 aging effects on, 225
 organs, **94**
- Immune thrombocytopenia
 mechanism and findings, 432
 Type II hypersensitivity, 110
- Immunity
 adaptive, 415
 innate, 415
 passive vs active, **108**
- Immunocompromised patients
 Candida albicans in, 150
 common organisms affecting, 175
 invasive aspergillosis, 150
 Listeria monocytogenes, 137
- Immunodeficiencies
 defects, presentation, and findings, **114**
 flow cytometry diagnosis, 52
 infections in, **116**
 Th1 response, 114
 Th17 cell deficiency, 114
 thymus in, 96
- Immunofluorescence, pemphigus vulgaris vs bullous pemphigoid, 489
- Immunoglobulin isotypes, **103**
- Immunoglobulins
 adaptive immunity and, 97
 breast milk and, 653
- Immunohistochemical stains, tumor identification, **223**
- Immunologic blood transfusion reactions, **112**
- Immunologic memory, 99
- Immunology
 cellular components, 97
- immune responses, 102
- immunosuppressants, **118**
- lymphoid structures, 94
- Immunophenotype assessment, 52
- Immunosuppressants
 mechanism, indications and toxicity, **118**
 nucleotide synthesis effects of, 34
- Immunosuppression
 squamous cell carcinoma and, 494
 vitamin A deficiency, 64
- Immunotherapy, recombinant cytokines, 119
- Impaired automobile drivers, confidentiality and, 269
- Impaired colleague, 273
- Imperforate hymen, **662**
- Impetigo
 characteristics of, 487
 crusts with, 483
 Streptococcus pyogenes, 134
- Implantable cardioverter-defibrillator (ICD), 312
- Implantation (zygote), 651
- Imprinting disorders
 mechanism of, **56**
 Prader-Willi and Angelman syndrome comparison, 56
- Inactivated (killed) vaccine, 109
- Incidence vs prevalence, **261**
- Inclusion bodies, 45
- Inclusion cell (I-cell) disease, cell trafficking, 45
- Inclusions
 Cowdry A, 163
 Negri bodies, 169
 “owl eye”, 162
 RBCs, **421**
 reticulate bodies, 146
- Incomplete penetrance, 54
- Incontinence (fecal/urinary), 457
- Increased intracranial pressure
 venous sinus thrombosis, 514
 vitamin A toxicity, 64
- Incus (ossicles), 547, 638
- India ink stain, 123
- Indirect bilirubin, 382
- Indirect cholinomimetic agonists, actions and applications, 239
- Indirect inguinal hernia, 377
- Indirect (inhibitory) pathway, 511
- Indirect sympathomimetics, actions and applications, 241
- Indirect (unconjugated) hyperbilirubinemia, **400**
- Indomethacin, 287, 496
- Infant and child development, **572**
- Infant development, 572
- Infantile gastroenteritis, 165
- Infantile hemangioma, 486
- Infarction
 bone and marrow, 469
 hypoxia/ischemia in, 206

- Infarcts
 - atherosclerosis, 305
 - cortical areas, 513
 - pituitary, 343
 - types of, **206**
- Infection-related glomerulonephritis, 614
- Infections
 - brain abscess with, **176**
 - common vaginal, 178
 - dilated cardiomyopathy and, 315
 - ESR with, 210
 - fungal, **150**
 - healthcare-associated, **181**
 - IL-12 receptor deficiency, 114
 - in immunocompromised patients, 137
 - in immunodeficiency, **116**
 - TORCH, **180**
- Infectious esophagitis, 384
- Infective dementia, 535
- Infective endocarditis
 - Candida albicans*, 150
 - causes, presentation, **318**
 - coarctation of aorta, 304
 - culture-negative, 148
 - daptomycin, 191
 - enterococci, 135
 - nonbacterial thrombotic, 224
 - prophylaxis, 193
 - Staphylococcus aureus*, 133
 - Streptococcus gallolyticus*, 135
- Inferior gluteal nerve, 457
- Inferior oblique muscle, 555
- Inferior rectal artery, 372
- Inferior rectus muscle, 555
- Inferior vena cava (IVC), derivation of, 286
- Infertility
 - clomiphene, 674
 - Kallmann syndrome, 656
 - leuprolide for, 674
 - mumps, 671
 - salpingitis, 181
 - varicoceles, 669
 - with uterine anomalies, 640
- Infiltrative cardiomyopathy, 315
- Inflammasome, 210
- Inflammation
 - acute-phase reactants, **209**
 - cardinal signs, 209
 - characteristics of acute, **210**
 - chronic, **212**
 - CRP with, 209
 - ESR with, 210
 - granulomatous, **213**
 - in atherosclerosis, 305
 - neutrophils in, 412
 - systemic manifestations (acute-phase reaction), 209
 - types of, **209**
 - wound healing, 212
- Inflammatory bowel diseases
 - antimetabolites for, 444
 - colorectal cancer and, 394
- Crohn disease vs ulcerative colitis, **389**
 - microscopic colitis, 389
 - sclerosing cholangitis and, 402
 - spondyloarthritis with, 475
- Inflammatory breast disease, 667, 668
- Inflammatory hypersensitivity reaction, 111
- Inflammatory pseudopolyps, 394
- Infliximab
 - for Crohn disease, 389
 - mechanism, use and adverse effects, 498
- Influenza
 - bacterial superinfections, 166
 - pneumonia, 701
 - structure and medical importance, 164, **166**
 - treatment/prevention, 196
- Informed consent requirements, 267, **268**
- Infraspinatus muscle
 - Erb palsy, 452
 - pitching injury, **451**
- Infundibulopelvic ligament, 643
- Inguinal canal, **376**
- Inguinal hernia, 377
- Inguinal ligament, 375
- Inguinal triangle, 377
- Inhaled anesthetics
 - mechanism and adverse effects, 565
 - naming conventions for, 252
- Inhaled glucocorticoids, 704
- Inhaled psychoactive drugs, 588
- Inheritance modes, **57**
- Inherited epidermolysis bullosa, 490
- Inhibin B, secretion of, 646
- Initiation (protein synthesis), 43
- Injection drug use, pneumonia causes, 175
- Innate immune system
 - components and mechanism, 97, 415
 - in acute inflammation, 210
 - natural killer cells in, 415
- Innate vs adaptive immunity
 - dendritic cell functions, 414
 - mechanism and response, **97**
- Inner ear, 547
- Inotropy, 291
- INR (international normalized ratio), 431
- Insomnia therapy, agents, mechanism and adverse effects, **562**
- Inspiration, 295
- Inspiratory capacity (IC), 682
- Inspiratory reserve volume (IRV), 682
- Inspiratory stridor, **167**, 182
- Insulin
 - glycogen regulation, 84
 - serum level in Type 2 diabetes, 351
 - synthesis, function, and regulation, **338**
- Insulin-dependent glucose transporters, 338
- Insulin-like growth factor 1 (IGF-1)
 - acromegaly, 343
 - signaling pathways for, 341
- Insulinoma, 357
- Insulin preparations, mechanism and adverse effects, 358
- Insulin resistance
 - acanthosis nigricans and, 492
 - cortisol, 340
 - GH, 333
 - with human placental lactogen, 652
- Insulin sensitivity, diabetes Type 1 vs Type 2, 351
- Insurance
 - financial coverage, 273
 - types of plans, 275
- Integrase inhibitors, **197**, 252
- Integrins
 - epithelial cell junctions, 482
 - viral receptor, 163
- Intellectual disability
 - autism and, 574
 - childhood and early-onset disorders, **574**
 - cri-du-chat syndrome, 62
 - fragile X syndrome, 60
 - Patau syndrome, 61
 - phenylketonuria, 82
 - Williams syndrome, 63
- Intellectualization, 571
- Intention-to-treat analysis, 257
- Intention tremor, 533
- Intercellular bridges, 703
- Interdigital tinea pedis, 488
- Interferons
 - clinical use, 119
 - mechanism, clinical use and adverse effects, **107**
- Interferon- γ release assay (IGRA), 138
- Interleukin 1 (IL-1), 106
- Interleukin-2 agonist/analog, naming conventions for, 254
- Interleukin 2 (IL-2)
 - clinical use, 119
 - functions of, 106
 - sirolimus and, 118
 - tacrolimus and, 118
- Interleukin 3 (IL-3), functions of, 106
- Interleukin-4, functions of, 106
- Interleukin 5 (IL-5), functions of, 106
- Interleukin 6 (IL-6), functions of, 106, 209
- Interleukin 8 (IL-8), functions of, 106
- Interleukin-8 (IL-8), functions of, 210
- Interleukin 10 (IL-10), functions of, 106
- Interleukin-10 (IL-10), functions of, 210
- Interleukin 12 (IL-12), functions of, 106
- Interleukin-13 (IL-13), functions of, 106
- Interleukin receptor antagonist, naming conventions for, 254
- Interleukin receptor modulators, naming conventions for, 254
- Intermediate acting insulin, 358
- Intermediate filaments, cytoskeletal element, 46
- Intermediate lobe (pituitary), secretions of, 331
- Intermediate zone (Zone II), 374
- Intermittent explosive disorder, 574
- Internal carotid artery, cavernous sinus, 557
- Internal hemorrhoids, 373
- Internal jugular vein, 514
- Internal oblique muscle, 456
- Internal rotation, hip, 455
- International Foundations of Medicine (IFOM), 10
- Internuclear ophthalmoplegia, 524, **558**
- Interossei muscles, Klumpke palsy, 452
- Interpersonal therapy, 590
- Interpreters, use of, **274**
- Interpreting study results, 262
- Intersex states, 655
- Interstitial (atypical) pneumonia, 701
- Interstitial cells of Cajal, 369
- Interstitial fluid, 299
- Interstitial fluid oncotic pressure, 301
- Interstitial lung disease, 694
- Interstitial nephritis
 - as drug reaction, 250
 - NSAID toxicity, 496
 - penicillins, 184
- Interstitial pneumonia, 701
- Interventricular foramen, 285
- Interventricular septal rupture, 309, 314
- Interviewing
 - cultural formulation, 271
 - delivering bad news, 270
 - establishing rapport, 270
 - history taking, 271
 - interpreter use, 274
 - motivational, 271
 - patient-centered, **270**
- “Intestinal angina”, 393
- Intestinal atresia, presentation and causes of, **366**
- Intestinal disorders, **393**
- Intestinal gastric cancer, 386
- Intestinal infections
 - cestodes, **157**
 - nematodes, 156
 - trematodes, **157**
- Intestinal microbiota
 - Klebsiella* spp in, 143
 - vitamin K synthesis, 69
- Intestinal obstruction, intermittent, 370
- Intimate partner violence, 273

- Intoxication (psychoactive drugs), **588**
 Intracellular bacteria, **125**
 Intracellular receptors, endocrine
 hormone signaling
 pathways, 341
 Intracranial calcifications, *Toxoplasma gondii*, 153
 Intracranial hemorrhage
 eclampsia, 660
 types and findings, **528**
 Intracranial hypertension
 idiopathic, **536**
 vitamin A toxicity, 64
 Intracranial pressure
 ex vacuo ventromegaly, 536
 hydrocephalus, 536
 in Cushing reflex, 299
 in perfusion regulation, 512
 superior vena cava syndrome, 704
 Intraductal papilloma, 667
 Intraepithelial adenocarcinoma, 661
 Intraocular pressure (IOP), 551
 Intraparenchymal hemorrhage, 528
 Intrauterine adhesions, 666
 Intrauterine device (IUD), 675
 Intravascular catheters, 181
 Intravascular hemolysis
 causes and findings with, 427
 G6PD deficiency, 428
 paroxysmal nocturnal
 hemoglobinuria, 105
 Intravenous anesthetics, mechanism
 and adverse effects, 565
 Intraventricular hemorrhage,
 neonatal, **527**
 Intrinsic factor, source, action and
 regulation, 379
 Intrinsic hemolytic anemias, types
 and findings, **428**
 Intrinsic (mitochondrial) pathway
 regulation factors, function
 and regulation, 204
 Intrinsic pathway
 coagulation disorders, 431
 heparin and, 441
 Intrinsic renal failure, 620
 Introns
 splicing out, 40
 vs exons, **41**
 Intussusception, 391, **392**
 Inulin
 clearance, 600
 glomerular filtration rate and, 599
 in proximal convoluted tubules, 605
 Invariant chain, 98
 Invasive carcinomas, cervix, 663
 Invasive ductal carcinomas, 668
 Invasive lobular carcinomas (breast),
 668
 Inverse agonist, 233
 Inversion (foot), 457
 Involuntary treatment, 269
 Iodine
 infection control, 199
 teratogenic effects of, 632
 Iodophors, 199
 Ionizing radiation
 carcinogenicity of, 221
 toxicity, **207**
 IP3, endocrine hormone signaling
 pathways, 341
 IPEX syndrome, 100
 Ipilimumab, 446
 Ipratropium, 240, 704
 Irinotecan/topotecan, 36, 445
 Iritis, 553
 Iron
 absorption and vitamin C, 67
 absorption of, 67, 381
 excess, 66
 granules in RBCs, 421
 in hemochromatosis, 402
 interpretation of studies, **423**
 restless legs syndrome and, 533
 toxicity of, 67
 toxicity treatment, 247
 Iron deficiency anemia
 iron study interpretation, 423
 lab findings with, 424
 organisms associated with, 158
 with colorectal cancer, 395
 Iron granules, 421
 Iron poisoning, acute vs chronic, **431**
 Iron studies, interpretation, **423**
 Irreversible cellular injury changes, 203
 Irritable bowel disease (IBD)
 fecal calprotectin and, 389
 GI bleeding with, 387
 Irritable bowel syndrome
 antispasmodic drugs, 240
 criteria and symptoms, **390**
 Isavuconazole, 150, 195
 Ischemia
 acute tubular necrosis, 621
 acute tubular necrosis from, 620
 coagulative necrosis, 205
 colonic, 370
 digital, 480
 liver effects of, 374
 mesenteric and colonic, 393
 of bowel, 397
 vulnerable organs and
 mechanisms, **206**
 watershed areas, 206
 Ischemic brain disease/stroke
 consequences and time course, **525**
 types of, 525
 Ischemic heart disease
 contraindicated antiarrhythmics,
 327
 manifestations of, **308**
 Ischemic priapism, 669
 Islet amyloid polypeptide, 208, 351
 Islets of Langerhans, 331
 Isocarboxazid, 593
 Isocitrate dehydrogenase, rate-
 determining enzyme, 71
 Isodisomy, 55
 Isoflurane, 565, 566
 Isolated atrial amyloidosis, 208
 Isolation (of affect), 571
 Isoleucine
 classification of, 79
 maple syrup urine disease and, 79
 Isoniazid
 cytochrome P-450, 251
 drug reactions with, 248, 250
 mechanism and adverse effects,
 192
 visual disturbance, 250
 Vitamin B₆ (pyridoxine) deficiency,
 66
 Isoproterenol
 sympathomimetic action, 242
 tachyarrhythmia evaluation, 241
 Isosorbide dinitrate, 322
 Isosorbide mononitrate, 322
 Isotretinoin
 cystic acne, 64
 teratogenicity of, 632
 Isovolumetric contraction, 292
 Isovolumetric relaxation, 292
 Ito (hepatic stellate) cells, 374
 Itraconazole
 mycoses treatment, 195
 systemic mycoses, 149, 151
 Ivabradine
 drug reactions with, 250
 mechanism, use and adverse
 effects, **328**
 Ivacaftor, in cystic fibrosis, 58
 Ivermectin, 156, 158, 195, 196
 IVIG therapy, 108
 “Ivory white” plaques, 696
 Ixazomib, 447
 Ixekizumab, 498
 Ixodes ticks, diseases transmitted, 144,
 147, 154
J
 JAK2 gene
 associated neoplasm, 220
 in myeloproliferative disorders, 438
 Janeway lesions, 318
 Jarisch-Herxheimer reaction, 144
 Jaundice
 biliary tract disease, **400**
 cholangitis, 403
 drugs causing, 248
 graft-versus-host disease, 117
 hereditary hyperbilirubinemias,
 401
 painless, 375
 pancreatic cancer, 405
 yellow fever, 168
 Jaw jerk reflex, 519
 JC virus (John Cunningham virus)
 HIV-positive adults, 173
 immunocompromised patients, 116
 in demyelination disorders, 538
 polyomaviruses, 161
 Jejunal and ileal atresia, 366
 Jejunum, histology, 369
 Jervell and Lange-Nielsen syndrome,
 312
 Jimson weed, 240
 Job syndrome, 114
 “jock itch”, 488
 Jod-Basedow phenomenon, 346
 Joint hypermobility, 49
 Joints
 angle change sensation, 504
 Chikungunya virus, 168
 hypermobility, 49
 restricted movements of, 45
 J point (ECG), 298
 Jugular venous distention
 heart failure, 316
 with Budd-Chiari syndrome, 397
 Jugular venous pressure tracings, **293**
 Jugular venous pulse, 292, 320
 “jumping” process (transposon), 129
 Justice (ethics), 267
 Juvenile polyposis syndrome, 394
 Juxtaglomerular apparatus,
 components and functions,
 607
 Juxtaglomerular cells, tumors in, 354
K
 K⁺-sparing diuretics, 625
 K_m (enzyme kinetics), 228
 Kallikrein, 105
 Kallmann syndrome, 508, 654, **656**
 Kaplan Meier curve, **259**
 Kaposi sarcoma
 bacillary angiomatosis vs, 486
 HHV-8, 162
 HIV-positive adults, 173
 oncogenic microbes, 222
 skin tumors, 486
 Kartagener syndrome, dextrocardia, 284
 Karyolysis, 203
 Karyorrhexis, 203
 Karyotyping, **53**
 Kayser-Fleischer rings, 402
 K cells, GIP production, 378
 Kegel exercises, 618
 Keloid scars, 214
 Keratinocytes, 212
 Keratin pearls, 494, 703
 Keratoconjunctivitis, 162
 Keratoconjunctivitis sicca, 474
 Keratomalacia, 64
 Keratosis
 hyperkeratosis, 483
 parakeratosis, 483
 seborrheic, 485
 Keratosis pilaris, 485
 Kernicterus, 199, 401
 Ketamine, 565, 578
 Ketoacidosis
 diabetes Type 1 vs Type 2, 351
 ethanol metabolism, 70
 in ethanol metabolism, 70
 Ketoconazole
 cytochrome P-450, 251
 mechanism, use and adverse
 effects, 195, 676
 reaction to, 248

- Ketogenesis
ethanol metabolism, 70
metabolic site, 72
rate-determining enzyme for, 71
- Ketogenic amino acids, 79
- Ketone bodies
in starvation, 89
metabolism of, **88**
- Ketorolac, 496
- Kidney disease
acute injury, 143, **620**
acute interstitial nephritis, **620**
acute tubular necrosis, **621**
diffuse cortical necrosis, **621**
extrahepatic manifestations of
hepatitis, 171
glomerular diseases, 613
pyelonephritis, **619**
renal papillary necrosis, **621**
renal tubular defects, **604**
vitamin D deficiency and, 68
- Kidneys
adrenergic receptors in, 236
blood flow autoregulation by, 300
carcinogens affecting, 221
changes in glomerular dynamics,
601
chronic graft nephropathy, 117
collecting system anomalies, 597
congenital solitary, **597**
electrolyte disturbances, **609**
embryology, **596**
filtration, **601**
glucose clearance, **602**
hormonal functions of, **607**
hormones acting on, **608**
ischemia, 206
reabsorption and secretion
calculation, **602**
transplant prophylaxis, 118
- Kidney stones
cystine stones, 83
electrolyte disturbances, 609
hyperparathyroidism, 349
presentation, content and findings,
617
risk factors for, 611
urinary tract infections, 178
urine casts with, 612
- Kiesselbach plexus, 690
- Killed (inactivated) vaccine, 109
- Killian triangle, 391
- Kimmelstiel-Wilson lesions, 616
- Kinases, 71
- Kinesin, movement of, 46
- Kinin pathways, **418**
- Klebsiella* spp
acute cystitis, 619
alcohol use disorder, 175
effects of, **143**
healthcare-associated infections, 181
kidney stones and, 617
pneumonia, 701
pneumonia with, 701
- Klebsiella pneumoniae*
cephalosporins, 185
polymyxins, 189
urinary tract infections, 178
- Klinefelter syndrome
characteristics of, 655
chromosome association, 62
gynecomastia, 667
- Knumpke palsy, injury and deficits,
452
- Klüver-Bucy syndrome, brain lesions
with, 524
- Knee conditions
common, **464**
examination for, **454**
iliotibial band syndrome, 465
ligament and meniscus, 464
- Osgood-Schlatter disease, 466
- overuse injury, 466
- popliteal cyst, 464
- prepatellar bursitis, 464
- Knockdown, 54
- Knock-in, 54
- Knock-out, 54
- Knudson 2-hit hypothesis, 220
- KOH preparation, 488
- Koilocytes
condylomata acuminata, 179
verrucae, 485
- Koilonychia, 424
- Koplik spots, 167, 177
- Korsakoff syndrome, 64, 575
- Kozak sequence, 40
- Krabbe disease, 86, 538
- KRAS gene
adenomatous colonic polyps and,
394
associated neoplasm, 220
lung cancer and, 703
- Krebs cycle, 75
- Krukenberg tumor, 386
- Kulchitsky cells, 703
- Kupffer cells, 374
- Kuru, 174
- Kussmaul respirations, 351
- Kussmaul sign, **320**
- Kwashiorkor, **69**
- Kyphoscoliosis
I-cell disease, 45
in childhood, 545
- Kyphosis
in homocystinuria, 83
osteoporosis, 467
- L**
“La belle indifférence”, 583
- Labetalol, 244, 323
in pregnancy, 660
- Labile cells, 44
- Lac operons, **39**
- Lacrimation reflex, 519
- Lactase deficiency
malabsorption syndromes, 388
types, findings and treatment, **79**
- Lactase-persistent allele, **79**
- Lactation, 648, **653**
- Lactational mastitis, 667
- Lactic acid dehydrogenase
pyruvate metabolism, 75
- Lactic acidosis
ethanol metabolism and, 70
pyruvate dehydrogenase complex
deficiency, 75
- Lactobacillus* spp, neonatal
microbiota, 174
- Lactose-fermenting enteric bacteria
culture requirements, 124
types and culture, **142**
- Lactose hydrogen breath test, 79, 388
- Lactose intolerance, 388
- Lactose metabolism, environmental
change and, 39
- Lactulose
for hepatic encephalopathy, 399
gut microbiota effects, 408
in hyperammonemia, 80
- Lacunar infarcts, 526
- Ladd bands, 392
- Lambert-Eaton myasthenic syndrome
as paraneoplastic syndrome, 224
autoantibody, 113
pathophysiology, symptoms and
treatment, 480
- Lamina propria
in Whipple disease, 388
Peyer patches in, 381
- Lamins, 46
- Lamivudine, 197
- Lamotrigine
mechanism and adverse effects,
560
rash caused by, 249
- Lancet-shaped diplococci, 134
- Landmarks (anatomical)
for dermatomes, **523**
structures penetrating diaphragm, 681
vertebral, 371
- Langerhans cell histiocytosis, **439**
pulmonary, 694
- Langerhans cells, 101, 138
- Langhans giant cell, 138
- Lansoprazole, 406
- Laplace’s law, 289, 679
- Large cell carcinoma of lung, 703
- Larva migrans, 156
- Laryngeal papillomatosis, 690
- Laryngopharyngeal reflux, 384
- Laryngospasm
drug-induced, 587
tracheoesophageal anomalies, 366
- Larynx
carcinogens affecting, 221
intrinsic muscles of, 638
respiratory tree, 680
- Lassa fever encephalitis, 164
- Latanoprost, 568
- Latent errors (medical), 277
- Lateral collateral ligament (LCL)
injury, 454
- Lateral corticospinal tract, **521**
- Lateral femoral cutaneous nerve, 456
- Lateral geniculate nucleus
(thalamus), 508
- Lateral medullary (Wallenberg)
syndrome, 527
- Lateral meniscal tear, 454
- Lateral nucleus (hypothalamus), 508
- Lateral rectus muscle, 555
- Lateral (tennis) elbow tendinopathy, 462
- Lateral thoracic artery, 458
- Lateral ventricles (brain), 515
- LD50 (lethal median dose), 233
- LDL (low-density lipoprotein)
functions of, 92
PCSK9 enzyme, 91
receptor binding, 91
serum tumor marker, 222
- Leaden paralysis, 578
- Lead lines, 425
- “Lead pipe” appearance (colon), 389
- Lead poisoning
anemia with, 425
mechanism and presentation, **430**,
604
signs/symptoms and treatment, 425
treatment for, 247
- Lead-time bias, 262
- Leber hereditary optic neuropathy
(LHON), 55, 57, 60
- Lecithinase, 131, 136
- Lecithin-cholesterol acetyltransferase
(LCAT), activation of, 91
- Ledipasvir, 199
- Leflunomide
dihydroorotate dehydrogenase
inhibition, 34
mechanism, use and adverse
effects, **496**
- Left bundle branch, 298
- Left circumflex coronary artery, 309
- Left heart disease, pulmonary
hypertension, 698
- Left heart failure, 316
- Left-right disorientation, 524
- Left shift, 412
- Left-to-right shunts, 303
- Legally incompetent patient, 268
- Legg-Calvé-Perthes disease, 466, 469
- Legionella* spp
atypical organism, 175
culture requirements, 124
Gram stain for, 123
macrolides, 189
pneumonia, 701
pneumonia with, 701
stain for, 123
- Legionella pneumophila*, findings and
treatment, **141**
- Legionnaires’ disease, 141
- Leiomyoma (fibroid), 666
nomenclature, 216
- Leiomyosarcoma, 216

- Leishmania* spp, visceral infections, 155
- Length-time bias, **262**
- Lens, collagen in, 48
- Lens dislocation
 - causes and disease association, 550
 - in homocystinuria, 83
- Marfan syndrome and homocystinuria, 50
- Lenticulostriate artery, stroke effects in, 526
- Lentiform nucleus, 511
- Leonine facies, 139
- Lepromatous leprosy, 139
- Leprosy
 - animal transmission, 147
 - characteristics of, **139**
 - dapsone, 190
 - erythema nodosum, 492
- Leptin
 - appetite regulation, 340
 - in hypothalamus, 508
- Leptospira* spp
 - disease and transmission, 147
 - Gram stain for, 123
- Leptospira interrogans*, clinical significance, **145**
- Leptospirosis, 145, 147
- Lesch-Nyhan syndrome
 - inheritance, 59
 - metabolic error and findings, 35
- Leser-Trélat sign, 224, 485
- Lesser omental sac, 368
- Letrozole, 675
- Leucine, classification of, 79
- Leucovorin, 444, 447
- Leukemias
 - antimetabolites for, 444
 - carcinogens for, 221
 - cyclophosphamide for, 444
 - epidemiology in children, 218
 - lymphoma comparison, **434**
 - mucormycosis, 150
 - nomenclature, 216
 - suppressor genes, 220
 - types and characteristics, **437**
 - vinca alkaloids for, 445
- Leukemoid reaction, **438**
- Leukocoria, **553**
- Leukocyte adhesion deficiency types, 115, 211
- Leukocyte alkaline phosphatase (LAP), 412
- Leukocyte esterase, 178, 619
- Leukocyte extravasation, steps of, 210, **211**
- Leukocytes
 - in leukemias, 437
 - in urine (pyuria), 178, 612
- Leukocytoclastic vasculitis, 171
- Leukocytosis
 - healthcare-associated infections, 181
 - inflammation, 209
- Leukoerythroblastic reaction, 412
- Leukopenias
 - cell types, counts and causes, **429**
 - ganciclovir, 196
 - trimethoprim, **190**
- Leukoplakia
 - hairly, 487
 - squamous cell carcinoma of penis, 669
 - vulvar carcinoma and, 661
- Leukostasis, 437
- Leuprolide, 332, 674
- Luteinizing hormone (LH), clomiphene effects on, 674
- Levator veli palatini muscle, 638
- Levetiracetam, 560
- Levodopa (L-DOPA)/carbidopa, 563
- Levofloxacin, 191
- Levomilnacipran, 593
- Levonorgestrel, 675
- Levothyroxine, **360**
- Lewy body dementia, 507, 535
- Leydig cells
 - cryptorchidism, 669
 - endocrine function, **639**, 654
 - secretions of, **646**
 - tumors of, 671
- Libido, testosterone and, 653
- Libman-Sacks endocarditis, 318, 476
- Lice
 - head/scalp, 158
 - treatment, 195
- Lichen planus, 171, 483, 492
- Lichen sclerosus, 661
- Lichen simplex chronicus, 661
- Liddle syndrome
 - renal disorder features, 605
 - renal tubular defects, 604
- Lid lag/retraction, 344
- Lidocaine
 - Class IB sodium channel blockers, 565
 - mechanism, use and adverse effects, 326
- Life support withdrawal, 273
- Li-Fraumeni syndrome
 - chromosomal abnormality, 62
 - osteosarcomas, 471
 - tumor suppressor genes, 44, 54
- Ligaments
 - female reproductive anatomy, 643
 - gastrointestinal anatomy, **368**
- Ligamentum arteriosum, 286
- Ligamentum teres hepatis (round ligament), 286, 368
- Ligamentum venosum, 286
- Lightheadedness, 548
- Light-near dissociation, 542
- Likelihood ratio (LR), 259
- Limb ataxia, 524
- Limb compartment syndrome, 465
- Limb deformities, fetal, 596
- Limbic system
 - behavior modulation, 508
 - structures and function of, **509**
- Limited scleroderma, autoantibody, 113, 481
- Linacotide, 408
- Linagliptin, 359
- Lines of Zahn, 691
- Lineweaver-Burk plot, 228
- Linezolid
 - drug reactions with, 249
 - mechanism, use and adverse effects, **189**
- Lingual thyroid, 330
- Lingula (lung), 681
- Linitis plastica, 386
- Linkage disequilibrium, 55
- Linoleic acid, 63
- Liothyronine, **360**
- Lipases
 - in pancreatitis, 404
 - pancreatic secretion, 380
- Lipid-lowering agents
 - drug reactions with, 248
 - mechanism and adverse effects, **324**
- Lipids, transport of, 87
- Lipid transport, key enzymes in, **90**, **91**
- Lipoamide, activated carrier, 73
- Lipodystrophy, tesamorelin for, 332
- Lipofuscin, **225**
- Lipolysis
 - cortisol and, 340
 - sympathetic receptors and, 237
 - thyroid hormone and, 335
- Lipomas, 216
- Lipooligosaccharide
 - in *Neisseria* spp, 131
- Lipooligosaccharides (LOS), endotoxin activity, 140
- Lipophilic hormones, 335
- Lipoprotein lipase, 91
- Lipoproteins, functions of, **92**
- Liposarcomas, 216
- Lipoteichoic acid, cytoplasmic membrane, 122
- Liquefactive necrosis, 205, 525
- Liquid biopsy, 223
- Liraglutide, 359
- Lisch nodules, 539
- Lisdexamfetamine, 584, 590
- Lisinopril, 628
- Lispro, 358
- Lissencephaly, 501
- Listeria monocytogenes*
 - food poisoning, 174
 - medical importance, **137**
- Lithium
 - drug-induced thyroiditis, 346
 - drug reactions with, 248
 - mechanism, use and adverse effects, **592**
 - prenatal exposure, 304
 - teratogenicity of, 632
 - toxicity of, 587
- Live attenuated vaccines, 109
- Livedo reticularis, **306**, 563
- Liver
 - adrenergic receptors in, 236
 - blood supply to, 374
 - carcinogens affecting, 221
 - functional liver markers, 397
 - in gastrointestinal anatomy, 368
 - ischemia, 206
 - lipid transport and, 92
 - sources of metastases, 399
 - tissue architecture, **374**
 - tumor metastases from, 219
- Liver/biliary disease
 - alcoholic, **398**
 - biopsy with hepatitis, 170
 - Budd-Chiari syndrome and, 397
 - drug dosages with, 229
 - hepatosteatosis, 70
 - hereditary, **401**
 - serum markers, 397
 - Wilson disease and, 402
- Liver disease
 - enzymes released with, 397
 - hyperammonemia with, 80
 - protein-energy malnutrition, 69
 - RBC morphology with, 420
 - “violin string” adhesions, 181
 - vitamin D deficiency with, 68
- Liver fluke, hyperbilirubinemia with, 400
- Liver function tests
 - cholestatic pattern of, 402
 - thyroid storm, 346
- Liver transplants, graft-versus-host disease, 117
- Liver tumors, **399**
- Living wills, 268
- Loading dose calculations, 229
- Loa loa*
 - disease, transmission and treatment, 156
 - infection routes, 155
- Lobar pneumonia
 - natural history of, **702**
 - organisms and characteristics, 701
 - physical findings with, 698
- Lobular carcinoma in situ, 668
- Local anesthetics
 - classes, mechanism, use and adverse effects, **565**
 - naming conventions for, 252
- Localized amyloidosis, 208
- Locked-in syndrome
 - stroke and, 526
- Locus coeruleus, 505
- Locus heterogeneity, 55
- Löffler endocarditis, restrictive/infiltrative cardiomyopathy, 315
- Löffler medium, *Corynebacterium diphtheriae*, 124, 137
- Lomustine, 445
- Lone Star tick, 147
- Long-acting insulin, 358
- Long-chain fatty acid (LCFA), metabolism of, 87

- Long thoracic nerve, neurovascular pairing, 458
- Loop diuretics
effects on electrolyte excretion, 625
for heart failure, 316
mechanism, use and adverse effects of, **626**
- Loop of Henle
Bartter syndrome and, 604
ethacrynic acid effect on, 626
loop diuretics, 626
“Loose associations”, 576
- Loperamide
for diarrhea, 567
mechanism, clinical use and adverse effects, **407**
- Lopinavir, 198
- Loratadine, 705
- Lorazepam, 562
- Losartan, 628
- Lovastatin, 324
- Löwenstein-Jensen medium, 124
- Lower esophageal sphincter (LES)
achalasia and, 378, 383
nitric oxide and, 378
- Lower extremity
nerves, injury and presentation, **456**
- Lower extremity, neurovascular pairing in, 458
- Lower GI bleeding, 387
- Lower left quadrant (LLQ) pain, 390
- Lower motor neuron (LMN)
CN XII lesion, 546
effects of injury, 543
facial nerve lesion, 546
facial paralysis, 526
in amyotrophic lateral sclerosis, 544
lesion signs in, 543
pathways for, 522
- Low-molecular-weight heparin,
naming conventions for, 253
- LPS
E coli endotoxin, 143
lipid A component, 129
- LTB₄ (Leukotriene B₄), 412, 495
- Lubiprostone, 408
- Lumacaftor, in cystic fibrosis, 58
- Lumbar puncture
idiopathic intracranial hypertension, 536
in hydrocephalus, 536
site for, 520
- Lumbosacral radiculopathy, **458**
- Lumbrical muscles
functions, 453, 454
Klumpke palsy and, 452
- Luminous phenomena/visual brightness, 328
- Lunate bone, 453
- Lung abscess, **702**
- Lung adenocarcinoma
oncogene, 220
- Lung and chest wall properties, **683**
- Lung cancer
carcinogens for, 221
cisplatin/carboplatin for, 445
hypercalcemia, 224
incidence/mortality in, 218
metastases from, 219
non–small cell, 703
presentation and complications, 703
small cell, 224, 703
types, location and characteristics, **703**
- Lung diseases
obstructive, **692**
physical findings in, **698**
pulmonary hypertension, 698
restrictive, **694**
SIADH with, 342
- Lungs
anatomy, **681**
blood flow regulation, 300
carcinogens for, 221
congenital malformation of, **679**
development stages, **678**
parenchyma of, 680
physical findings, **698**
respiratory zones, 685
sclerosis of, 481
structural development, **678**
volumes and capacities, **682**
- Lupus
drug-induced, 249
microangiopathic hemolytic anemia, 429
nephritis, 476
- Lupus anticoagulant, 113
- Lurasidone, 591
- Luteinizing hormone (LH)
cosecretion of, 331
estrogen/progesterone regulation, 648
in menstrual cycle, 650
in ovulation, 649
signaling pathways of, 341
- Lyme disease
animal transmission, 147
ceftriaxone, 185
findings and treatment, **144**
- Lymphadenopathy
autoimmune lymphoproliferative syndrome, 204
Corynebacterium diphtheriae, 130
hilar, 694
in viral infections, 94
- Lymphogranuloma venereum, 179
measles (rubeola) virus, 167
mediastinal, 695
mononucleosis, 162
postauricular, 166, 177
regional, 179
rubella, 180
serum sickness, 111
syphilis, 179
tinea capitis, 488
- Toxoplasma gondii*, 180
- Trypanosoma brucei*, 153
- Lymphatic drainage
reproductive organs, 642
- Lymphatic filariasis (elephantiasis),
Wuchereria bancrofti, 156
- Lymph nodes
anatomy and function, **94**
drainage sites, **95**
- Lymphocutaneous sporotrichosis, 151
- Lymphocyte depleted lymphoma, 434
- Lymphocyte rich lymphoma, 434
- Lymphocytes
breast milk and, 653
CLL/small cell lymphocytic lymphoma, 437
lichen planus, 492
macrophage interactions, **100**
non-Hodgkin lymphoma, 435
spleen, 94
thymus, 94, 96
types of, **415**
- Lymphocytic choriomeningitis virus (LCMV), arenaviruses, 164
- Lymphocytosis
Bordetella pertussis, 141
postsplenectomy, 96
- Lymphogranuloma venereum
Chlamydia trachomatis, 146
clinical features and pathogen, 179
- Lymphoid hyperplasia, 390
- Lymphoid neoplasms, types of, 437
- Lymphoid structures, Peyer patches, 381
- Lymphomas
antimetabolites for, 444
Burkitt, 435
carcinogens for, 221
diffuse large B-cell lymphoma, 435
doxorubicin for, 444
EBV and, 162
follicular, 435
Hodgkin vs non-Hodgkin, **434**
hypercalcemia, 224
leukemia comparison, **434**
mantle cell, 435
nomenclature, 216
non-Hodgkin, **435**
of stomach, 386
oncogene for, 220
oncogenic microbes, 222
paraneoplastic syndromes, 224
primary testicular, 671
treatment, 445
- Lymphopenias
ataxia-telangiectasia, 115
cell counts and causes, 429
- Lynch syndrome, 37, 54, **395**
- Lyonization (x-inactivation), Barr body formation, 59
- Lysergic acid diethylamide (LSD), 589
- Lysine
classification of, 79
cystinuria, 83
- for pyruvate dehydrogenase complex deficiency, 75
- kidney stones, 617
- Lysogenic phage infection, 128
- Lysosomal storage diseases, 45, **86**
- Lysosomal α -1 4-glucosidase, 84, 85
- Lysosomes, 45
- LYST gene, 115
- Lytic bone lesions
adult T-cell lymphoma and, 435
Langerhans cell histiocytosis, 439
multiple myeloma, 436
- M**
- MacConkey agar, 124, 142
- “Machinelike” murmur, 303
- Macroangiopathic hemolytic anemia,
causes and findings, 429
- Macrocytic anemias
description and findings, **426**
megaloblastic anemia, 426
Vitamin B₁₂ deficiency, 426
with orotic aciduria, 426
- Macroglulinemia, Waldenström, 436
- Macrolides
Bordetella pertussis, 141
hypertrophic pyloric stenosis association, 366
Legionella pneumophila, 141
mechanism, use and adverse effects, **189**
Mycoplasma pneumoniae, 148
naming conventions for, 252
- Macro-ovalocytes, 420
- Macrophage activation, 106
- Macrophage-lymphocyte interaction, **100**
- Macrophages
apoptosis, 205
breast milk and, 653
caseous necrosis, 205
cell surface proteins, 108
cytokines secreted by, 106
endotoxin activation, 131
functions of, **413**
hemosiderin-laden (alveolar), 679
in chronic inflammation, 210
in heart failure, 316
in MI, 309
innate immunity, 97
in rheumatic fever, 319
in Whipple disease, 388
in wound healing, 210, 212
Kupffer cells, 374
pneumoconioses, 696
vitamin D excess and, 68
- Macrosomia, 652
- Macula adherens, 482
- Macula densa, juxtaglomerular apparatus, 607
- Macula (eye), age-related degeneration of, 552
- Macular cherry-red spot, 86
- Macular sparing, 526

- Macules
 - characteristics/examples, 483
 - junctional nevi, 485
- Maculopapular rash
 - graft-versus-host disease, 117
 - measles (rubeola) virus, 167
 - rubella virus, 166
 - syphilis, 145
- Mad cow disease, 174
- Magenta tongue, 65
- Magnesium
 - antiarrhythmic treatment, 328
 - cardiac glycoside overdose, 326
 - digoxin toxicity, 328
 - low vs high serum concentration effects, 609
- Magnesium citrate, 408
- Magnesium hydroxide, 406, 408
- Magnesium sulfate
 - for cerebral palsy, 545
 - preeclampsia/eclampsia, 660
- Magnetic gait, 536
- Maintenance (change model), 586
- Maintenance drug dose, 229
- Major apolipoproteins, **91**
- Major basic protein (MBP), 414
- Major depressive disorder
 - diagnostic symptoms for, **578**
 - peripartum onset, 579
- Major depressive disorder with psychotic features, 578
- Major depressive disorder with seasonal pattern, 578
- Major histocompatibility complex, 98
 - MCH I and II comparison, **98**
- Malabsorption syndromes/ malnutrition
 - anemias with, 426
 - effects and diagnosis, **388**
 - fat-soluble vitamin deficiencies, 63
 - inflammatory bowel diseases, 389
 - pancreatic adenocarcinoma, 405
 - with Whipple disease, 388
- Malaria, *Plasmodium*, 154
- Malassezia* spp
 - cutaneous mycoses, 488
 - seborrheic dermatitis, 484
- Malathion, 158, 195
- Male genital embryology, 639
- Male reproductive anatomy, **644**
- Male sexual response, **645**
- Malformation (morphogenesis), 633
- Malignant carcinoid syndrome, 65
- Malignant hyperthermia
 - dantrolene use, 567
 - inhaled anesthetics, 565
 - neuromuscular blocking drugs, 566
 - with inhaled anesthetics, **566**
- Malignant mesothelioma
 - carcinogens for, 221
- Malignant (necrotizing) otitis externa, 547
- Malignant osteoblasts, 471
- Malignant transformation, 202
- Malignant tumors, 216
 - of bone, 471
- Malingering
 - fictitious and somatic symptom comparison, **583**
 - symptoms and motivation for, **583**
- Malleus (ossicles), 547, 638
- Mallory bodies, in alcoholic hepatitis, 398
- Mallory-Weiss syndrome, 384
- Malnutrition
 - measles mortality in, 167
 - protein-energy, 69
- Malrotation, **392**
- “Maltese cross” appearance, 154
- MALT lymphoma
 - H pylori* and, 144, 386
 - oncogenic microbes, 222
 - Sjögren syndrome, 474
- Mammary glands, 631
- Mammillary bodies
 - lesions in, 524
 - limbic system, 509
- Mandibular process, 638
- Manic episode, **577**
- Mannitol
 - blood-brain barrier effects of, 506
 - extracellular volume measurement, 599
 - mechanism, use and adverse effects, **626**
- Mantle cell lymphomas
 - chromosomal translocations, 439
 - occurrence and genetics, 435
- MAO-B inhibitor
 - naming conventions for, 252
- Maple syrup urine disease
 - cause and treatment, **82**
 - leucine, 79
- Marasmus, 69
- Maraviroc, 198
- Marburg hemorrhagic fever, virus
 - structure and medical importance, 164
- Marfanoid habitus
 - homocystinuria, 83
- MEN2B syndrome and, 356
- Marfan syndrome
 - aortic aneurysm with, 306
 - cardiac defect association, 304
 - chromosome association, 62
 - elastin and, 50
 - homocystinuria comparison, 50
- Marginal zone lymphoma
 - chromosomal translocation, 439
 - occurrence and causes, 435
- Marginal zone (spleen), 96
- Marine omega-3 fatty acids, 325
- Marjolin ulcer, 494
- Masseter muscle, 519
- Massive RNA (mRNA), 40
- Mast cells, **414**
- Mast cell stabilizers, 414, 704
- Mastectomy, winged scapula with, 452
- Mastication muscles, 519, **520**
- Mastoid air cells, 637
- Mastoiditis
 - brain abscesses, 176
- Maternal diabetes
 - fetal insulin effects of, 338
 - teratogenicity of, 632
- Maternal PKU, teratogenicity of, 632
- Maternal (postpartum) blues, 579
- Matonavirus, structure and medical importance, 164
- Mature cystic teratoma, 664
- Mature ego defenses, 571
- Maturity onset diabetes of the young (MODY), glucokinase in, 73
- Maxillary process, 638
- Mayer-Rokitansky-Küster-Hauser syndrome, 639
- McArdle disease, 85
- McBurney point, 390
- McMurray test, 454
- MDMA intoxication and withdrawal, 589
- Mean arterial pressure
 - equation for, 290
 - gradient with intracranial pressure, 512
- Mean (statistics), 264
- Measles
 - vitamin A for, 64
- Measles (rubeola) virus
 - medical importance, **167**
 - rash with, 177
 - unvaccinated children, 182
- Measurement bias, 262
- Measures of central tendency, 264
- Measures of dispersion, 264
- Mebendazole, microtubules and, 46
 - mecA* gene, penicillin resistance and, 133
- Mechanical ventilation, 181
- Meckel diverticulum, **391**, 636
- MECP2* gene, Rett syndrome, 60
- Medial collateral ligament (MCL)
 - injury, in “unhappy triad”, 464
- Medial elbow (golfer’s) tendinopathy, 462
- Medial epicondyle fracture, 450
- Medial femoral circumflex artery, 469
- Medial geniculate nucleus (thalamus), 508
- Medial lemniscus, 527
- Medial longitudinal fasciculus
 - lesion effects, 524
 - ophthalmoplegia and, 558
- Medial medullary syndrome, 527
- Medial meniscal tear, 454
- Medial tibial stress syndrome, 465
- Medial umbilical ligament, 286
- “Median claw”, 454
- Median nerve
 - carpal tunnel syndrome, 463
 - injury and presentation, 450
 - neurovascular pairing, 458
 - recurrent branch, 450
- Median (statistics), 264
- Median umbilical ligament, 286
- Mediastinal masses, 691
- Mediastinal pathology
 - common sites of, **691**
 - lymphadenopathy, 694, 695
 - mediastinitis, 135
- Mediastinitis, 691
- Medical abortion
 - antimetabolites for, 444
 - ethical situations, 272
- Medical equipment
 - infections from, 181
- Medical errors
 - analysis of, **277**
 - causes of, 277
 - types and causes, **277**
- Medical insurance plans, **275**
- Medical power of attorney, 268
- Medicare/Medicaid, **276**
- Medication-induced esophagitis, 248, 384, 496
- Medium-chain acyl-CoA
 - dehydrogenase deficiency, 87
- Medroxyprogesterone, 675
- Medulla (brain)
 - cranial nerves and nuclei, 515
 - cross-sections of, **517**
- Medulla (lymph nodes), 94
- Medullary carcinoma (thyroid), 347
- Medullary cystic kidney disease, 622
- Medullary thyroid carcinoma
 - serum tumor marker, 222
- Medullary thyroid carcinomas
 - amyloid deposits in, 208
 - multiple endocrine neoplasias, 356
- Medulloblastoma, 354, 542
- “Medusa head” appearance, 135
- Mefloquine, 154, 193
- Megaesophagus, *Trypanosoma cruzi*, 155
- Megakaryocytes, 413, 438
- Megaloblastic anemia
 - causes and findings, 426
 - Diphyllobothrium latum*, 157
 - drugs causing, 249
 - RBCs and PMNs with, 420
 - trimethoprim, 190
 - tropical sprue, 388
 - vitamin B₉ deficiency, 66
- Megestrol, 675
- Meglitinides, 253, 359
- Meissner corpuscles, 504
- Meissner plexus, 391
- Melanocytes
 - destruction of, 484
 - tumor nomenclature, 216

- Melanocyte-stimulating hormone (MSH)
function and notes, 332
signaling pathways of, 341
- Melanocytic nevus, 485
- Melanoma
nomenclature, 216
oncogene, 220
recombinant cytokines for metastatic, 119
tumor suppressor gene, 220
types of, 494
- Melanotropin, 331
- Melarsoprol, 153, 195
- Melasma (chloasma), 484
- MELAS syndrome, 60
- Melena
GI bleeding, 387
Meckel diverticulum, 391
- Meloxicam, 496
- Memantine, 564
- Membrane attack complex (MAC), 104
- Membrane inhibitor of reactive lysis (MIRL/CD59), 105
- Membranoproliferative glomerulonephritis
hepatitis B and C, 171
nephritic syndrome, 615
- Membranous glomerular disorders
hepatitis B and C, 171
types of, 612
- Membranous interventricular septum, 285
- Membranous nephropathy
mechanism and histology, 616
primary autoantibody, 113
- Membranous ossification, 461
- Memory loss
anti-NMDA receptor encephalitis, **224**
- Memory, neural structures and, 509
- MEN1
characteristics of, **356**
chromosomal abnormality, 62
- MEN1 gene, product and associated condition, 220, 356
- MEN2A
characteristics of, 356
- MEN2A/2B
oncogenes, 220
- MEN2B
characteristics of, 356
- Menaquinone, 69
- Ménétrier disease, **386**
- Ménière disease, 548
- Menin, 220
- Meninges, **506**
- Meningioma
characteristics and histology, 540
- Meningitis
chloramphenicol, 188
coccidioidomycosis, 149
common causes by age, **176**
cryptococcal, 150
CSF findings in, **176**
Hemophilus influenzae, 140
hemorrhagic, 135
Listeria monocytogenes, 137
mumps, 167
Streptococcus agalactiae, 135
picornavirus, 165
unvaccinated children, 182
viral, 162
viruses causing, 176
with rhinosinusitis, 690
- Meningocele, 501
- Meningococcal prophylaxis, 193
- Meningococci vs gonococci, 140
- Meningoencephalitis
herpes simplex virus, 180
Naegleria fowleri, 153
West Nile virus, 164
- Menkes disease
collagen crosslinking in, 48
mechanism and symptoms, **49**
- Menopause
diagnosis and treatment, **653**
Turner syndrome, 655
- Menorrhagia
coagulation disorder presentation, 433
- Menstrual cycle, phases of, **650**
- Mentzer index, **423**
- Meperidine, 567
- Mepivacaine, 565
- Mepolizumab, 705
- Meralgia paresthetica, **456**
- Mercury poisoning, 247
- Merkel discs, 504
- Merlin protein, 220
- MERRF syndrome, 60
- MERS (Middle East respiratory syndrome), structure and medical importance, 164
- Mesalamine, 389
- Mesangial cells, juxtaglomerular apparatus, 607
- Mesencephalon, 500
- Mesenchymal tissue,
immunohistochemical stains, 223
- Mesenchymal tumor nomenclature, 216
- Mesenteric ischemia, 393
- Mesna, 447
- Mesocortical pathway, 509
- Mesoderm
derivatives, 631
pharyngeal (branchial) arches derivation, 637
- Mesolimbic pathway, 509
- Mesonephric (Wolffian) duct, 639
- Mesothelioma, **695**
- Meta-analysis, **266**
- Metabolic acidosis
laboratory findings with, 609
renal failure, 621
- Metabolic alkalosis
in hypertrophic pyloric stenosis, 366
laboratory findings with, 609
renal tubular defects, 604
thiazides, 627
- Metabolic compartmentation
metabolism sites, **72**
summary of pathways, 72
urea cycle, 80
- Metabolic disorders
glycogen storage, **85**
- Metabolic drug naming conventions, 253
- Metabolic fuel use, **89**
- Metabolic syndrome
in Cushing syndrome, 352
- Metabolism
disorders of galactose, 78
dyslipidemias, 92
fasted vs. fed state, **88**
fatty acids, 87
fructose disorders, 78
gluconeogenesis, 76
ketone bodies, 88
lipoprotein functions, 92
pyruvate, **75**
rate-determining enzymes and regulators, **71**
TCA cycle, **75**
tyrosine catabolism, 81
- Metacarpal neck fracture, 463
- Metachromatic granules, 137
- Metachromatic leukodystrophy, 86, 538
- Metalloproteinases, 212
- Metal storage diseases, 206
- Metamorphopsia, 552
- Metanephric diverticulum, 596
- Metanephric mesenchyme, 596
- Metanephries, in pheochromocytoma, 355
- Metanephros, 596
- Metaphase, 44
- Metaplasia
changes with, 202
esophagus, 385
intestinal, 386
specialized intestinal, 385
- Metastases, 216
common sites, **219**
from prostatic adenocarcinomas, 672
gastric cancer, 386
heart tumors from, 320
lung cancer, 703
mechanisms, 217
melanoma, 494
neoplastic progression, 215
testicular choriocarcinoma, 671
to liver, 399
- Metastatic calcification
electrolyte disturbances, 609
vs dystrophic, 207
- Metatarsophalangeal (MTP) joints in gout, 473
- Metencephalon, 500
- Metformin
drug reactions with, 248
mechanism and adverse effects, 359
- Methacholine, action and applications, 239
- Methadone
opioid analgesics, 567
opioid detoxification/maintenance, 594
opioid withdrawal treatment, 588
- Methamphetamine, 588, 590
- Methanol toxicity, 70, 247
- Methemoglobin, **688**
- Methemoglobinemia
blood oxygen in, 687
dapsone, 190
local anesthetics and, 565
presentation, 688
toxicity and treatment, 247, 688
- Methenamine silver stain, 151
- Methimazole
drug reactions with, 249
mechanism, use and adverse effects, 360
teratogenicity of, 632
- Methionine
classification of, 79
genetic coding for, 35
start codons, 42
- Methotrexate
hydatidiform moles, 659
lung disease with, 694
mechanism, use and adverse effects, 444
rheumatoid arthritis, 472
- Methotrexate (MTX)
drug reactions with, 249, 250
effects in humans, 34
purine and pyrimidine synthesis, 34
toxicity treatment, 247
vitamin B₉ deficiency, 66
- Methylation
histones, 32
in heterochromatin, 32
protein synthesis, 43
- Methylcellulose, 408
- Methyldopa
drug reactions with, 249
- Methylene blue, 247, 688
- Methylenetetrahydrofolate reductase (MTHFR) deficiency, 83
- Methylmalonic acid
vitamin B₉ deficiency, 66
vitamin B₁₂ deficiency, 67
- Methylmalonic acidemia, 83, 88
- Methylmalonyl-CoA mutase, 67, 83
- Methylmercury, 632
- Methylphenidate, 574, 590
- Methyltestosterone, **676**
- Methylxanthines, 704

- Metoclopramide
drug reactions with, 250
extrapyramidal symptoms, 407
with chemotherapy, 447
- Metolazone, 627
- Metoprolol, 244, 327
- Metronidazole
bacterial vaginosis, 147
clindamycin vs, 188
disulfiram-like reaction, 250
for Crohn disease, 389
Helicobacter pylori, **144**
mechanism and clinical use, **191**
protozoal GI infections, 152
vaginal infections, 178
vaginitis, 155
- Mexiletine
Class IB sodium channel blockers,
326
- Meyer loop, 557
- Micafungin, 195
- Michaelis-Menten kinetics, 228
- Miconazole, 195
- Microangiopathic hemolytic anemia
causes and findings, 429
hypertensive emergency and, 304
intravascular hemolysis in, 427
- Microarrays, **52**
- Microbiology
antimicrobial therapy, **183**
bacteriology, 122
clinical bacteriology, 132
mycology, 149
oncogenic organisms, 222
parasitology, 152
systems, 174
virology, 159
- Microcephaly
cri-du-chat syndrome, 62
maternal phenylketonuria, 82
Patau syndrome, 61
Zika virus, 168
- Microcytic, hypochromic anemias
Ancylostoma, 156
description and causes, **424**
iron deficiency, 424
lead poisoning, 425, 430
Sideroblastic anemia, 425
thalassemias, 424
- Microcytosis, 210
- Microdeletion
22q11, 114
congenital, 63
fluorescence in situ hybridization, 53
- Microfilaments, 46
- Microfold (M) cells, 381
- Microglia, 503
- Micrognathia
Edwards syndrome, 61
- Microphthalmia, 61
- MicroRNA (miRNA), 40, 54
- Microsatellite instability pathway, 395
- Microscopic polyangiitis
autoantibody, 113
- Microsomal transfer protein (MTP),
92
- Microsporum* spp, 488
- Microtubules
cytoskeletal elements, 46
drugs acting on, 46
dysfunction of, 115
structure and function of, **46**
- Micturition center, 236
- Micturition control, **236**
- Midazolam, 562
- Midbrain, 516
- Middlebrook medium, 124
- Middle cerebral artery
saccular aneurysms, 530
stroke effects, 526
watershed zones, 513
- Middle ear, 547
- Middle meningeal artery
epidural hematoma and, 528
- Middle rectal vein, 372
- Midgut, blood supply and
innervation, 371
- Midgut volvulus, 392
- Midodrine, 241
- Mifepristone, 675
- Miglitol, 359
- Migraine headaches
characteristics and treatment, 532
triptans for, 562
- Migrating motor complexes (MMC),
378
- Migratory polyarthritis, 319
- Milestones in development, 572
- Milnacipran, 593
- Milrinone, 245
- Mineralocorticoids
adrenal insufficiency, 353
adrenal steroids and, 340
- Mineral oil intake, 63
- Minimal change disease, 616
- Minocycline, 188
- DRESS with, 249
- Minors consent for, **268**
- Minoxidil, **676**
- Minute ventilation, 683
- Miosis
drugs producing, 251
pupillary control pathway, 554
- Mirabegron, 236, 241
- miRNA (microRNA), 54
- Mirtazapine
depressive disorders, 578
physiologic effects, 243
use and toxicity, 594
- Mismatch repair, 37
- Misoprostol
mechanism and clinical use, **406**
off-label use, 406
- Missense mutation, 38, 416
- Mites/louse treatment, 195
- Mitochondria
genetic code in, 35
high altitude and, 688
- Mitochondrial diseases, **60**
mitochondrial DNA (mtDNA),
heteroplasmy, 55
- Mitochondrial inheritance, 57
- Mitochondrial myopathies, 60
- Mitosis, 44, 195
- Mitral regurgitation
heart murmur with, 296
hypertrophic cardiomyopathy, 315
in myocardial infarction, 309
pressure-volume loops in, 293
- Mitral stenosis
murmur and clinical associations,
296
murmurs caused by, 295
pressure-volume loops in, 293
- Mitral/tricuspid regurgitation, heart
murmur with, **296**
- Mitral valve closure, 292
- Mitral valve, in cardiac cycle, 292
- Mitral valve prolapse
heart murmur with, 296
Marfan syndrome, 50
renal cyst disorders and, 622
- Mittelschmerz, 649
- Mixed cellularity lymphoma, 434
- Mixed connective tissue disease
antibodies with, 476
anti-U1 RNP antibodies, **476**
autoantibody, 113
- Mixed (direct and indirect)
hyperbilirubinemia, 400
- Mixed germ cell tumor, serum tumor
marker, 222
- Mixed platelet and coagulation
disorders, **433**
- MLH1* and *MSH2* gene mismatch, 395
- MMR vaccine, 167
- Mobitz type II, 313
- Mobitz type I (Wenckebach), 313
- Modafinil
cytochrome P-450 interaction, 251
- Modes of inheritance, **57**
- Mode (statistics), 264
- Molecular cloning, **53**
- Molecular mimicry, 127, 538
- Molecular motor proteins, 46
- Molluscum contagiosum, 161, 487
- “Monday disease”, 322
- Monoamine oxidase inhibitors
atypical depression, 578
mechanism, use and adverse
effects, **593**
Parkinson disease, 564
- Monobactams, *Pseudomonas*
aeruginosa, 141
- Monoclonal antibodies naming
conventions, 254
- Monoclonal gammopathy of
undetermined significance,
436
- Monoclonal immunoglobulin, 436
- Monocytes
differentiation of, **413**
- innate immunity, 97
- morulae in, 148
- Monoiodotyrosine (MIT), 335
- Monozygotic twinning, 635
- Montelukast, 704
- Mood disorder
characteristics of, **576**
hypomanic episode, **578**
manic episode, **577**
schizoaffective disorder and, 577
- Moraxella catarrhalis*, 547
- Moro reflex, 523
- Morphine, 233, 315, 567
- Morphogenesis, errors in, **633**
- Mortality rate, 259
- Morulae, 148
- Mosaic bone architecture, 469
- Mosaicism, 55
- Mosquitoes (disease vectors)
malaria, 154
Zika virus, 168
- Motilin, source, action, and
regulation of, 378
- Motion sickness, 240, 506
- Motivational interviewing, **271**, 590
- Motoneuron action potential to
muscle contraction, **459**
- Motor cortex
thalamic relay for, 508
topographic representation, 513
- Motor function
abnormal posturing, **524**
conversion disorder, 583
dysarthria, 529
upper and lower motor neuron
signs, **543**
- Motor innervation
to tongue, **364**
- Motor neuron signs
Brown-Séquard syndrome, 545
in amyotrophic lateral sclerosis,
544
in anterior spinal artery occlusion,
544
upper compared to lower lesions,
543
- Movement disorders
abnormal posturing, **524**
neurodegenerative, **534**
- Moxifloxacin, 191
- M phase, 44
- M protein
bacterial virulence, 127
rheumatic fever and, 134
mRNA
aminoglycosides, 187
hepatitis viruses, 170
pre-mRNA splicing, 40
protease inhibitors, 198
splicing error detection, 51
start codons, 42
stop codons, 42
translation of, 40
vaccines, 109

- MRSA (methicillin-resistant *Staphylococcus aureus*)
cephalosporins, 185
daptomycin, 191
healthcare-associated infections, 181
medical importance, 133
prophylaxis for, 193
- Mucicarmine stain, polysaccharide capsule staining, 123
- Mucinous carcinoma, 664
- Mucinous cystadenoma, 664
- Mucociliary escalator, 680
- Mucopolidosis type II, 45
- Mucopolysaccharidoses, 86
- Mucor* spp
in immunodeficiency, 116
opportunistic infection, 150
treatment, 194
- Mucormycosis, 150
- Mucosa-associated lymphoid tissue (MALT), 474
- Mucosa (digestive tract), 369
- Mucosal cells, 379
- Mucosal neuromas, 356
- Mucosal polyps, 394
- Mucositis
methotrexate, 444
“Muddy brown” casts (urine), 612
- Mulberry molars, 145
- Müllerian (paramesonephric) duct agenesis, 639
anomalies of, **640**
derivatives of, 639
- Multicystic dysplastic kidney, 596, 597
- Multidrug resistance (MDR), *Klebsiella* spp, 143
- Multidrug resistance protein 1 (MDR1), 223
- Multifactorial pulmonary hypertension, 698
- Multifetal gestation, 652, 660
- Multifocal atrial tachycardia description and management, 311
- Multiple endocrine neoplasias subtypes and characteristics of, **356**
Zollinger-Ellison syndrome, 356
- Multiple myeloma
clinical features, 436
plasma cell dyscrasia, 415
- Multiple sclerosis
drug therapy for, 567
findings and treatment, **537**
internuclear ophthalmoplegia, 558
recombinant cytokines for, 119
- Mumps virus
acute pancreatitis with, 404
medical importance, **167**
- Munro microabscesses, 485
- Murphy sign, 403
- Muscarinic ACh receptors, 235
- Muscarinic agonists, 236
- Muscarinic antagonists
atropine, 240
for asthma, 704
- micturition control, 236
- multiple sclerosis treatment, 537
- organ system and applications, **240**
- Muscarinic effects, 239
- Muscarinic receptors
in airway, 239
vomiting center input, 506
- Muscle
immunohistochemical stains, 222
- Muscle atonia, loss of, 507
- Muscle contraction
motoneuron action potential and, **459**
- Muscles
in starvation, 88
mastication, **520**, 638
metabolism in, 85
motor neuron signs and, 543
of facial expression, 638
proprioceptors in, **461**
- Muscle spasm treatment
 α_2 -agonists, 567
botulinum toxin, 136
- Muscle stretch receptors, 461
- Muscular dystrophies
frameshift mutation, 59
types of, **59**
X-linked recessive disorder, 59
- Muscularis externa, 369
- Musculocutaneous nerve, injury and presentation, 450
- Musculoskeletal/skin/connective tissue
dermatology, **481**
pharmacology, 495
- Musculoskeletal system
aging effects on, 225
common conditions, **465**
drug reactions with, **249**
paraneoplastic syndromes, **224**
- Mutases, 71
- Mutations
allelic heterogeneity, 55
BRAF, 437
cancer and genetic linkage analysis, 52
COL3A1, 49
COL5A1, 49
COL5A2, 49
in cancer, 217
in DNA, **38**
in HbS and HbC, 416
in PBPs, 183
JAK2, 438
locus heterogeneity in, 55
mosaicism, 55
muscular dystrophies, 59
myelodysplastic syndromes, 436
non-Hodgkin lymphoma, 435
STAT3, 114
tumor suppressor genes, 44
WT1 deletion, 624
- MUTYH gene
associated disorders, 394
associated polyposis syndrome, 394
- Myalgias
Ebola virus, 169
fluoroquinolones, 191
Leptospira interrogans, 145
Lyme disease, 144
meningitis, 182
polymyalgia rheumatica, 477
trichinosis, 156
- Myasthenia gravis
as paraneoplastic syndrome, 224
autoantibody, 113
neostigmine for, 239
pathophysiology, symptoms and treatment, 480
pyridostigmine for, 239
restrictive lung diseases, 694
thymus association with, 96
Type II hypersensitivity, 110
- MYCC (*c-myc*) gene, associated neoplasm, 220
- MYCN (*N-myc*) gene, associated neoplasm, 220
- Mycobacteria, **138**
- Mycobacterial infections, II-12
receptor deficiency, 114
- Mycobacterium* spp
characteristics of, **138**
Gram stain for, 123
Ziehl-Neelsen stain, 123
- Mycobacterium avium* complex, HIV-positive adults, 173
- Mycobacterium avium-intracellulare*
HIV positive adults, 173
prophylaxis and treatment, 193
- Mycobacterium leprae*
diagnosis, 139
disease and transmission, 147
prophylaxis and treatment, 193
- Mycobacterium marinum*, hand infections, 138
- Mycobacterium scrofulaceum*, 138
- Mycobacterium tuberculosis*
culture requirements, 124
HIV-positive adults, 173
prophylaxis and treatment, 193
symptoms of, 138
vertebral osteomyelitis, 176
- Mycolic acid, isoniazid, 123
- Mycology, 149
- Mycophenolate, inosine monophosphate dehydrogenase inhibition, 34
- Mycophenolate mofetil, 119
- Mycoplasma* spp
atypical organisms, 175
Gram stain for, 123
macrolides, 189
pneumonia caused by, 701
- Mycoplasma pneumoniae*
culture requirements, 124
presentation and findings, **148**
- Mycoses
cutaneous, **488**
systemic, **149**
- Mydriasis
drugs producing, 251
glaucoma treatment and, 568
meperidine, 567
muscarinic antagonists for, 240
pupillary control pathway, 554
saccular aneurysm, 530
- Myelencephalon, 500
- Myeloblasts (peripheral smear), 437
- Myelodysplastic syndromes
acute myelogenous leukemia, 437
causes of, **436**
leukemias, **437**
lymphoid neoplasms, 437
sideroblastic anemia, 425
- Myelofibrosis, 420, 438
- Myeloid neoplasms, 437
- Myelomeningocele, 61, 501
- Myeloperoxidase
 H_2O_2 degradation, 126
in neutrophils, 412
in sputum, 107
- Myeloperoxidase-antineutrophil cytoplasmic antibody (MPO-ANCA)
autoantibody, 113
- Myeloproliferative disorders
antimetabolites for, 444
- Myeloproliferative neoplasms
effects and gene associations, **438**
gene association, 220
- Myeloschisis, 501
- Myelosuppression
alkylating agents, 445
antimetabolites, 444
flucytosine, 194
- Myenteric nerve plexus (Auerbach), 369
- Myocardial action potential, **297**, 312
- Myocardial infarction
angina and NSTEMI vs STEMI, **308**
CK-MB in diagnosis, 310
complication and findings, **314**
diagnosis of, **310**
evolution and complications, **309**
 β -blocker use, 244
- Myocardial O_2 consumption/demand
angina treatment, 323
in antianginal therapy, 323
- Myocarditis
adenovirus, 161
causes and complications, **320**
coxsackievirus, 164
diphtheria, 137
Toxocara canis, 156
- Myoclonic seizures, 531
- Myoclonus, 533
- Myofibrils, 460
- Myofibroblasts, in wound healing, 212
- Myogenic blood flow (kidney), **600**
- Myoglobin, 687
- Myoglobinuria
McArdle disease, 85
neuroleptic malignant syndrome, 587

- Myonecrosis, 136
Myonuclei, 460
Myopathy
 daptomycin, 191
 drugs causing, 249
 with hypo- and hyperthyroidism, 344
Myopectineal orifice, **376**
Myopia, 549
Myositis ossificans, **477**
Myotonic dystrophy
 findings with, 59
 inheritance, 60
Myxedema treatment, 360
Myxomas, 320
- N**
- N-myc oncogene, 354
N₂O, 565
NAAT (nucleic acid amplification test), 140
 Chlamydiae diagnosis, 146
 severe acute respiratory syndrome coronavirus 2, 169
N-acetylcysteine
 for acetaminophen toxicity, 247
N-acetylglucosaminyl-1-phosphotransferase, 45
NADH (reduced nicotinamide adenine dinucleotide), 75
 electron transport chain, 76
Nadolol, 244
NADPH production
 pentose phosphate pathway (HMP shunt), **77**
NADPH (reduced nicotinamide adenine dinucleotide phosphate)
 source of, 77
 universal electron acceptors, 73
Naegleria fowleri
 CNS infection, 153
Nafarelin, 674
Nafcillin, 184
Nails
 glomus body tumors, 486
 pitting, 485
 splinter hemorrhages in, 318
 Tinea unguium, 488
 with psoriatic arthritis, 475
Nalbuphine, 567, **568**
Naloxone
 dextromethorphan overdose, 706
 for opioid toxicity, 247, 588
 opioid detoxification, 594
Naltrexone
 alcohol use disorder, 590
 opioid toxicity, 567
 relapse prevention, 594
Naming conventions for drugs, **252**
Naproxen, 496
Narcissistic personality disorder, 582
Narcolepsy
 amphetamines for, 241
 characteristics and treatment, **585**
 CNS stimulants for, 590
Narrow complex tachycardias, **311**
Narrow spectrum anticonvulsants, 560
Nasal angiofibromas, 690
Nasal congestion/decongestion, 241, 706
Nasal nitric oxide (screening test), 47
Nasopharyngeal carcinoma, **690**
 EBV and, 162
 oncogenic microbes, 222
Natalizumab, 537, 538
Nateglinide, 359
National Board of Medical Examiners (NBME), 2, 9
Natural contraception, 332
Natural killer (NK) cells, 97, **415**
 activation of, 106
 cell surface proteins, 108
 functions, **99**
Natural selection, 55
Nausea
 adverse drug effects, 407
 appendicitis, 390
 biliary colic, 403
 migraine headaches, 532
 myocardial infarction, 309
 vitamin A toxicity, 64
 vitamin C toxicity, 67
Near miss (medical errors), 277
Nearightedness, 549
Nebivolol, 244
Necator spp
 disease associations, 158
 infection routes, 155
Necator americanus
 disease, transmission and treatment, 156
Neck and head cancer, **690**
Necrosis
 acute pancreatitis, 404
 Amanita phalloides, 40
 Arthus reaction, 111
 causes and histology of, **205**
 enterocolitis, 393
 femoral head, 119
 glioblastoma, 540
 granulomatous inflammation, 213
 hepatic, 495
 jaw, 496
 saponification, 205
 transplant reaction, 119
Necrotizing enterocolitis, 393
Necrotizing fasciitis, 134, 144, 487
Needlesticks
 infections from, 181
Negative predictive value, 260
Negative reinforcement, 570
Negative skew distribution, 264
Negri bodies, 169
Neisseria spp
 bacteremia with complement deficiency, 105
 cephalosporins, 185
 gonococci vs. meningococci, **140**
 transformation, 128
Neisseria gonorrhoeae
 culture requirements, 124
 cystitis, 619
 epididymitis and orchitis, 671
 osteomyelitis, 176
 pelvic inflammatory disease, 181
 prostatitis, 672
 septic arthritis, 474
 septic arthritis with, 474
 sexually transmitted infections, 179
Neisseria meningitidis
 chloramphenicol, 188
 culture requirements, 124
 meningitis, 176
Nematode infections
 infection routes and sites, **155**
 intestinal, 156
 tissue infections, 156
Nematode (roundworm) infections
 disease, transmission and treatment, **156**
Nematodes, **156**
Neomycin, 187
Neonatal abstinence syndrome, 567, **633**
Neonatal birth weight, **652**
Neonatal conjunctivitis
 Chlamydia trachomatis serotype, 146
Neonatal lupus, 476
Neonatal respiratory distress syndrome, **679**
 adhesive atelectasis with, 699
Neonates
 birth weight of, **652**
 Candida albicans in, 150
 coagulation cascade in, 419
 common meningitis causes, 176
 conjunctivitis, 140
 extracranial injuries, 527
 Group B streptococcal meningitis, 176
 hemolytic anemia in, 428
 hemolytic disease of, **411**
 hepatitis B, 170
 hernias in, 377
 herpes in, 162
 hyperbilirubinemia in, 400
 hyperthermia in, 240
 hypertrophic pyloric stenosis in, 366
 intraventricular hemorrhage, **527**
 Listeria monocytogenes in, 137
 necrotizing enterocolitis and, 393
 normal microbiota, **174**
 obesity risk factors, 653
 persistent jaundice in, 401
 physiologic gynecomastia, 667
 pneumonia, 146, 304
 pneumonia causes in, 175
 pulmonary vascular resistance in, 303
 Streptococcus agalactiae in, 135
 TORCH infection manifestations, 180
tracheoesophageal anomalies in, 366
 vitamin K synthesis in, 69
 Zika virus effects, 168
Neoplasia/neoplastic progression, **215**
 dysplasia, 202
Neoplasms
 mature B cells, **434**
 mature T cells, **435**
 myelodysplastic syndromes, 437
Neoplastic progression
 normal cells, 215
Neoplastic transformation
 chronic inflammation, 212
Nephritic-nephrotic syndrome, 613
Nephritic syndrome, 613, 614
 mechanism and histology, **614**
Nephroblastoma, **624**
Nephrocalcinosis, 207
Nephrogenic diabetes insipidus, 342
 central diabetes insipidus
 comparison, 342
 lithium toxicity, 587
 treatment, 627
Nephrolithiasis
 calcium oxalate, 67
Nephron transport physiology, **603**
Nephropathy
 hypertension and, 304
 transplant rejection, 118
Nephrotic syndrome, 613
 early-onset, 624
 ESR with, 210
 fatty casts in, 612
 mechanism and histology, **616**
Nephrotoxicity
 acute tubular necrosis, 621
 aminoglycosides, 186, 187
 amphotericin B, 194
 cidofovir, 197
 drug reactions, 250
 foscarnet, 197
 ganciclovir, 196
 immunosuppressants, 118
 platinum compounds, 445
 polymyxins, 189
Nephrilysin inhibitor, 324
Nerve fibers, 505
Nerve injury
 peripheral nerve regeneration, 46
Nerves
 lower extremity, **457**
 upper extremity, **450, 451**
Nervous system
 aging effects, 225
 cells of, **503**
 drug reactions in, 250
Neural crest
 immunohistochemical stains, 223
Neural crest cells, 500, 631
Neural development, **500**
Neuralgia
 post-herpetic, 162
 trigeminal, **532**

- Neural tube, 500
 - defect prevention, 66
 - defects, **501**
 - derivatives, 631
 - regionalization of, **500**
- Neural tube defects
 - serum tumor marker, 222
- Neuraminidase inhibitors
 - naming conventions for, 252
- Neuroblastomas
 - incidence and mortality, 218
 - oncogenes, 220
 - paraneoplastic syndromes, 224
 - presentation, **354**
 - serum tumor marker, 222
- Neurocutaneous disorders
 - genetics and presentation, **539–568**
- Neurocysticercosis, 157, 158
- Neurodegenerative disease therapy, **564**
- Neurodegenerative disorders
 - dementia, 534
 - drug therapy for, **564**
 - movement disorders, **534**
 - Niemann-Pick disease, 86
 - Tay-Sachs disease, 86
 - ubiquitin-proteasome system defects, 46
- Neuroendocrine cells
 - secretions of, 354, 357
 - serum tumor markers for, 222
 - tumors of, **354**, 357
- Neuroendocrine tumors, **354**
- Neurofibromatosis
 - chromosome association, 62
 - types I and II, 539
 - variable expressivity, 54
- Neurofilaments
 - cytoskeletal element, 46
 - tumor identification, 223
- Neurogenic (autonomic) symptoms, 352
- Neurogenic bladder
 - with multiple sclerosis, 537
- Neurogenic ileus, 239
- Neuroglia
 - immunohistochemical stains, 223
- Neuroglycopenic symptoms, 352
- Neurohypophysis
 - hypothalamus and, 508
- Neurokinin receptors (NK-1)
 - vomiting center input, 506
- Neuroleptic malignant syndrome, 567, 587
- Neurologic drug reactions, **250**
- Neurologic signs/symptoms
 - unvaccinated children, 182
- Neurology and special senses
 - anatomy and physiology, 503
 - embryology, 499
 - ophthalmology, 499, 549
 - otology, 499, 547
 - pathology, 524
 - pharmacology, 560
- Neuromuscular blocking drugs
 - types and use, **566**
- Neuromuscular junction
 - diseases of, **480**
 - in reflex pathways, 522
- Neuromuscular junction blockade
 - acetylcholinesterase poisoning, 239
 - nondepolarizing, 252
 - reversal, 239
- Neuromuscular junction, skeletal muscle, 235
- Neuromuscular paraneoplastic syndromes, 224
- Neuron action potential, **504**
- Neurons
 - immunohistochemical stains, 223
 - in spinal tracts, 522
 - response to axonal injury, **505**
 - vitamin E protection of, 68
- Neuron-specific enolase, 222
- Neuron-specific enolase (NSE), 354
- Neuropathic pain, 235, 477
- Neuropathic ulcer, 491
- Neurophysins, 331
- Neuropsychiatric dysfunction
 - electrolyte disturbances and, 609
 - in hepatic encephalopathy, 399
 - in Wilson disease, 402
 - primary central nervous system lymphoma, 435
 - vitamin B₁₂ (cobalamin) deficiency, 426
 - with porphyria, 430
- Neurosyphilis, 145
- Neurotoxicity
 - methylxanthines, 704
- Neurotransmitters
 - bacterial toxin effects, 130
 - synthesis and changes with disease, **505**
- Neurovascular pairing, **458**
- Neutropenia
 - cell counts and causes, 429
 - disseminated candidiasis, 150
 - ganciclovir, 196
- Neutrophils, **412**
 - chemotactic agents, 106, 412, 495
 - chemotactic agents, 104
 - in leukocyte adhesion deficiency, 115
 - in myocardial infarction, 309
 - innate immunity, 97
 - liquefactive necrosis, 205
 - megaloblastic anemia, 426
 - nonmegaloblastic anemia, 426
 - pseudo-Pelger-Huët anomaly, 436
 - stimulation of chemotaxis, 42
 - wound healing, 212
- Never event (medical error), 277
- Nevi
 - dysplastic, 494
 - intralesional, 485
- Nevirapine, 251
 - cytochrome P-450 interaction, 251
- Nevus flammeus, 539
- Nevus/mole, 216
- NF1 gene
 - product and associated condition, 220
- NF2 gene
 - product and associated condition, 220
- NF-κB activation, 97
- N-formylmethionine (fMet), 42
- NHE3 inhibitor, 408
- Niacin
 - deficiency, 357
 - drug reactions with, 249
 - lipid lowering agents, 325
- Nicardipine, 323
- Nickel carcinogenicity, 221
- Niclosamide, 157
- Nicotinamides, 73
- Nicotine intoxication and withdrawal, 589
- Nicotine replacement therapy, 594
- Nicotinic acetylcholine receptors, 163
- Nicotinic ACh receptors, 235
- Nicotinic acid, 65
- Nicotinic effects, 239
- Niemann-Pick disease, 86
- Nifedipine, 323, 660
- Nifurtimox, 155, 195
- Night blindness, 64
- Nigrostriatal pathway, 509
- Nikolsky sign
 - blistering skin disorders, 487, 490
 - scalded skin syndrome, 487
- Nilotinib, 447
- Nimodipine, 323, 528
- Nipple
 - intraductal papilloma, 667
 - lactational mastitis, 667
- Nissl bodies, 45
- Nitrates
 - and hydralazine in heart failure, 316
 - antianginal therapy, 323
 - mechanism, use and adverse effects, **322**
- Nitric oxide source and action, 378
- Nitrites in urine, 619
- Nitrite test, 178
- Nitroblue tetrazolium dye reduction test, 115
- Nitrofurantoin
 - drug reactions with, 249
 - in glucose-6-phosphate dehydrogenase deficiency, 77
- Nitrogen mustards
 - mechanism, use and adverse effects, 445
- Nitroglycerin, 322
 - acute coronary syndromes, 315
- Nitroprusside, 323
- Nitrosamines
 - carcinogenicity of, 221
 - stomach cancer and, 386
- Nitrosoureas
 - mechanism, use and adverse effects, 445
 - naming convention, 252
- Nivolumab, 218, 446
- Nizatidine, 406
- NK1 blocker naming convention, 253
- NNRTIs in HIV therapy, **197**
- Nocardia* spp
 - caseous necrosis, 205
 - stain for identification, 123
 - sulfonamides, 190
- Nocardia* spp vs *Actinomyces* spp, **137**
- Nociceptive pain, 235
- Nocturia, 672
- Nocturnal enuresis, 333
- Nocturnal perianal pruritus, 158
- Nodular goiter, 346
- Nodular sclerosis, 434
- Noise-induced hearing loss, 548
- Nonalcoholic fatty liver disease, **398**
- Nonbacterial thrombotic endocarditis, 224, 318
- Nonbenzodiazepine hypnotics, 562
- Noncaseating granulomas, 213, 694, 695
- Noncommunicating hydrocephalus, 536, 542
- Noncompetitive agonists, 228
- Noncompetitive antagonist, 233
- Noncompetitive inhibitors, 228
- Noncompliant patient, 272
- Nondepolarizing neuromuscular blocking drugs, 252, 566
- Nondihydropyridine CCBs, 323
- Nondihydropyridines, 323
- Non-frameshift mutations, deletions
 - Becker muscular dystrophy, 59
- Nonhemolytic normocytic anemia, **427**
- Non-Hodgkin lymphoma, 435
 - HIV-positive adults, 173
 - oncogenes, 220
 - rituximab for, 445
 - vinca alkaloids for, 445
 - vs Hodgkin, **434**
- Nonhomologous end joining, 37
- Non-HPV vulvar carcinoma, 661
- Nonmaleficence (ethics), 267
- Nonmegaloblastic anemia, 426
- Nonmotile (primary) cilia, 47
- Non-neoplastic malformations, 216
- Nonnormal distributions, 264
- Nonoverlapping genetic code, 35
- Nonoxidative (reversible) reactions, 77
- Nonproliferative diabetic retinopathy, 552
- Nonreceptor tyrosine kinase, 341
- Non-REM sleep stage, 507
- Nonrhegmatogenous retinal detachment, 552
- Nonselective antagonists, 244
- Nonselective α-blockers, 243

- Nonsense mutation, 38
 Nonspecific PDE inhibitor, 245
 Nonspecific screening antibody, 113
 Nonsteroidal anti-inflammatory drugs (NSAIDs)
 acute gout treatment, 497
 acute pericarditis treatment, 319
 calcium pyrophosphate deposition disease, 473
 chemopreventive for CRC, 395
 drug reactions with, 249, 250
 gastritis with, 386
 GFR effects of, 607
 gout, 473, 497
 headaches, 532
 hemolytic anemia with, 429
 loop diuretics and, 626
 mechanism, use and adverse effects, **496**
 misoprostol use, 406
 osteoarthritis, 472
 peptic ulcer disease and, 387
 renal papillary necrosis, 621
 rheumatoid arthritis, 472
 Non-ST-segment elevation MI (NSTEMI)
 ECG changes with, 310
 STEMI comparison, 310
 treatment, 310, 315
 Nonthyroidal illness syndrome, 345
 Non- α , non- β islet cell pancreatic tumor, 378
 Norepinephrine
 actions and applications, 241
 bupropion effect on, 594
 MAO inhibitor effects, 593
 pheochromocytoma secretion, 355
 synthesis and change with diseases, 505
 vitamin B₆ and, 66
 Norethindrone, 675
 Normal aging, **225**
 Normal distribution, 264
 Normal microbiota
 colonic, 135
 female genital tract, 133
 neonates, 174
 skin, 133
 Normal pressure hydrocephalus, 536
 Normocytic, normochromic anemias
 causes and findings, **427**
 Norovirus, 164, 175
 Northern blot, 51
 Nortriptyline, 593
 Notched (Hutchinson) teeth, 145
 Novobiocin
 Staphylococcus epidermidis, 133
 NPH insulin, 358
 NRTIs in HIV therapy, **197**
 NS3/4A inhibitors
 naming convention, 252
 NS5A inhibitors
 naming conventions, 252
 NS5B inhibitors
 mechanism and toxicity, 199
 naming conventions, 252
 Nuchal translucency, 61
 Nucleosome, 32
 Nucleotide excision repair, 37
 Nucleotides
 composition of, **33**
 deamination reactions, 33
 ribose for synthesis of, 77
 synthesis, 72
 Nucleus accumbens, 505
 appetite control, 340
 Nucleus ambiguus, 516
 stroke effects, 527
 Nucleus pulposus, collagen in, 48
 Nucleus tractus solitarius, 506, 516
 Null hypothesis, 264
 Number needed to harm, 258
 Number needed to treat, 258
 Nursemaid's elbow, 466
 Nutcracker syndrome, **370**
 Nutmeg liver, 316, 397
 Nutrition, 63–92
 Nyctalopia, 64
 Nystagmus
 cerebellum, 524
 Friedreich ataxia, 545
 internuclear ophthalmoplegia, 558
 retinoblastoma presentation, 552
 Nystatin, **194**
- O**
- Obesity, 403
 amphetamine for, 241
 DM type 2 and, 351
 esophageal cancer and, 385
 hypertension, 304
 hypoventilation syndrome, 697
 lateral femoral cutaneous nerve injury, 456
 osteoarthritis/rheumatoid arthritis, 472
 renal cell carcinoma association, 623
 sleep apnea, 697
 stress incontinence and, 618
 Obesity hypoventilation syndrome, 697
 Obligate intracellular bacteria, 125
 Obliterative endarteritis, 306
 Observational studies, 256
 Observer-expectancy bias, 262
 Obsessive-compulsive disorder
 characteristics, **580**
 trichotillomania, 580
 Obsessive-compulsive personality disorder, 582
 Obstructive crystalline nephropathy, 196
 Obstructive hydrocephalus, 542
 Obstructive jaundice, 405
 Obstructive lung disease
 flow volume loops in, 692
 pulsus paradoxus, **317**
 types, presentation and pathology, **692**
 Obstructive shock, 317
 Obstructive sleep apnea, 697
 hypertension risk with, 304
 pulse pressure in, 290
 pulsus paradoxus, 317
 Obstructive uropathy, 596
 Obturator externus muscle, 455
 Obturator internus muscle, 455
 Obturator nerve, 456
 Obturator sign, 390
 Occipital lobe, 508, 526
 Occult bleeding, FOBT for, 395
 Ochronosis, 82
 Octreotide, 360
 acromegaly treatment, 343
 carcinoid tumor treatment, 357
 growth hormone excess treatment, 333
 islet cell tumor treatment, 357
 mechanism, clinical use and adverse effects, **407**
 Ocular motility, **555**
 Oculomotor nerve (CN III)
 causes of damage to, 556
 functions of, 519
 in hemiation syndromes, 543
 internuclear ophthalmoplegia, 558
 ocular motility, 555
 palsy of, 528
 pharyngeal arch derivation, 638
 pupillary contraction, 554
 Oculosympathetic pathway, 545
 Odds ratio, 256, 258
 Odynophagia, 384
 Off-label drug use, **257**
 Okazaki fragment, 36
 Olanzapine, 591
 Olaparib, 447
 Olfaction
 hallucinations, 576
 limbic system in, **508**, 509
 Olfactory bulbs
 developmental failure of, 656
 Olfactory nerve (CN I)
 function and type, 519
 Oligodendrocytes, 503
 in progressive multifocal leukoencephalopathy, 538
 Krabbe disease, 86
 Oligodendroglioma, description and histology, 540
 Oligohydramnios
 associations with, 634
 posterior urethral valves and, **597**
 Potter sequence, 596
 Oligospermia, 407
 Olive-shaped mass, 366
 Omalizumab, 704
 Omeprazole, 406
 cytochrome P-450 interaction, 251
 Omphalocele, 365
Onchocerca volvulus
 disease, transmission and treatment, 156
 Oncogenes
 gene product and neoplasm, **220**
 Oncogenesis
 aneuploidy, 54
 Oncogenic microbes, **222**
 Ondansetron, 407, 447
 1-25-(OH)₂D₃
 kidney endocrine function, 607
 “100-day cough”, 130
 “Onion skin” periosteal reaction, 471
 “Onion skinning” (arteriosclerosis), 306
 Onychomycosis
 terbinafine, 195
 tinea unguium, 488
 Oocysts
 acid-fast stain, 152
 toxoplasmosis, 153
 Oogenesis, **649**
 Opalescent teeth, 49
 Open-angle glaucoma, 551
 pilocarpine for, 239
 Operant conditioning, **570**
 OPG (osteoprotegerin), 462
 Ophthalmoplegia
 internuclear, **558**
 Wernicke-Korsakoff syndrome, 590
 Opioid analgesics
 intoxication and withdrawal, 588
 mechanism, use and adverse effects, **567**
 overdose, 588
 sleep apnea, 697
 toxicity treatment, 247
 withdrawal/relapse prevention, **594**
 Opioid receptors, 567
 Opisthotonos, 130
 Opisthotonus, 182
 Opponens pollicis muscle, 453
 Opportunistic fungal infections, **150**
 Oppositional defiant disorder, 574
 Opposition (thumb), 450
 Opsoclonus-myoclonus syndrome, 354
 Oponins, 209
 functions of, 104
 Oponization
 complement activation and, 104
 Optic nerve (CN II)
 function and type, **519**
 Krabbe disease, 86
 Optic neuritis
 drug-related, 250
 with multiple sclerosis, 537
 Optic neuropathy, 551
 ethambutol, 192
 Oral advance directives, 268
 Oral contraceptives (OCs)
 SHBG effects on, 341
 vitamin B₆ deficiency, 66

- Oral glucose tolerance test
diabetes mellitus diagnosis, 350
- Oral hairy leukoplakia, 173
- Oral/intestinal ganglioneuromatosis, 356
- Oral pathologies, **383**, 389
- Oral thrush, 173
- Orbital cellulitis, 559
- Orchiectomy, 670
- Orchiopexy, 669
- Orchitis, 167, 671
- Orchitis and epididymitis, **671**
- Orexigenic effect, 340
- Orexin, 585
- Organ failure in acute pancreatitis, 404
- Organic acidemias, **83**
- Organ of Corti, 548
- Organogenesis
teratogens in, **632**
- Organophosphates
acetylcholinesterase poisoning, 239
toxicity treatment, 247
- Organ transplants
Kaposi sarcoma with, 486
rejection prevention, 444
TORCH infections, 180
- Organum vasculosum of the lamina terminalis (OVLt), 506
- Orientation (mental status), **575**
- Origin of DNA replication, 36
- Orlistat
drug reactions with, 248
mechanism, clinical use and adverse effects, **407**
- Ornithine
cystinuria, 83
kidney stones and, 617
- Ornithine transcarbamylase
deficiency, **81**
- Ornithine transcarbamylase (OTC)
deficiency
inheritance, 59
- Orofacial clefts, **639**
- Oropharynx
carcinogens affecting, 221
- Orotic acid, 81
- Orotic aciduria, 426
- “Orphan Annie” eyes, 347
- Orthomyxoviruses
structure and medical importance, 164
- Orthopedic conditions
common knee conditions, **464**
- Orthopnea
heart failure, 316
left heart failure, 316
- Orthostatic syncope, 318
- Ortner syndrome, 288
- Ortolani maneuver, 466
- Oseltamivir
mechanism and use, **196**
- Osgood-Schlatter disease, 466
- Osler nodes, 318
- Osler-Weber-Rendu syndrome, 320
- Osmoreceptors, 506
- Osmotic demyelination syndrome, 538
- Osmotic diarrhea, 388
- Osmotic laxatives, 408
- Ossicles, 49, 547, 548
- Ossification, 461
- Osteitis deformans, **468**
- Osteitis fibrosa cystica
characteristics, 349
lab values with, 469
- Osteoarthritis
celecoxib for, 496
pathogenesis, findings and treatment, 472
- Osteoarthropathy, hypertrophic, 224
- Osteoblastoma, 470
- Osteoblasts
bone formation, 461, 462
cortisol effect on, 340
- Osteochondroma, 470
- Osteoclast-activating factor, 106
- Osteoclasts
bone formation, 461
dysfunction in osteopetrosis, 468
mechanism, 462
- Osteodystrophy, renal, **622**
- Osteogenesis imperfecta
bisphosphonates, **496**
collagen synthesis in, 48
findings in, **49**
- Osteoid osteoma, 470
- Osteoma, 216, 470
- Osteomalacia
lab values in, 469
phosphate and, 609
vitamin D and, 68
- Osteomalacia/rickets, presentation and lab values, **468**
- Osteomyelitis
associated infection and risk, **176**
common organisms, **474**
Pseudomonas aeruginosa, 141
Staphylococcus aureus, 133
- Osteonecrosis, 496
- Osteopenia, 468
- Osteopetrosis
characteristics of, **468**
lab values in, 469
- Osteophytes, 472
- Osteoporosis
bisphosphonates, 496
causes of, 332
diagnosis and complications of, **467**
drugs causing, 249
Gaucher disease, 86
homocystinuria, 83
hypertension with, 321
lab values in, 469
teriparatide for, 497
- Osteosarcoma
epidemiology and characteristics, 471
- risk with osteitis deformans, 468
vs osteoma, 216
- Ostium primum, 284
- Ostium secundum, 284
- Otitis externa
presentation, **547**
- Otitis externa (swimmer’s ear)
Pseudomonas aeruginosa, 141
- Otitis media
brain abscess from, 176
Haemophilus influenzae, 140
Langerhans cell histiocytosis, 439
presentation and complications, **547**
Streptococcus pneumoniae, 134
- Otology
anatomy and physiology, 547
- Otorrhea, painless, 548
- Ototoxicity
aminoglycosides, 187, 199
ethacrynic acid, 626
loop diuretics, 626
platinum compounds, 445
vancomycin, 186
- Outer ear, 547
- Outer membrane (bacteria), 122
- Outflow tract formation, **285**
- “Oval fat bodies”, 612
- Ovarian cancer
cisplatin/carboplatin for, 445
epidemiology of, 661
hypercalcemia, 224
microtubule inhibitors, 445
serum tumor marker, 222
with Lynch syndrome, 395
- Ovarian cycle, 650
- Ovarian cysts, **663**
- Ovarian dysgerminoma
serum tumor marker, 222
- Ovarian ligament, 642, 643
- Ovarian teratomas, paraneoplastic syndrome, 224
- Ovarian tumors, **664**
- Ovaries
descent of, **642**
epithelial histology, 644
estrogen production, 648
- Overflow incontinence, 618
- Overuse injury
carpal tunnel syndrome, 463
elbow, **462**
knee, 465, 466
radial nerve, 450
- Ovotesticular DSD, 655
- Ovulation
process of, **649**
progesterone and, 648
prolactin effect on, 332
“Owl eyes” inclusions, 434
- Oxacillin, 184
- Oxaliplatin, 445
- Oxazepam, 562
- Oxidative (irreversible) reactions, 77
- Oxidative phosphorylation
ATP production, 76
- electron transport chain, **76**
in mitochondrial diseases, 60
metabolic site, 72
skeletal muscle types and, 460
- Oxybutynin
bladder spasm treatment, 240
for micturition control, 236
- Oxygen
exercise and, 685
for carbon monoxide poisoning, 247
- Oxygen content of blood, **687**
- Oxygen-hemoglobin, cyanide effects, 689
- Oxygen toxicity, 206
- Oxyhemoglobin dissociation curve, **687**
- Oxytocin, 360
function and notes, 332
hypothalamus production, 508
lactation and, 653
secretion of, 331
signaling pathways for, 341
- P**
- p21, cell cycle regulation, 44
- p53 gene
cell cycle regulation, 44
dominant negative mutation of, 55
- Pacemaker action potential, **297**
- Pacinian corpuscles, 504
- Packed RBCs, transfusion of, 434
- Paclitaxel
mechanism, use and adverse effects, 445
- Paclitaxel
drug reactions with, 250
- Paget disease
breast, 668
extramammary, 661
- Paget disease of bone
bisphosphonates, 496
lab values in, 469
osteosarcomas and, 471
serum tumor marker, 222
woven bone in, 461
- Pain
neuropathic, 477
periorbital, 532
referred, 288, 403, 681
sensory receptors for, 504
thalamic nuclei and, 508
transmission of, **235**
treatment in multiple sclerosis, 537
with peptic ulcer disease, 387
- Painless chancre, 145
- Palbociclib, 447
- Pale infarct, 206
- Paliperidone, 591
- Palivizumab
pneumonia prophylaxis, 166
- Palliative care, **276**
- Pallor in aplastic anemia, 427
- Palmar interossei, 453

- Palmar reflex, 523
- PALM-COEIN, 651
- Panacinar emphysema, 400
- Pancoast tumor
 - characteristics of, **704**
 - lung cancer, 703
 - superior vena cava syndrome, 704
 - thoracic outlet syndrome, 452
- Pancreas
 - adrenergic receptors in, 236
 - annular, 367
 - carcinogens affecting, 221
 - divisum, 367
 - endocrine cell types, **331**
 - tumors arising from, 375
- Pancreas and spleen embryology, **367**
- Pancreatic adenocarcinoma
 - carcinogens for, 221
 - location, risk factors and presentation, **405**
 - nonbacterial thrombotic endocarditis with, 318
 - serum tumor marker, 222
- Pancreatic cancer
 - adenocarcinomas, 375
 - biliary cirrhosis and, 402
 - 5-Fluorouracil for, 444
 - hyperbilirubinemia with, 400
 - paraneoplastic syndromes, 224
- Pancreatic cancers
 - oncogenes, 220
- Pancreatic ducts
 - development, 367
 - obstruction of, 375
 - tumors from, 405
- Pancreatic insufficiency
 - malabsorption with, **388**
 - with chronic pancreatitis, 404
- Pancreatic islet cell tumors, **357**
- Pancreatic secretions
 - enzymes and role of, **380**
 - lipase, 91
- Pancreatitis
 - acute, 404
 - ARDS and, 697
 - causal agents for, 248
 - characteristics of, **404**
 - chronic, 404
 - hyperchylomicronemia, 92
 - hyperparathyroidism, 349
 - hypertriglyceridemia, 92
 - mumps, 167
- Pancuronium
 - function of, 566
- Pancytopenia
 - characteristics of, 427
 - Chédiak-Higashi syndrome, 115
 - Diamond-Blackfan anemia, 426
 - Gaucher disease, 86
 - hairy cell leukemia, 437
 - leishmaniasis, 155
 - osteopetrosis and, 468
- Paneth cells, secretions of, 369
- Panic disorder
 - SSRIs for, 580, 593
 - symptoms and treatment, **580**
- Panitumumab, 446
- Panniculitis, 492
- Panton-Valentine leukocidin (PVL), 133
- Pantoprazole, 406
- Pantothenic acid, 65
- Papillary carcinoma
 - causes and findings, 347
 - nomenclature, 216
- Papillary muscle rupture, 309, 314
- Papillary thyroid carcinoma
 - carcinogens for, 221
 - oncogenes, 220
- Papilledema
 - cause and fundoscopic appearance, **553**
 - hydrocephalus, 536
 - hypertensive emergency and, 304
 - idiopathic intracranial hypertension, 536
 - medulloblastoma and, 542
- Papillomas, 216
- Papillomaviruses
 - genome, 160
 - structure and medical importance, 161
- Pappenheimer bodies, 421
- Papules
 - actinic keratosis, 494
 - capillary, 486
 - characteristics/examples, 483
 - dermatitis herpetiformis, 490
 - molluscum contagiosum, 161, 487
 - rosacea, 485
- Para-aminohippuric acid (PAH), 600
- Paracoccidioidomycosis, unique symptoms and features, 149
- Paracortex (lymph node), 94
- Paracrine renal functions, 607
- Paradoxical emboli, with patent foramen ovale, 284
- Paradoxical splitting, 294
- Paraesophageal hiatal hernia, 377
- Parafollicular cells, 330, 637
- Parainfluenza
 - croup, 167
 - paramyxovirus, 166
- Parakeratosis
 - characteristics/examples, 483
 - psoriasis, 485
- Paralysis
 - face, 526
 - inflammatory demyelinating disorders, 538
 - inflammatory demyelinating polyneuropathy, 538
 - limb compartment syndrome, 465
 - osmotic demyelination syndrome, 538
 - rabies, 169
 - stroke, 526
- tetanic, 136
- unvaccinated children, 182
- Paramedian pontine reticular
 - formation, lesions in, 524
- Paramesonephric (Müllerian) duct, 639
- Paramyxoviruses
 - croup, 166
 - medical importance, **166**
 - mumps, 166
 - structure and medical importance, 164
- Paranasal sinus infections, 690
- Paraneoplastic syndromes
 - manifestation and associated tumors, **224**
 - renal cell carcinoma, 623
 - small cell (oat cell) carcinoma, 703
- Paranoia, LSD, 589
- Paranoid personality disorder, 582
- Parasitic infestations
 - granulomatous inflammation, 213
- IgE in, 103
- infections with immunodeficiency, 116
- myocarditis with, 320
- sign/symptom and organism hints, **158**
- Parasitology, 152
- Parasympathetic nervous system
 - cranial nerves supply of, 234
 - gastrointestinal innervation by, 371
 - male erection, 645
 - thoracoabdominal viscera innervation, 519
 - vagus nerve and, 516
 - VIP and, 378
- Parathyroid adenomas, MEN1/MEN2A syndromes, 356
- Parathyroid disease, **348**
- Parathyroid glands
 - adenomas of, 349
 - derivation of, 637
 - disease diagnosis and causes, **348**
- Parathyroid hormone
 - bone formation and disorders, 462
 - calcium homeostasis, **337**
 - osteomalacia, 468
 - signaling pathways of, 341
 - source, function, and regulation, **336**
- Paraumbilical veins, 368
- Paraventricular nucleus
 - secretions of, 331, 508
- Parent-of-origin effects (genetics), 56
- Paresthesias
 - acetazolamide use, 626
 - fibromyalgia, 477
 - in upper extremity, 450
 - lumbosacral radiculopathy, 458
 - vitamin B₁₂ deficiency, 67
- Parietal cells, 379
- Parietal cortex/lobe
 - lesions in, 524
 - projections to, 508
- Parinaud syndrome, 524
- Parity (“para”), 651
- Parkinson disease
 - benztropine for, 240
 - dream enactment, 507
 - MAO inhibitor use, 593
 - neurotransmitter changes with, 505
 - seborrheic dermatitis association, 484
 - symptoms and histologic findings, 534
 - therapy, 564
 - therapy for, **563**
 - trihexyphenidyl, 240
- Parkinson-like syndrome, drugs causing, 250
- Paromomycin, 152
- Parotid gland
 - embryologic derivation, 631
 - enlargement of, 474
 - mumps, 167
- Parotitis, 167
- Paroxetine, 593
- Paroxysmal nocturnal dyspnea, 316
- Paroxysmal nocturnal hemoglobinuria
 - causes and findings, **428**
 - CD55 deficiency, 105
 - diagnostic procedures, 52
 - intravascular hemolysis in, 427
- Paroxysmal supraventricular tachycardia, description and management, 311
- Partial agonist, 233
- Partial (focal) seizures
 - anticonvulsants for, 560
- Partial thromboplastin time (PTT), 431
- Parvoviridae
 - genome, 160
 - structure and medical importance, 161
- Parvovirus B19
 - hereditary spherocytosis, 428
 - hydrops fetalis, 177
 - rash, 180
 - receptors, 163
- Passive aggression, 571
- Passive leg raise, 295
- Passive vs active immunity, **108**
- Pasteurella* spp, culture requirements, 124
- Pasteurella multocida*
 - disease and transmission, 147
 - osteomyelitis, 176
- Patau syndrome (trisomy 13)
 - chromosome association, 62
 - findings with, 61
- Patches (skin), characteristics/examples, 483
- Patellar reflex, 523
- Patellofemoral syndrome, 466
- Patent ductus arteriosus
 - heart murmur with, 296

- indomethacin for, 496
- mechanism and treatment, 303
- neonatal respiratory distress syndrome and, 679
- Patent foramen ovale
 - atrial septal defect vs, 302
 - emboli with, 284
- Patent urachus, 636
- Patent vitelline duct, 636
- Pathogen-associated molecular patterns (PAMPs), 97, 108
- Pathologic hyperplasia, 202
- Pathology
 - aging, 225
 - cardiovascular, **302**
 - cellular injury, **202–225**
 - endocrine, 342
 - gastrointestinal, 383
 - hematology/oncology, 420
 - inflammation, **209–225**
 - musculoskeletal/skin/connective tissue, 462
 - neoplasia, **215**
 - neuronal, 505
 - oral, **383**
 - renal, 612
 - reproductive, 655
 - respiratory, 690
- Patient and ethical scenarios
 - alternative/holistic medicine trial, 273
 - angry about waiting, 272
 - assisted suicide request, 272
 - attraction to physician, 272
 - continued life support after brain death, 273
 - feels guilt for sibling death, 273
 - feels ugly, 272
 - impaired colleague, 273
 - intimate partner violence, 273
 - invasive test on wrong patient, 273
 - pharmaceutical company sponsorship, 273
 - possible abuse, 273
 - religious beliefs and, 273
 - suicidal patient, 272
 - treatment cost discussions, 273
 - treatment from another physician, 272
 - vaccination refusal, 273
- Patient-centered interviewing techniques, **270**
- Patient information disclosure, 272
- Patient prognosis disclosure, 272
- Patients with disabilities,
 - communication with, 274
- Patiromer, 361
- Pattern recognition receptors, 97
- Payment models for healthcare, 276
- P-bodies (cytoplasmic processing bodies), 40
- PCR (polymerase chain reaction) test
 - arbovirus diagnosis, 168
 - Babesia* spp diagnosis, 154
 - Chlamydiae diagnosis, 146
 - Clostridioides difficile* diagnosis, 136
 - Ebola diagnosis, 169
 - for protozoa GI infections, 152
 - HSV identification, 163
 - leprosy diagnosis, 139
 - Neisseria meningitidis*, 140
 - of amniotic fluid, 153
 - severe acute respiratory syndrome coronavirus 2, 169
 - Zika virus diagnosis, 168
- PCSK9, 91
- PCSK9 inhibitors, 325
- PDE-3 inhibitor, 245
- PDE-4 inhibitor, 245
- PDE-4 inhibitors, asthma therapy, 704
- PDE-5 inhibitors
 - drug reactions with, 250
 - for pulmonary hypertension, **706**
 - mechanism and use, 245
 - naming conventions for, 253
- Pearson correlation coefficient (r), **267**
- Peau d'orange, 668
- PECAM-1/CD-31, tumor identification, 223
- Pectinate line, **373**
- Pectineus, 455
- Pectoriloquy (whispered), 698
- Pectus carinatum, **50**
- Pectus excavatum, 50
- Pediatric patients
 - abuse, **573**
 - brachial plexus injury, 452
 - causes of seizures in, 531
 - common fractures, **467**
 - growth retardation in, 621
 - infant and child development, **572**
 - intraventricular hemorrhage, 527
 - juvenile polyposis syndrome in, 394
 - lead poisoning treatment, 247
 - leukocoria in, 553
 - liver transplantation, 401
 - neglect in, 573
 - pathogens affecting, 182
 - precocious puberty, 55
 - primary brain tumors, **542**
 - rhabdomyomas in, 320
 - scalded skin syndrome in, 487
 - sleep terror disorder in, 585
 - tetracycline adverse effects, 188
 - volvulus in, 392
 - Wilms tumors in, 624
- Pediculus humanus*, disease and treatment, 158
- Pegloticase, 497
- Pegvisomant, 343
- Pellagra, 65
- Pelvic inflammatory disease (PID)
 - common organisms, **181**
 - Neisseria* spp, 140
- Pelvic organ prolapse, **643**
- Pelvic splanchnic nerves, 234
- Pelvis
 - fracture and nerve injury, 456
 - nerve injury with surgery, 456
- Pembrolizumab, 218, 446
- Pemphigus vulgaris
 - acantholysis and, 483
 - autoantibodies in, 113, 482
 - pathophysiology and morphology, 489
 - type II hypersensitivity, 110
- Penicillamine
 - drug reactions with, 249
 - for Wilson disease, 402
- Penicillin
 - Actinomyces* treatment, 137
 - antipseudomonal, 184
 - drug reactions with, 249
 - penicillinase-resistant, 184
 - penicillinase-sensitive, 184
- Penicillinase-resistant penicillins
 - mechanism, use and adverse effects, **184**
- Penicillinase-sensitive penicillins
 - mechanism, use and adverse effects, **184**
- Penicillin G
 - syphilis treatment, 145
- Penicillin G, V
 - mechanism, use and adverse effects, **183**
 - meningococci treatment, 140
 - prophylactic use, 193
- Penicillins
 - antipseudomonal, 141
 - drug reactions with, 250
- Penile cancer, 222
- Penile pathology, **669**
- Penis
 - carcinoma in situ, 669
 - congenital abnormalities, **641**
 - squamous cell carcinoma, 669
- Pentamidine, 151
- Pentobarbital, 561
- Pentose phosphate pathway (HMP shunt)
 - functions, sites and reactions, **77**
 - metabolic site, 71
 - NADPH production, 72
 - rate-determining enzyme, 71, 72
 - vitamin B₁ deficiency, 64
- Pentostatin
 - clinical use, 437
 - mechanism, use and adverse effects, 444
- PEP carboxykinase, 76
- Pepsinogen
 - location of, 379
- Pepsin, source, action and regulation, 379
- Peptic ulcer disease
 - glycopyrrolate for, 240
 - H₂-blockers for, 406
- Helicobacter pylori*, 144
- Helicobacter pylori* risk for, 386
- mechanism and presentation, **387**
- misoprostol for, 406
- proton pump inhibitors for, 406
- Peptidoglycan, in gram negative bacteria, 123
- Peptostreptococcus* spp
 - alcohol use disorder, 175
 - lung abscess, 702
- Percussion, 698
- Perforation (GI)
 - inflammatory bowel diseases, 389
 - necrotizing enterocolitis, 393
 - ulcer complications, 387
- Perforin, 99, 100
- Perforin/granzyme B pathway, 204
- Performance anxiety, 580
- Perfusion-limited gas exchange, 684
- Periarteriolar lymphatic sheath, 96
- Pericardial effusion, 314, 317, 319
- Pericarditis
 - acute, **319**
 - constrictive, **319**
 - fibrinous, 309
 - jugular venous pulse in, 292
 - picornaviruses, 164
 - postinfarction, 309
 - pulsus paradoxus in, 317
 - referred pain from, 288
- Pericardium, anatomy of, 288
- Pericentral (centrilobular) zone of liver, 374
- Pericytes, 506
- Perihepatitis, 181
- Peri-infarction pericarditis, 314
- Perinephric abscesses, 619
- Perineurium, 505
- Perinuclear ANCA (p-ANCA)
 - autoantibody, 113
- Periodic acid-Schiff stain, 85, 123
- Perioral numbness, 246
- Periorbital edema
 - thyroid disease and, 344
 - Trichinella spiralis*, 156, 158
 - trichinosis, 156
- Peripartum cardiomyopathy, dilated, 315
- Peripartum mood disturbances, **579**
- Peripheral blood smear
 - basophilic stippling, 425
 - in plasma cell dyscrasias, 436
 - RBC inclusions, 421
 - schistocytes, 429
 - smudge cells, 437
 - spherocytes and agglutinated RBCs, 429
 - with acute myelogenous leukemia, 437
 - with HbC disease, 428
- Peripheral edema
 - calcium channel blockers, 323
 - heart failure, 316
 - right heart failure, 316

- Peripheral facial palsy, 546
Peripheral nervous system
 glial cells, 503
 nerve structures, **505**
 origins of, **500**
Peripheral neuropathy
 alcohol use disorder, 590
 drugs causing, 250
 Fabry disease, 86
 Krabbe disease, 86
 linezolid, **189**
 Lyme disease, 144
 sorbitol, 79
 vitamin B₆ deficiency, 66
Peripheral precocious puberty, 654
Peripheral resistance, 291
Peripheral smear, 421
Peripheral vascular disease, with
 atherosclerosis, 305
Peripheral vertigo, 548
Periplasm, in bacteria, 122
Periportal zone (Zone I), 374
Peristalsis
 motilin receptor agonists and, 378
 visible, 366
Peritoneum
 hernias and, 377
 in gastroschisis vs omphalocele,
 365
 “violin string” adhesions, 181
Peritonitis
 appendicitis, 390
 diverticulitis, 390
 spontaneous bacterial, **397**
Periventricular calcifications (brain),
 180
Periventricular plaques, 537
Permanent cells, 44
Permethrin
 anti-mite/lice therapy, 195
 for scabies, 158
Permissive drug effects, 234
Pernicious anemia
 autoantibody, 113
 gastritis and, 379
 vitamin B₁₂ deficiency, 67, 426
Peroxisome functions, **46**
Per-protocol analysis, 257
Persistent depressive disorder
 (dysthymia), 578
Persistent metaplasia, 202
Persistent pulmonary hypertension of
 the newborn, **304**
Persistent truncus arteriosus, 285, 302
Personality disorders classification,
 582
Pertussis, unvaccinated children, 182
Pes cavus, Friedreich ataxia, 545
Petechniae, aplastic anemia, 427
Petit mal (absence) seizures, 531
Peutz-Jeghers syndrome, 216, 394
PEX genes, 46
Peyer patches
 features and functions, **381**
 histology, 369
 IgA antibody production, 103, 381
 immune system organ, 94
Peyronie disease, 669
PGI₂, 495
P-glycoprotein, **223**
Phagocyte dysfunction
 defect, presentation, and findings,
 115
 exotoxin inhibition in, 130
Phagocytosis
 alveolar macrophages, 679
 defect, presentation, and findings,
 115
 exotoxin inhibition, 130
Phalen maneuver, 463
Phantom limb pain, **529**
Pharmaceutical company
 sponsorship, 273
Pharmacokinetics
 administered drugs, **229**
 age-related changes in, **246**
Pharmacology
 autonomic drugs, **234, 238**
 cardiovascular, **321**
 endocrine, 358
 gastrointestinal, 405
 hematologic/oncologic, 440
 musculoskeletal/skin/connective
 tissue, **495**
 neurology, 560
 pharmacokinetics/
 pharmacodynamics, 228
 renal, 625
 respiratory, 704
 toxicities and adverse effects, 246
Pharyngeal apparatus, **637**
Pharyngeal arch derivatives, **638**
Pharyngeal arch syndromes, **638**
Pharyngeal (branchial) cleft cyst, 637
Pharyngeal cleft derivatives, **637**
Pharyngeal pouch derivatives, **637**
Pharyngitis
 adenovirus, 161
 mononucleosis, 162
 prophylaxis (rheumatic fever), 193
 strep prophylaxis, 193
 Streptococcus pyogenes, 134
 unvaccinated children, 182
Pharyngitis
 group A β -hemolytic streptococci,
 319
Pharyngoesophageal false
 diverticulum, 391
Pharynx, 680
Phencyclidine, intoxication and
 withdrawal, 589
Phenelzine, 593
Phenobarbital
 cytochrome P-450 interaction, 251
 mechanism, use and adverse
 effects, 561
Phenotypic mixing (viral genetics),
 159
Phenoxybenzamine, for
 pheochromocytomas, 355
Phentolamine
 in hypertensive crisis, 587
 reversible block, 243
Phenylalanine, classification of, 79
Phenylalanine embryopathy, 82
Phenylalanine hydroxylase (PAH), 82
Phenylephrine, 241, **706**
Phenyl ketones
 in urine, 82
Phenylketonuria, **82**
Phenytoin
 cytochrome P-450 interaction, 251
 DRESS with, 249
 drug reactions with, 249, 250
 mechanism and adverse effects,
 560
 vitamin B₉ deficiency, 66
Pheochromocytomas
 etiology, symptoms, findings and
 treatment, **355**
 gene association, 220
 MEN2A/MEN2B and, 355
 phenoxybenzamine for, 243
Philadelphia chromosome
 in myeloproliferative disorders,
 437, 438
 translocations of, 439
Phlebitis, drugs causing, 194
Phlebotomy, for hemochromatosis,
 402
Phobias, diagnosis of, **580**
Phosphatases, 71
Phosphate
 low vs high serum concentration
 effects, 609
Phosphodiesterase (PDE) inhibitors
 for pulmonary hypertension, 706
 type, clinical use and adverse
 effects, **245**
Phosphoenolpyruvate carboxykinase
 gluconeogenesis, 76
Phosphofructokinase-1 (PFK-1)
 metabolic pathways, 71
Phospholipid bilayer sac, in bacteria,
 122
Phosphorus, values in bone disorders,
 469
Phosphorylases, 71
Phosphorylation, posttranslational, 43
Photodermatitis, 328
Photophobia/photosensitivity
 drugs causing, 188
 migraine headache, 532
 rabies, 169
Photosensitivity, drugs causing, 249
Phototherapy for jaundice, 401
Phrenic nerve, 681, 704
Pthirus pubis, disease and treatment,
 158
Phylloides tumor, 667
Phylloquinone, 69
Physical abuse (child), 573
 in factitious disorders, 583
Physician-assisted suicide, 267
Physiologic dead space
 determination, **682**
Physiologic splitting (S₂), 294
Physiology
 cardiovascular, 289
 endocrine, 332
 gastrointestinal, 378
 hematology/oncology, 416
 musculoskeletal, skin, and
 connective tissue, 450
 neurological, 499
 renal, **599**
 reproductive, 647
 respiratory, 682
Physostigmine, 568
 anticholinergic toxicity treatment,
 247
 anticholinesterase toxicity antidote,
 239
Phytanic acid, 46
Phytomenadione, 69
Phytonadione, 69
Pia mater, 506
Pibrentasvir, 199
Pica, 424, 584
Picornaviruses
 characteristics, **165**
 hepatitis A, 170
 structure and medical importance,
 164
Pierre Robin sequence, 638
PIGA gene, 105
Pigmented skin disorders, **484**
Pigment-producing bacteria, **126**
Pigment stones, 403
Pilocarpine
 action and applications, 239
 uses of, 568
Pilocarpine-induced sweat test, 58
Pilocytic astrocytoma, 542
Pilus/fimbria, 122
Pimozide, 591
Pineal gland
 location of, 515
 tumor histology, 542
Pinworms, 156
Pioglitazone, 359
Piperacillin
 mechanism, use and adverse
 effects, **184**
 Pseudomonas aeruginosa, with
 tazobactam, 141
Piriformis muscle, 455
Piroxicam, 496
Pisiform bone, 453
Pitting edema, 316
Pituitary adenoma
 acromegaly, 343
 characteristics and histology, 540
 growth hormone secretion with,
 333
Pituitary apoplexy, 540
Pituitary gland, **331**
Pituitary tumors, MEN1 and, 356

- Pityriasis, 488
 Pityriasis rosea, 492
Pityrosporum spp, cutaneous mycoses, 488
 pKa, 231
 Placenta
 estrogen production, 648
 fetal component, **634**
 hormone secretion by, 651
 immune privilege in, 97
 maternal component, 634
 progesterone production, 648
 twin-twin transfusion syndrome, 635
 Placenta accreta, 657
 Placenta accreta spectrum, 657
 Placenta increta, 657
 Placental abruption
 features of, 657
 preeclampsia, 660
 pregnancy complications, 657
 Placental alkaline phosphatase, with
 germ cell tumors, 671
 Placental disorders
 chronic placental insufficiency, 596
 insufficiency with preeclampsia, 660
 types of, **657**
 Placenta percreta, 657
 Placenta previa, 657
 Plague, 147
 Plantar aponeurosis, 465
 Plantar fasciitis, 465
 Plantar flexion, 457
 Plantaris, 457
 Plantar reflex, 523
 Plaques (skin)
 actinic keratosis, 494
 characteristics/examples, 483
 hairy leukoplakia, 487
 lichen planus, 492
 pityriasis rosea, 492
 psoriasis, 483
 seborrheic dermatitis, 484
 Plasma acute-phase reactants
 (inflammation), 209
 Plasma cells
 antibody production, 99, 415
 dyscrasias of, **436**
 functions of, **415**
 Plasmalogens, 46
 Plasma membrane
 in cell injury, 203
 Plasma membrane structure, 47
 Plasma protein concentration, 601
 Plasma volume, measurement of, **599**
 Plasmids, in drug resistance, 129
 Plasminogen, 442
Plasmodium spp
 chloroquine use, 195
 hematologic infections, **154**
 stains for, 123
Plasmodium falciparum, 154
Plasmodium malariae, hematologic
 infection, 154
Plasmodium ovale, 154
Plasmodium vivax, 154
 Platelet-activating factor, 412
 Platelet-derived growth factor
 (PDGF)
 signaling pathways for, 341
 wound healing, 212
 Platelet disorders, **432**
 “Platelet inhibitors”, 245
 Platelet plug formation (primary
 hemostasis), **417**
 Platelets
 essential thrombocythemia, 438
 functional liver markers, 397
 in wound healing, 212
 transfusion of, 434
 Platinum compounds
 drug reactions with, 250
 mechanism, use and adverse
 effects, **445**
 naming conventions for, 252
 Plecanatide, 408
 Pleiotropy, 54
 Pleomorphic adenoma, 383
 Pleomorphism, characteristics of, 202
 Pleural effusions, **699**
 asbestosis, 696
 mesothelioma, 695
 physical findings, 698
 Pleuroperitoneal membrane defect,
 377
 Plicae circulares, 369
 Plummer-Vinson syndrome, 384, 424
 Pneumatoceles, 151
 Pneumatosis intestinalis, 393
 Pneumoconioses, types, **696**
 Pneumocystis jirovecii
 asymptomatic infections, 151
 HIV-positive adults, 173
 opportunistic infections, **151**
 prophylaxis, 190
 stain for, 123
 stain for identification, 123
 Pneumocytes, Types I and II, 679
 Pneumomediastinum, 691
 Pneumonia
 ARDS, 697
 common causes by age, **175**
 common causes in adults by age,
 175
 giant cell, 167
 Haemophilus influenzae, 140
 HIV/AIDS prophylaxis, 193
 injectable drug use, 175
 Klebsiella spp, 143
 measles-associated death, 167
 pneumococcal, 134
 Pneumocystis jirovecii, 151
 PPI adverse effects, 406
 Pseudomonas aeruginosa, 141
 Q fever, 147
 Streptococcus agalactiae, 135
 type, organisms and characteristics
 of, **701**
 VZV, 162
 Pneumoperitoneum, 387, 393
 Pneumothorax
 physical findings, 698
 presentation and types of, **700**
 Pneumoviruses
 structure and medical importance,
 164
 Podagra, 65, **473**
 Podocyte damage, 613, 616
 Poikilocytosis, 413
 Point of service plan, 275
 Point (single nucleotide) mutation, 38
 Poliovirus/poliomyelitis
 immunodeficient patients, 116
 RNA translation in, 165
 spinal cord effects, 544
 unvaccinated children, 182
 Polyadenylation signal, 40
 Poly(ADP-ribose) polymerase
 inhibitor, naming
 conventions for, 254
 Polyarteritis nodosa
 risk with hepatitis B and C, 171
 Type III hypersensitivity, 111
 Polyarthralgias
 gonococcal arthritis, 474
 rubella, 180
 Polycystic ovarian syndrome
 antiandrogens, 676
 clomiphene, 674
 diagnosis of, **662**
 Polycythemia
 blood oxygen in, 687
 Eisenmenger syndrome, 303
 lab/test findings, **439**
 paraneoplastic syndromes, 224
 with pheochromocytoma, 355
 Polycythemia vera
 Budd-Chiari syndrome and, 397
 lab findings with, **439**
 myeloproliferative neoplasms, 438
 vs essential thrombocythemia, 438
 Polydactyly, 61
 Polydipsia, 350, 351
 Polyethylene glycol, 408
 Polyhydramnios
 causes of, 634
 esophageal atresia and, 366
 Polymerase chain reaction (PCR), **50**
 Polymorphic ventricular tachycardia,
 312
 Polymorphonuclear cells (PMNs)
 hypersegmented, 66, 67
 Polymyalgia rheumatica
 ESR with, 210
 symptoms, findings and treatment,
 477
 Polymyositis
 autoantibody, 113
 mixed connective tissue disease,
 476
 Polymyositis/dermatomyositis, **477**
 Polymyxin B, 189
 Polymyxin E, 189
 Polymyxins, mechanism, use and
 adverse effects, **189**
 Polyneuropathy, 430
 Polyomaviruses, structure and
 medical importance, 161
 Polyostotic fibrous dysplasia, 55
 Polyphagia
 diabetes Type 1 vs Type 2, 351
 in diabetes mellitus, 350
 Polyposis syndromes, **394**
 Polyps
 adenomatous, 394
 APC gene, 394
 colonic, **394**
 hyperplastic, 394
 inflammatory pseudopolyps, 394
 KRAS gene, 394
 mucosal, 394
 neoplastic transformation of, 394
 serrated, 394
 submucosal, 394
 Polysaccharide vaccine, 109
 Polyuria
 hyperparathyroidism, 349
 in diabetes mellitus, 350
 lithium, 592
 POMC derivatives, production of,
 353
 Pompe disease, 85
 Pons, 517
 Pontiac fever, 141
 Pontine syndrome, 526
 “Pope’s blessing”, 454
 Popliteal artery
 atherosclerosis in, 305
 neurovascular pairing, 458
 Popliteal cyst, 464
 Popliteal fossa, 458
 Popliteus, 457
 Population genetics concepts, **55**
 Porcelain gallbladder, 403
 Porphobilinogen deaminase, 430
 Porphyria cutanea tarda
 features of, 430
 with hepatitis B and C, 171
 Porphyrias, **430**
 Portal hypertension
 ARPKD, 622
 etiologies of, 396
 pulmonary arterial hypertension,
 698
 Schistosoma spp, 157, 158
 serum markers for, 397
 varices and, 372
 Portal triad, 368, 374
 Portal vein, 368
 Portal vein thrombosis, 397
 Portal venous gas, 393
 Portosystemic anastomoses, **372**
 Positive predictive value, 260
 Positive reinforcement, 570

- Positive skew distribution, 264
- Postauricular lymphadenopathy, 166, 177
- Postcardiac injury syndrome, 314, 319
- Posterior cerebral artery
 - stroke effects, 526
 - watershed zones, 513
- Posterior circulation strokes, 526
- Posterior circumflex artery, 458
- Posterior compartment prolapse, 643
- Posterior cruciate ligament (PCL)
 - injury, 454
- Posterior drawer sign, 454
- Posterior fossa, malformations, **502**
- Posterior inferior cerebellar artery,
 - stroke effects, 527
- Posterior interosseus nerve, 450
- Posterior nucleus (hypothalamus), 508
- Posterior pituitary (neurohypophysis),
 - functions of, 331
- Posterior urethral valves, 596, **597**
- Posterior vitreous detachment, 552
- Post-herpetic neuralgia, 162
- Postinfectious encephalomyelitis, 538
- Postoperative ileus treatment, 239
- Postpartum blues, 579
- Postpartum hemorrhage, **658**
- Postpartum psychosis
 - electroconvulsive therapy, 579
 - features of, 579
- Postpartum thyroiditis, 345
- Postradiation fibrosis (heart), 315
- Postrenal azotemia, 620
- Poststreptococcal glomerulonephritis,
 - Type III hypersensitivity, 111
- Posttranslational modification
 - (proteins), **43**
- Post-traumatic stress disorder
 - diagnostic criteria/treatment, 581
- Post-traumatic stress disorder (PTSD)
 - characteristics and treatment, 581
 - prazosin for, 243
- Posttussive emesis, 130
- Posttussive vomiting, 141
- Postural hypotension
 - midodrine for, 241
 - trazodone, 594
- Posturing, abnormal motor, 524
- Postviral infections
 - pneumonias, 175
- Potassium
 - low vs high serum concentration effects, 609
- Potassium channels
 - myocardial action potential, 297
 - opioid effect, 567
- Potassium chloride, 248
- Potassium iodide
 - for thyroid storm, 346
 - Sporothrix schenckii*, 151
- Potassium shifts, hypokalemia/hyperkalemia, **608**
- Potassium-sparing diuretics
 - mechanism, use and adverse effects, **627**
- Potency vs efficacy of drugs, **232**
- Potential drug effects, 234
- Pott disease, 176
- Potter sequence, **596**
 - ARPKD, 622
 - pulmonary hypoplasia, 679
 - with oligohydramnios, **634**
- Poxvirus
 - molluscum contagiosum, 487
 - structure and medical importance, 161
- PPAR- γ activator naming convention, 253
- PR3-ANCA/c-ANCA autoantibody, 113
- Practice tests, 18
- Prader-Willi syndrome
 - chromosome association, 62
 - ghrelin in, 378
 - imprinting disorder in, 56
 - isodisomy in, 55
- Pralidoxime, 239
- Pramipexole, 563
- Pramlintide, 248, 359
- Prasugrel, 417, 442
- Pravastatin, 324
- Praziquantel
 - anthelmintic therapy, 196
 - trematodes, 157
- Prazosin
 - clinical use, 243
 - in PTSD, 581
- Precision (reliability), 261
- Precision vs accuracy (diagnostic tests), **261**
- Precision vs accuracy (statistical tests), 265
- Precocious puberty
 - adrenal steroids and, 339
 - causes, **654**
 - leuprolide, 674
- Precontemplation, 586
- Precursor mRNA (pre-mRNA), 41
- Predictive value, 260
- Prednisolone for thyroid storm, 346
- Preeclampsia, 660
 - hydatidiform moles, 659
- Preferred provider organization, 275
- Prefrontal cortex lesions, 524
- Pregabalin, 560
- Pregnancy
 - aliskiren contraindication, 628
 - anemia caused by, 424
 - carpal tunnel syndrome in, 463
 - contraindicated antimicrobials, **199**
 - ectopic, **658**
 - ESR with, 210
 - estrogen in, 648
 - folate deficiency caused by, 426
 - folic acid supplementation, 66
 - Graves disease with, 346
 - heparin in, 440
 - hypertension and treatment in, 243, 321, 660
 - intrapartum prophylaxis, 193
 - iron study interpretation, 423
 - Listeria monocytogenes* in, 137
 - lithium in, 304
 - physiologic changes in, **651**
 - pituitary infarcts with, 343
 - progesterone in, 648
 - pyelonephritis, 619
 - pyogenic granulomas and, 486
 - risks with SLE, 476
 - sex hormone-binding globulin, 341
 - Sjögren syndrome and, 474
 - stages of, **651**
 - stillbirth, 180
 - Streptococcus agalactiae* screening, 135
 - syphilis in, 145
 - termination of, 675
 - thyroxine-binding globulin, 335
 - Turner syndrome and, 655
 - urinary tract infections, 178
 - uterine rupture, **658**
 - vitamin B₉ deficiency, 66
 - Zika virus in, 168
- Pregnancy complications
 - ectopic pregnancy, **658**
 - hypertension, **660**
 - placental disorders, **657**
 - postpartum hemorrhage, **658**
- Prehn sign, 669, 671
- Preload
 - approximation of, 289
- Premature atrial contraction, 313
- Premature beats, **313**
- Premature ejaculation, 584, 593
- Premature ovarian failure, 653, 662
- Premature ventricular contraction, 313
- Premenstrual dysphoric disorder, 593
 - pre-mRNA splicing, **41**
- Preoptic nucleus, GnRH release, 508
- Preparation/determination, 586
- Prepatellar bursitis, 464
- Preprocollagen, 48
- Preproinsulin, 338
- Prerenal azotemia, 620
- Presbycusis, 548
- Presbyopia, **550**
- Preschool age development, 572
- Preseptal cellulitis, 559
- Pressure injury (skin), 491
- Pressure sensation
 - receptors for, 504
 - thalamic relay for, 508
- Pressure-volume loops, **292, 293**
- Presynaptic terminals, adrenergic
 - receptors in, 236
- Pretectal nuclei, 554
- Pretest probability, 259
- Prevalence vs incidence, **261**
- Prevotella* spp
 - alcohol use, 175
 - healthcare-associated infections, 181
- Priapism
 - ischemic, 669
 - sickle cell anemia, 428
 - trazodone and, 594
- Prilocaine, 565
- Primaquine
 - drug reactions with, 249
 - for prophylaxis, 193
 - in G6PD deficiency, 77
- Primary adrenal insufficiency, 353
- Primary amyloidosis, 208
- Primary biliary cholangitis, 400, 402
- Primary bone tumors, **471**
- Primary central nervous system
 - lymphoma, occurrence and associations, 435
- Primary ciliary dyskinesia, clinical findings, **47**
- Primary disease prevention, **275**
- Primary dysmenorrhea, **663**
- Primary (essential) hypertension, 321
- Primary glomerular disease, 612
- Primary hemostasis, 413, **417**
- Primary hyperaldosteronism
 - causes of, 354
 - hypertension with, 304
 - renal disorder features, 605
- Primary hyperparathyroidism
 - lab values in, 469
 - neuropsychiatric disturbances, 349
 - presentation, 349
- Primary lactase deficiency, 79
- Primary ovarian insufficiency, 653, **662**
- Primary polydipsia, **342**
- Primary sclerosing cholangitis, 402
 - autoantibody, 113
 - jaundice with, 400
- Primary spontaneous pneumothorax, 700
- Primary syphilis, 145
- Primary testicular lymphoma, 671
- Primase, replication initiation by, 36
- Primitive atrium, 286
- Primitive pulmonary vein, 286
- Primitive reflexes, **523**
- Primitive ventricle, 286
- PR interval
 - antiarrhythmic effects, 327
 - time of, 298
- Prinzmetal angina, 308
- Prions, diseases caused by, **174**
- Probenecid, 497
- Procainamide
 - antiarrhythmic effects, 326
 - drug reactions with, 249
- Procalcitonin, 209
- Procarbazine
 - disulfiram-like reaction with, 250
 - mechanism, use and adverse effects, 445
- Procedure bias, 262
- Processus vaginalis, 642
- Prochlorperazine, 407, **447**
- Procoagulation, 419

- Procollagen peptidase deficiency, 49
Proctitis, 393
Progeria, 36
Progesterone
 lactation and, 653
 signaling pathways for, 341
 source and function, **648**
Progestins
 mechanism and use, **675**
Progressive multifocal
 leukoencephalopathy (PML)
 features of, 538
 HIV-positive adults, 173
 polyomaviruses, 161
Projection, 571
Prokaryotes
 DNA replication in, 36
 fluoroquinolones effect in, 36
 mRNA start codons, 42
 RNA polymerases in, 40
Prolactin
 function and notes, 332
 lactation and, 653
 secretion of, 331, 509
 signaling pathways for, 341
 source, function, and regulation,
 334
Prolactin-inhibiting factor, 332
Prolactinoma, treatment, 334
Proliferative diabetic retinopathy, 552
Proliferative glomerular disorders, 612
Proliferative phase (wound healing),
 212
Prolonged grief disorder, 572
Prometaphase, 44
Promoters (gene expression), 40
Pronephros, 596
Proopiomelanocortin, 331
Propafenone, 327
Proper hepatic artery, 368
Prophase, 44
Prophylaxis
 calcium pyrophosphate deposition
 disease, 473
 for migraine headaches, 532
 for rheumatic fever, 319
 indications and medication, **193**
 infections in HIV/AIDS, **193**
 Pneumocystis jirovecii, 151
 rabies postexposure, 169
 Trichomonas vaginalis, 155
Propionic acidemia, 83, 88
Propionyl-CoA carboxylase, vitamin
 B₇ and, 66
Propofol, 565
Propranolol, 244, 327, 346
Proprioception
 Friedreich ataxia, 545
 muscle receptors for, **461**
Propylthiouracil
 drug reactions with, 249
 for thyroid storm, 346
 T3 in peripheral tissues, 335
 thionamides, 360
Prostacyclin analogues
 clinical use, 706
Prostaglandin analogs
 naming conventions for, 253
Prostaglandins
 aspirin effects, 496
 cortisol effect on, 340
 glaucoma therapy, 568
 kidney effects of, 607
Prostate cancer
 adenocarcinomas, **672**
 immunohistochemical stains, 223
 incidence/mortality of, 218
 leuprolide for, 674
 serum tumor marker, 222
Prostate-specific antigen (PSA)
 serum tumor marker, 222
 stains for, 223
Prostatic acid phosphatase (PAP), 672
Prostatic adenocarcinoma, **672**
Prostatitis
 characteristics of, **672**
 Escherichia coli, 672
 gonorrhea, 179
Prosthetic devices
 Staphylococcus epidermidis, 126
Prosthetic heart valves, 429
Protamine sulfate, 247, 440
Protease inhibitors
 drug reactions with, 249
 HIV therapy, **198**
 naming convention for, 252
Proteases, pancreatic secretion, 380
Proteasome inhibitors, naming
 conventions for, 254
Proteasome, in immune response, **46**
Protein A, bacterial virulence, 127
Proteinases, 412
Protein C/S deficiency, hereditary
 thrombophilias, 433
Protein-energy malnutrition, **69**
Protein kinase A, fructose
 bisphosphatase-2 and, 74
Protein metabolism, amino acids, 79
Protein synthesis
 exotoxin inhibition of, 130
 metabolic site, 72
 posttranslational modification, **43**
 RNA polymerases in, 40
 sequence of, **43**
Protein synthesis inhibitors
 naming conventions for, 252
Protein transcription, histone
 deacetylation in, 32
Proteinuria
 ACE inhibitors for, 628
 glomerular disease and, 613
 nephritic-nephrotic syndrome, 613
 nephrotic syndrome, 613
 preeclampsia, 660
 serum sickness, 111
Proteolysis, cortisol and, 340
Proteolytic processing (collagen
 synthesis), 48
Proteus spp
 struvite stones, 125
Proteus mirabilis
 cephalosporins, 185
 clinical significance, **143**
 penicillins for, 184
 urinary tract infections, 178, 619
Prothrombin G20210A mutation, 433
Prothrombin, complex concentrate
 transfusion, 434
Prothrombin time
 functional liver markers, 397
Proton pump inhibitors
 drug reactions with, 249, 250
 mechanism, use and adverse
 effects, **406**
 naming conventions for, 253
Protoporphyrin, 430
Protozoa
 CNS infections, **153**
 gastrointestinal infections, **152**
 hematologic infections, **154**
 pyrimethamine effects in, 34
 stains for identification, 123
 visceral infections, **155**
 watery diarrhea, 175
Proximal renal tubular acidosis (RTA
 type 2), 611
Proximal renal tubule, relative
 concentrations along, **605**
PRPP aminotransferase
 glycogenolysis, 71
 in Lesch-Nyhan syndrome, 35
Prucalopride, 408
Pruritus
 anal, 156
 aquagenic, 438
 atopic dermatitis, 485
 biliary tract disease, 402
 chloroquine, 195
 cutaneous mycoses, 488
 dermatitis herpetiformis, 490
 ectoparasites, 158
 lichen planus, 492
 lichen sclerosus, 661
 nocturnal perianal, 158
 otitis externa, 547
 pseudofolliculitis barbae, 485
Prussian blue stain, 402, 696
Psammoma bodies
 calcification, 207
 characteristics, **207**
 mesotheliomas, 695
 serous carcinoma, 664
 thyroid cancer, 347
Pseudoappendicitis, *Yersinia*
 enterocolitica, 142
Pseudobulbar palsy, 544
Pseudodiverticulum, 390
Pseudoephedrine, **706**
Pseudofolliculitis barbae, 485
Pseudofractures, 468
Pseudohypoparathyroidism
 lab values with, 348
 type 1A, 348
Pseudomembranous colitis
 clindamycin, 188
 Clostridioides difficile, 136
 drugs causing, 248
 penicillins, 184
 watery diarrhea, 175
Pseudomembranous pharyngitis, 137
Pseudomonas spp
 epididymitis and orchitis, 671
 fluoroquinolones, 191
 immunodeficient patients, 116
 osteomyelitis, 176
 otitis externa (swimmer's ear), 547
 pyocyanin of, 107
Pseudomonas aeruginosa
 biofilm production, 126
 exotoxin in, 130
 findings and treatment, **141**
 healthcare-associated infections,
 181
 in cystic fibrosis, 58
 pigment production, 126
 polymyxins, 189
Swimmer's ear (otitis externa), 141
 urinary tract infections, 178
Pseudo-Pelger-HuSt anomaly, 436
Pseudostratified ciliated cells, 680
Pseudovirion, 159
Psittacosis, 147
Psoas abscess, **463**
Psoas sign, 390, 463
Psoriasis
 antimetabolites for, 444
 characteristics of, 485
 cyclosporine, 118
 etanercept for, 498
 hyperkeratosis, 483
 hyperkeratosis/parakeratosis, 483
 infliximab/adalimumab for, 498
 skin lesions, 483
Psoriasis biologics, **498**
Psoriatic arthritis
 arthritis with, 485
 HLA subtype, 98
 leflunomide for, 496
 seronegative spondyloarthritis, **475**
Psychiatric emergencies
 cause, manifestation and treatment,
 587
 delirium tremens, 587
Psychiatric overtones,
 hyperparathyroidism, 349
Psychiatry
 diagnostic criteria by symptom
 duration, **581**
 pathology, 573
 pharmacology, 590
Psychoactive drug intoxication/
 withdrawal, 588, **589**
Psychogenic nonepileptic events, 531
Psychology/psychiatry, **569**
Psychosis
 characteristics of, **576**
 LSD, 589
 postpartum, 579

- Psychosocial impact
of strabismus, 555
- Psychotherapy, techniques, **590**
- Psyllium, 408
- PTEN* gene
product and associated condition,
220
- PTH-related peptide (PTHrP)
functions, 336
- PTHrP (parathyroid hormone-related
protein), 224
- Ptoxis
CN III damage, 556
Horner syndrome, 555
myasthenia gravis, 480
saccular aneurysm, 530
- Pubarche, 654
- Puberty
Kallmann syndrome and, 656
precocious, 55
- Public health sciences
communication skills, 270
ethics, 267
- Pudendal nerve, 373, 457, 645
- Pulmonary arterial hypertension,
303, 698
- Pulmonary artery, 681
- Pulmonary capillary wedge pressure
(PCWP), 300, 317
- Pulmonary circulation
features of, **684**
persistent pulmonary hypertension,
304
uncorrected left-to-right shunt, 303
vascular resistance, **684**
ventilation/perfusion mismatch,
685
- Pulmonary edema
left heart failure, 316
nitrates for, 322
opioids for, 567
physical findings, 698
- Pulmonary emboli
presentation and treatment, **691**
treatment of, 440
- Pulmonary fibrosis
diffusion limited gas exchange, 684
drugs causing, 250
idiopathic, 694
- Pulmonary hypertension
acute respiratory distress syndrome,
697
chronic thromboembolic, 698
etiologies, **698**
hypoxia or lung disease, 698
hypoxic vasoconstriction, 684
left heart disease, 698
multifactorial, 698
sildenafil, 706
- Pulmonary hypertension drugs, **706**
- Pulmonary hypoplasia, 596, 679
- Pulmonary Langerhans cell
histiocytosis, 694
- Pulmonary vascular resistance (PVR),
684
- Pulmonary vasculature
alveolar hypoxia effects on, 300
- Pulmonic stenosis
wide splitting in, 294
- Pulmonic valves
physiologic splitting, 294
- Pulse pressure
equation for, 290
- Pulse-temperature dissociation], 142
- Pulsus paradoxus, cardiac tamponade,
317
- “Pulsus parvus et tardus”, 296
- “Punched out” bone lesions, 436
- Punishment (conditioning), 570
- Pupil
CN III palsy, 556
control of, **554**
drugs affecting size, 251
light reflex, 554
relative afferent pupillary defect,
554
- Pupillary reflex, 519
- Pure motor stroke, 526
- Pure red cell aplasia, 96, 224, 426
- Purines
de novo synthesis, **34**
de novo synthesis rate-limiting
enzyme, 71
drug actions on synthesis, 34
gout and, 473
Lesch-Nyhan syndrome, 35
salvage deficiencies, **35**
structure, 33
- Purkinje cells
ischemia effects, 206
paraneoplastic cerebellar
degeneration, 224
- Purkinje fibers, 298
- Purpura
aplastic anemia, 427
- Pustular psoriasis, 483
- Pustules
acne, 485
characteristics/examples, 483
pseudofolliculitis barbae, 485
rosacea, 485
- P value, 264
- P wave (ECG), 298
- Pyelonephritis
acute and chronic, **619**
kidney stones, 617
urinary tract infections, 178
- Pygmalion effect, 262
- Pyknosis, in cell injury, 203
- Pyloric channel
hypertrophic stenosis, **366**
obstruction with ulcer, 387
- Pyloromyotomy, 366
- Pyoderma gangrenosum,
inflammatory bowel disease,
389
- Pyogenic granulomas, 486
- Pyramidal cells, ischemia, 206
- Pyramidal tract demyelination, 537
- Pyrantel pamoate, 156, 196
- Pyrazinamide
adverse effects, 192
drug reactions with, 249
- Pyrethroids, 158
- Pyridostigmine, myasthenia gravis
treatment, 239, 480
- Pyridoxal phosphate, 66
- Pyridoxine, 66
- Pyrimethamine, 195
effects in protozoa, 34
purine and pyrimidine synthesis, 34
- Pyrimidines
de novo synthesis, 34
structure, 33
- Pyrimidine synthesis
de novo rate-limiting enzyme, 71
drug actions on, 34
leflunomide, 496
- Pyruvate carboxylase
gluconeogenesis, 76
vitamin B₇ and, 66
- Pyruvate dehydrogenase
deficiency, 75
vitamin B₁ and, 64
- Pyruvate dehydrogenase complex
cofactor requirements, 75
glycolysis regulation, **74**
- Pyruvate dehydrogenase complex
deficiency, **75**
- Pyruvate kinase deficiency
anemia with, 428
RBC morphology with, 420
- Pyruvate metabolism, **75**
- Pyuria
acute interstitial nephritis, 620
sterile, 619
- Q**
- Q fever
ricketsial disease, 147
transmission and presentation, 148
- QRS complex, 298
- QT interval, 298
- Quantifying risk, terminology for, **258**
- Quaternary amines, 199
- Quetiapine, 252, 591
- Quiescent (stable) cells, 44
- Quinidine
antiarrhythmic effects, 326
drug reactions with, 249
- Quinine
drug reactions with, 250
hematologic infection treatment, 154
- Quinolone, *Legionella pneumophila*,
141
- R**
- Rabies virus
medical importance, **169**
receptors, 163
structure and medical importance,
164
- Rachitic rosary, 468
- Radial head subluxation, 466
- Radial nerve
injury and presentation, 450
neurovascular pairing, 458
- Radiation dermatitis, 492
- Radiation exposure
aplastic anemia, 427
apoptosis, 204
free radical injury, 206
myelodysplastic syndromes, 436
- Radiation therapy
angiosarcomas, 486
lymphopenia, 429
papillary thyroid carcinoma risk,
347
- Radiculopathy, lumbosacral, **458**
- Radon, carcinogenicity of, 221
- RAG mutation, immunodeficiency,
115
- Rales, in heart failure, 316
- Raloxifene, clinical use, 674
- Ramelteon, 562
- Ramipril, 628
- Ramsay Hunt syndrome, 546
- Randomized clinical trials, 257
- Random plasma glucose, diabetes
mellitus diagnosis, 350
- RANK-L (RANK ligand), 336, 462
- Ranolazine, mechanism, use and
adverse effects, **324**
- Raphe nucleus, 505
- Rapid acting insulins, 358
- Rapid automated broth cultures, 124
- Rapidly progressive (crescentic)
glomerulonephritis, 614
- Rasagiline, 563
- Rasburicase, 440, 447
- RAS gene, 347
- Ras GTPase, 220
- Rashes
“blueberry muffin”, 166
“broad collar”, 65
carbapenems, 186
childhood diseases and
presentations, **177**
fluoroquinolones, 191
heliotrope, 224
macrolides, 189
malar, 476
palms and soles, 148
penicillinase-sensitive penicillins,
184
petechial, 180
ricketsial infections, 148
rubella, 180
unvaccinated children, 182
- Rathke pouch, 331, 631
- Rationalization, 571
- Raynaud phenomenon
calcium channel blockers for, 323
disease vs syndrome, 480
vs syndrome, **480**
“Razor bumps”, 485

- RB1* gene
 - mutation effects, 552
 - product and associated condition, 220
- RBC casts in urine, 612
- RBC inclusions, associated pathology, **421**
- RBC morphology, **420–448**
- Reabsorption and secretion rate
 - calculation, **602**
- Reaction formation, 571
- Reactive arthritis
 - Campylobacter jejuni*, 143
 - chlamydia, 179
 - classic triad of, 475
 - HLA subtype, 98
 - Type III hypersensitivity, 111
 - Yersinia enterocolitica*, 142
- Reactive oxygen species (ROS), 107
- Reassortment
 - influenza viruses, 166
 - viral genetics, 159
- Recall bias in studies, 262
- Receiver operating characteristic
 - curve, **260**
- Receptive (Wernicke) aphasia, 529
- Receptor binding, potency and efficacy with antagonists, **233**
- Receptor-mediated endocytosis, 45
- Receptors used by viruses, 163
- Receptor tyrosine kinase, 341
- Recklinghausen disease, 539
- Recombinant cytokines, clinical uses, **119**
- Recombinant parathyroid hormone, **497**
- Recombinant uricase naming
 - convention, 252
- Recombinant vaccine, 109
- Recombination
 - bacterial genetics, 128
 - viral genetics, 159
- Rectal sparing, 389
- Rectoceles, 643
- Rectum
 - familial adenomatous polyposis, 394
 - portosystemic anastomosis, 372
- Rectus abdominis muscle, 377
- Recurrent branch of median nerve,
 - injury and presentation, 450
- Recurrent laryngeal nerve
 - compression of, 288, 703
- Pancoast tumor, 704
- Recurrent respiratory papillomatosis, 690
- Red blood cell pathology
 - inclusions, **421**
 - pathologic morphology, **420**
- Red hepatization, 702
- Red infarct, 206
- Redox reactions, vitamin B₂ and, 65
- Redundant/degenerate genetic code, 35
- Reed-Sternberg cells, 434
- Refeeding syndrome (anorexia nervosa), 584
- Referred pain
 - cholecystitis, 403
 - diaphragm irritation, 681
 - pericardium/pericarditis, 288
- Reflex bradycardia, 606
- Reflexes
 - cranial nerves, **519**
 - grading of, 523
 - motor neuron signs, 543
 - primitive, **523**
 - spinal (clinical), **523**
- Reflex syncope, 318
- Reflex tachycardia, 243, 322
- Reflux (erosive) esophagitis, 384
- Refractive errors (vision), **549**
- Refractory angina, 324
- Refractory (autonomous)
 - hyperparathyroidism, 349
- Refsum disease, 46
- Refusing care, minors, 268
- Regan-Lowe medium, 124
- Registering for exam, 5–6
- Regression, 571
- Regulation of cell cycle
 - cyclin-dependent kinases (CDKs), 44
- Regulation of gene expression, **40**
- Regulatory T cells
 - cell surface proteins, 108
 - functions, **100**
- Regurgitation, in GERD, 384
- Reheated rice syndrome, 136
- Reichert cartilage, 638
- Reinforcement, 570
- Relapse (change model), 586
- Relapsing fever
 - animal transmission, 147
 - transmission, 158
- Relationship with patients, 272
- Relative afferent pupillary defect, 554
- Relative risk, 258
- Relative risk reduction, 258
- Relative risk (RR), 256
- Reliability (precision), 261
- Remdesivir, mechanism and use, **196**
- Remodeling (tissue), 212
- REM (rapid eye movement) sleep, 507
- REM sleep behavior disorder, **507**
- Renal agenesis
 - causes of, 596
- Potter sequence, 596
 - pulmonary hypoplasia association, 679
- Renal artery stenosis, causes and effects, **623**, 628
- Renal blood flow
 - autoregulation, **600**
 - diagram, **598**
 - renal artery stenosis, 623, 628
 - renal plasma flow and, 600
- Renal cell carcinoma
 - carcinogens for, 221
 - chromosome association, 62
 - hypercalcemia, 224
 - metastases, 219
 - presentation and treatment, **623**
 - PTH-related peptide (PTHrP) functions, 336
 - recombinant cytokines, 119
 - risk with complex cysts, 622
- Renal clearance calculation, **600**
- Renal cyst disorders, **622**
- Renal disorders/failure
 - acute pericarditis with, 319
 - conditions and features of, **605**
 - consequences of, **621**
 - drug dosages in, 229
 - ESR with, 210
 - Fabry disease, 86
 - genitourinary trauma, 645
 - gout and, 473
 - ischemia, 496
 - renin-secreting tumor, 605
 - staphylococcal scalded skin syndrome, 487
 - tetracycline use in, 188
 - waxy casts in, 612
 - Wilson disease, 402
- Renal/genitourinary drug reactions, **250**
- Renal oncocytoma, **624**
- Renal osteodystrophy, 349, 621, **622**
- Renal papillary necrosis
 - characteristics and associations, **621**
 - pyelonephritis and, 619
 - sickle cell anemia, 428
- Renal plasma flow, effective, **600**
- Renal sympathetic discharge, 606
- Renal system
 - aging effects on, 225
 - embryology, 596
 - genitourinary drug reactions with, **250**
- Renal tubular acidosis, types and findings with, **611**
- Renal tubular defects, effects and causes, **604**
- Renin
 - aliskiren effect on, 628
 - primary hyperaldosteronism, 354
 - source and effects, **606**
- Renin-angiotensin-aldosterone system, **606**
- Renomegaly, 85
- Renovascular disease, **623**
- Renovascular hypertension, 354
- Reoviruses
 - genome, 160
 - structure and medical importance, 164
- Repaglinide, 359
- Repair of DNA, **37**
- Reperfusion injury, 206, 309
- Reperfusion therapy, 315
- Replication fork, 36
- Replicative potential (cancer), 217
- Reportable diseases, confidentiality
 - exceptions, 269
- Repression, 571
- Repressor proteins, lactose effects
 - on, 39
- Reproductive/endocrine drug
 - reactions, **248**
- Reproductive hormones, control of, **673**
- Reproductive organs, drainage of, **642**
- Reproductive system
 - aging effects on, 225
 - anatomy, 642
 - female anatomy, **643**
 - male anatomy, **644**
 - pathology, 655
 - pharmacology, 673
 - physiology, 647
- Rescheduling exam, 6
- Residual volume, 682
- Resistance, pressure and flow in
 - vessels, **291**
- Reslizumab, 705
- Respiration
 - exercise response, **688**
 - high altitude response, **688**
- Respiratory
 - fluoroquinolones, 191
 - organisms in unvaccinated children, 182
- Respiratory acidosis
 - laboratory findings with, 609
- Respiratory alkalosis
 - high altitude, 688
 - laboratory finding with, 609
- Respiratory burst, 107, 115
- Respiratory depression
 - barbiturates, 588
 - benzodiazepines, 588
 - opioids, 588
 - psychoactive drug intoxication, 588
 - tricyclic antidepressants, 593
- Respiratory failure
 - inflammatory demyelination disorders, 538
 - polymyxins, 189
- Respiratory syncytial virus (RSV)
 - pneumonia, 701
- Respiratory system
 - aging effects on, 225
 - drug reactions with, 250
 - muscarinic antagonist effects, 240
 - pharmacology, 704
- Respiratory tract infections, C3
 - deficiency, 105
- Respiratory tree, **680**
- Respiratory zone, 680
- Resting tremor, 533
- Restless legs syndrome, **533**
- Restricting type (anorexia nervosa), 584
- Restrictive cardiomyopathy,
 - hemochromatosis, 402

- Restrictive/infiltrative cardiomyopathy, 315
- Restrictive lung diseases
 - ankylosing spondylitis, 475
 - flow volume loops, 692
 - types of, **694**
- Reteplase (rPA), 442
- Rete testis, 670
- RET gene
 - associated neoplasm, 220, 355
 - Hirschsprung disease, 391
- Reticular activating system, lesion effects, 524
- Reticulate body, 146
- Reticulin, 48
- Reticulocyte production index, **423**
- Reticulocytes
 - in aplastic anemia, 427
 - intravascular hemolysis, 427
- Retinal, 64
- Retinal artery occlusion, 552
- Retinal detachment, 552
- Retinal disorders, **552**
- Retinal vein occlusion, 552
- Retinitis
 - cidofovir, 197
 - foscarnet, 197
- Retinitis pigmentosa, 92, 552
- Retinoblastoma
 - cause and presentation, 552
 - chromosome association, 62
 - heterozygosity loss, 54
 - osteosarcomas, 471
- Retinoic acid, 64
- Retinoids, 485
- Retinol, 64
- Retinopathy
 - chloroquine, 195
 - diabetic, 552
 - hemorrhage, 552
 - hemorrhages and exudates in, 304, 318
 - in diabetes mellitus, 350
 - of prematurity, 679
 - retinitis, 553
 - sorbitol, 79
 - vein occlusion, 552
 - with hypertensive emergency, 304
- Retinopathy of prematurity, 206, 552
- RET/PTC rearrangements, 347
- Retrograde amnesia, 575
- Retroperitoneal fibrosis, 618
- Retroperitoneal structures, **367**
- Retrospective studies, 256, 262, 277
- Retroviruses, structure and medical importance, 164
- Rett syndrome, **60**
- Reverse T3 (rT3), 335
- Reverse transcriptase, telomerase, 36
- Reversible cellular injury changes, 203
- Reye syndrome, **398**, 495
- Reynolds pentad, 403
- Rhabdomyolysis
 - daptomycin, 191
 - refeeding syndrome and, 584
- Rhabdomyomas, 216, 320
- Rhabdomyosarcomas
 - dactinomycin for, 444
 - origin, 216
 - variant, 662
- Rhabdoviruses
 - structure and medical importance, 164
- Rhagades, 145
- Rhegmatogenous retinal detachment, 552
- Rheumatic fever
 - cause, findings and treatment, **319**
 - myocarditis with, 320
 - strep prophylaxis in, 193
 - streptolysin O, 131
 - type II hypersensitivity, 110
- Rheumatoid arthritis
 - antimetabolites for, 444
 - autoantibody, 113
 - carpal tunnel syndrome and, 463
 - celecoxib for, 496
 - etanercept for, 498
 - HLA subtype, 98
 - immunosuppressants, 119
 - infliximab/adalimumab for, 498
 - leflunomide for, 496
 - osteoarthritis vs, **472**
 - pathogenesis, findings and treatment, 472
 - Streptococcus pyogenes*, 134
- Rheumatoid factor, 113
- Rh hemolytic disease of newborn, 411
- Rhinitis medicamentosa, 706
- Rhinitis, phenylephrine for, 241
- Rhinocerebral abscess, 150
- Rhinophyma, 485
- Rhinosinusitis, **690**
- Rhinovirus
 - characteristics, **165**
 - picornavirus, 164
 - receptors, 163
 - RNA translation in, 165
- Rhizopus* spp, opportunistic infections, 150
- Ribavirin
 - contraindicated in pregnancy, 199
 - mechanism, 199
 - purine synthesis, 34
- Riboflavin, 65
- Ribose production, 77
- Ribosomes
 - free, 45
 - protein synthesis, 43
- Rice-water diarrhea
 - organisms causing, 175
 - Vibrio cholerae*, 144
- Richter transformation, 437
- Rickets
 - hypophosphatemic, 609, 611
 - lab values in, 469
 - metaphyseal cupping/fraying, 468
 - vitamin D and, 68
- Rickettsia* spp
 - stains for, 123
 - tetracyclines, 188
- Rickettsia prowazekii*
 - disease and transmission, 147
 - transmission of, 148, 158
- Rickettsia rickettsii*
 - chloramphenicol, 188
 - disease and transmission, 147
- Rocky Mountain spotted fever, 148
- Rickettsia typhi*
 - disease and transmission, 147
 - transmission, 148
- Rickettsial diseases
 - rash common, 148
 - vector-borne, **148**
 - with rash rare, 148
- Riedel thyroiditis, 345
- Rifabutin, 192, 193
- Rifampin
 - antituberculous drugs, 192
 - cytochrome P-450 interaction, 251
 - drug reactions with, 248, 250
 - Hemophilus influenzae* prophylaxis, 140
 - hepatotoxicity, 374
 - prophylactic use, 193
 - tubercloid leprosy, 139
- Rifamycins
 - antituberculous, 192
 - RNA polymerase effects, 40
- Rifapentine, 192
- Rifaximin, hepatic encephalopathy treatment, 399
- Rift Valley fever/Sandfly fever, 164
- Right anterior cardinal vein, 286
- Right bundle branch, 298
- Right bundle branch block, 294
- Right common cardinal vein, 286
- Right coronary artery (RCA),
 - occlusions of, 309
- Right heart failure, 316
- Right lower quadrant (RLQ) pain, 391
- Right-to-left shunts, 284, 302
- Right upper quadrant (RUQ) pain, 403
- Right ventricle
 - “atrializing” of, 302
 - traumatic injury to, 288
- Right ventricular hypertrophy (RVH),
 - high altitude, 688
- Rilpivirine, 197
- Riluzole, 544, 564
- Ring-enhancing lesions (MRI),
 - Toxoplasma gondii*, 153
- Ringworm
 - griseofulvin, 195
 - tinea corporis, 488
- Risankizumab, 498
- Risedronate, 496
- Risk quantification terminology, **258**
- Risperidone, 591
- Ristocetin, 417
- Risus sardonius, 130
- Ritonavir, 198, 251
- Rituximab, 429, 446
- Rivaroxaban, 441
- Rivastigmine, 239, 564
- River blindness, 156
- RNA
 - capping, 40
 - interference, 54
 - processing, **40**
- RNA polymerase inhibition, *Amanita phalloides*, 40
- RNA polymerases, **40**
 - types and functions of, **40**
- RNA processing (eukaryotes), **40**
- RNA viruses
 - genome, 160
 - structure and medical importance, **164**
- Robertsonian translocation, **62**
- Rocker-bottom feet, 61
- “Rocket tails”, 137
- Rocky Mountain spotted fever
 - animal transmission, 147
 - chloramphenicol, 188
 - vector-borne illness, 148
- Rocuronium, 566
- Roflumilast, 245, 704
- Romaña sign, 155
- Romano-Ward syndrome, 312
- Romberg sign, 544
- Romiplostim (TPO analog), 119
- Root cause analysis, 277
- Rooting reflex, 523
- Ropinirole, 563
- Ropivacaine, 565
- Rosacea, 485
- Rose gardener’s disease, 151
- Rosenthal fibers, 542
- Roseola infantum, HHV-6/HHV-7, 162
- Roseola, rash, 177
- Rosuvastatin, 324
- Rotator cuff muscles, **451**
- Rotavirus
 - diarrhea with, 175
 - medical importance, **165**
- Roth spots, 318
- Rotor syndrome, 400, 401
- Rough endoplasmic reticulum, **45**
- Rouleaux formation, 436
- Round ligament of uterus, 643
- Round ligament of uterus
 - male/female homologs, 642
- Rovsing sign, 390
- Rubella virus, 166
 - cardiac defect association, 304
 - medical importance, 164, **166**
 - rashes, 177
 - TORCH infection, 180
 - unvaccinated children, 182

- Rubeola (measles) virus, 177
 medical importance, **167**
- Rubor, 209
- Ruffini corpuscles, 504
- “Rusty” sputum, 134
- Ruxolitinib, 438, 447
- Ryanodine receptor, 459
- S**
- S-100
 immunohistochemical stain, 223
 Langerhans cell histiocytosis, 439
 tumor marker, 494
- Saber shins, 145, 180
- Sabin poliovirus vaccine, 164
- Sabouraud agar, 124
- Saccular aneurysms
 Ehlers-Danlos syndrome, 49
 presentation, 530
 renal cyst disorders and, 622
- Sacroccygeal teratomas, 670
- Sacubitril
 clinical use, 315
 mechanism, use and adverse effects, **324**
- Saddle embolus, 691
- Saddle nose, syphilis, 180
- S-adenosylmethionine (SAM), 73
 sail-shaped thymus, 96
- Salicylates, toxicity treatment, 247
- Salivary glands, adrenergic receptors
 in, 236
- Salivary gland tumors, 383
- Salmeterol, 241, 704
- Salmonella* spp
 bloody diarrhea, 175
 disease and transmission, 147
 food poisoning, 174
 in immunodeficiency, 116
 osteomyelitis, 176
 penicillins for, 184
 reactive arthritis, 475
Shigella spp vs, 142
 TMP-SMX, 190
- Salmonella* spp, virulence factors, 142
- Salmonella typhi* (ty-Vi)
Shigella comparison, 142
- Salpingitis, 181
- Salvage deficiencies, purines, **35**
- Sampling bias, 262
- Sandfly fever/Rift valley fever, 164
- SA node, 297
 action potential, 297
 aging effects, 312
 antiarrhythmic effects, 328
 cardiac glycoside effects, 326
 conduction pathway, 298
 premature beats, 313
- Saponification, 205
- Sarcoidosis
 cardiomyopathy with, 315
 characteristics and associations, **695**
 erythema nodosum, 492
 myocarditis with, 320
- Sarcoma, 216
- Sarcoma botryoides, 662
- Sarcoplasmic reticulum, 459
- Sarcoptes scabiei*
 disease and treatment, 158
- Sargramostim (GM-CSF), 119, 447
- SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2)
 receptors, 163
 remdesivir for, **196**
- SARS (sudden acute respiratory syndrome), 164
- Satellite cells, 503
- Satiety/hunger regulation, 508
- Saturday night palsy, 450
- “Sausage fingers”, 475
- Sausage link appearance
 (fundoscopy), 436
- “Saw-tooth” crypt pattern, 394
- Saxagliptin, 359
- Scabies, 195
- Scalded skin syndrome
 characteristics, 487
Staphylococcus aureus, 131
- Scales (skin)
 characteristics/examples, 483
 seborrheic dermatitis, 484
- Scar formation, types, **214**
- Scarlet fever
 rash with, 177
Streptococcus pyogenes, 134
- S cells, 378
- Schaumann bodies, 695
- Schiller-Duval bodies, 664, 671
- Schilling test, 426
- Schistocytes, 420, 429
 disseminated intravascular coagulation, 433
 HELLP syndrome, 660
 in intravascular hemolysis, 427
 Shiga toxin, 143
- Schistosoma* spp
 disease, transmission and treatment, 157
- Schistosoma haematobium*
 bladder cancer, 222
 disease association, 158
 squamous cell carcinoma of bladder, 622
- Schistosoma japonicum*
 portal hypertension, 158
- Schistosoma mansoni*
 portal hypertension, 158
- Schistosomiasis
 pulmonary arterial hypertension, 698
- Schizoaffective disorder, 577
- Schizoid personality disorder, 582
- Schizophrenia
 diagnostic criteria and treatment, 577
 hallucinations with, 576
 neurotransmitter changes with, 505
 preferred medications for, 591
- Schizophrenia spectrum disorders, **577**
- Schizophreniform disorder, 577
- Schizotypal personality disorder, 577, 582
- Schüffner stippling, 154
- Schwann cells, 503, 538
- Schwannomas
 characteristics and histology, 540
 in neurofibromatosis, 539
- Sciatic nerve, 456
- SCID (severe combined immunodeficiency)
 causes of, 35
 lymphopenia with, 429
- Sclerae
 alkaptonuria, 82
 osteogenesis imperfecta, 48, 49
- Sclerodactyly, 481
- Scleroderma, **481**
 autoantibody, 113
 diffuse vs limited, 481
 esophageal involvement, 384
- Sclerosing adenosis, 667
- Sclerosing cholangitis
 jaundice with, 400
 ulcerative colitis association, 389
- Scoliosis, restrictive lung disease with, 694
- Scombroid poisoning, 246
- Scopolamine, motion sickness
 treatment, 240
- Scoring of USMLE Step 1 exam, 6, 9–10
- Scorpion sting, 404
- Scrotal lesions
 benign, **670**
 scrotal enlargement, 669
 varicocele, **669**
- Scurvy
 collagen synthesis, 48
 vitamin C deficiency, 67
- Seafood toxins (ingested), **246**
- Seal-like barking cough, 167
- Seasonal affective disorder, 578
- Seborrheic dermatitis, **484**
- Seborrheic keratosis, 485
- Sebum, 485
- Secondary amyloidosis, 208
- Secondary and tertiary adrenal insufficiency, 353
- Secondary biliary cholangitis, 402
- Secondary glomerular disease, 612
- Secondary hyperaldosteronism, 354
- Secondary hyperparathyroidism
 lab values in, 469
 lab values with, 348
 presentation and findings, 349
- Secondary lactase deficiency, 79
- Secondary spontaneous pneumothorax, 700
- Secondary syphilis, 145
- Second-degree AV block, 313
- Second messengers, G-protein linked, **237**
- Second-wind phenomenon, 85
- Secretin
 secretory cell location, 379
 somatostatinomas and, 357
 source, action and regulation, 378
- Secretory (exported) protein synthesis, 45
- Secukinumab, 498
- Seizures
 anti-NMDA receptor encephalitis, 224
 benzodiazepine withdrawal, 562
 febrile, 530
 neurologic drug reactions with, 250
 types and phases of, **531**
- Selection bias, 262
- Selective dorsal rhizotomy, 545
- Selective estrogen receptor modulators (SERMs), 446, **674**
- Selective IgA deficiency, defects, presentation, and findings, 114
- Selective mutism, 574
- Selective α_1 blockers, 243
- Selective α_2 blockers, 243
- Selegiline, 563, 593
- Selenium sulfide, 488
- Self-mutilation
 fragile X syndrome, 60
 Lesch-Nyhan syndrome, 35
- Self-peptides, selection, 100
- Self-reacting lymphocytes, 204
- Semaglutide, 359
- Semimembranosus, 455
- Seminal vesicles, 639
- Seminiferous tubules, cells and functions, **646**
- Seminoma (PLAP), 222, 671
- Semitendinosus, 455
- Senna, 408
- Sensitivity (true-positive rate), 260
- Sensorineural hearing loss, 312, 548
- Sensory cortex
 stroke effects in, 526
 topographic representation, 513
- Sensory innervation
 tongue, 364
- Sensory loss
 Brown-Séquard syndrome, 545
 conversion disorder and, 583
 stroke effects, 526
- Sensory modalities/pathways, thalamus in, 508
- Sensory receptors, fiber type, location and modality, **504**
- Separation anxiety disorder, 574
- Sepsis
 ARDS, 697
 immunodeficient patients, 116
 lymphopenia with, 429
 neutropenia with, 429
Pseudomonas aeruginosa, 141
Streptococcus agalactiae, 135
- Septate uterus, 640

- Septation of heart chambers, 284
- Septic arthritis, *Neisseria gonorrhoeae*, 140
- Septic shock
- diffuse cortical necrosis (renal), 621
 - norepinephrine for, 241
- Septum primum, 284
- Septum secundum, 284
- Sequence (morphogenesis), 633
- Serine, 220
- SERMs, drug reactions with, 249
- Serologic markers
- hepatitis, 171
- Seronegative spondyloarthritis, **475**
- Serosa (digestive tract), 369
- Serotonergic agonists, enteric nerve stimulation, 408
- Serotonin
- synthesis and change with diseases, 505
 - vomiting center input, 506
- Serotonin syndrome
- cause, manifestation and treatment, 587
 - dextromethorphan, 706
 - MDMA, 589
 - oxazolidinones, 189
- Serous carcinoma, 664
- Serous cystadenoma, 664
- Serpentine cord, 138
- Serrated polyps, 394
- Serratia* spp, immunodeficient patients, 116
- Serratia marcescens*
- in immunodeficiency, 126
 - treatment of, 185
 - urinary tract infections, 178
- Sertoli cells
- secretions of, 639, 646
 - sexual differentiation, 640
 - tumors of, 671
- Sertoli-Leydig cell tumor, 665
- Sertraline, 593
- Serum amyloid A, acute phase reactants, 209
- Serum iron, iron study interpretation, 423
- Serum markers (liver pathology), **397**
- Serum osmolality
- primary polydipsia and diabetes insipidus, 342
 - regulation of, 333
- Serum sickness
- Type III hypersensitivity, 111
- Serum tumor markers
- α -fetoprotein (AFP), 664
 - dysgerminoma, 664
 - pancreatic adenocarcinomas, 405
 - placental alkaline phosphatase, 671
 - prostatic acid phosphatase, 672
 - use and associations of, **222**
 - yolk sac tumor, 664
- Sevelamer, **361**
- 17 α -hydroxylase, 339
- 17-hydroxyprogesterone, 339
- Severe acute respiratory syndrome coronavirus 2, **169**
- Severe combined immunodeficiency (SCID), defect, presentation, and findings, 115
- Sevoflurane, 565, 566
- Sex chromosome disorders
- karyotyping for, 53
 - types of, **655**
- Sex cord stromal tumors, 664
- ovarian, 665
- Sex hormone-binding globulin (SHBG), steroid hormone signaling pathways, 341
- Sex steroid replacement, 343
- Sexual abuse (child), 573
- Sexual development/disorders
- diagnosis by physical characteristics, **656**
 - diagnosis by sex hormones, **656**
 - 46,XX DSD, 655
 - 46,XY DSD, 655
 - other disorders of, **655**
 - ovotesticular DSD, 655
- Sexual differentiation, **640**
- Sexual dysfunction, **584**
- Sexually transmitted infections, 155
- clinical feature and pathogens, **179**
 - molluscum contagiosum, 487
 - parental consent with, 268
- Sexual maturity rating, 654
- SGLT-2 inhibitor, naming conventions for, 253
- Shaken baby syndrome, 573
- Shawl and face rash, 477
- Sheehan syndrome, 343
- Shiga toxin
- enterotoxin, 142
 - genes encoding for, 128
 - hemolytic-uremic syndrome, 143
 - mechanism, 130
- Shiga toxin-producing *Escherichia coli* (STEC) infection, 432
- Shigella*, comparison with *Salmonella*, **142**
- Shigella* spp
- bloody diarrhea, 175
 - comparison with *Salmonella* spp, 142
 - penicillinase-sensitive penicillins for, 184
 - reactive arthritis, 475
 - TMP-SMX, 190
 - toxin, 130
 - vs *Salmonella* spp, **142**
- Shigella dysenteriae*, 142
- Shigella flexneri*, 142
- Shigella sonnei*, 142
- Shine-Dalgarno sequence, 43
- Shingles (zoster), 162, 483
- Shock
- cardiogenic, 290, 309, 314, 321
 - Ebola, 169
 - endotoxins, 129
 - hypovolemic, 299
 - norepinephrine for, 241
 - superantigens causing, 131
 - types, causes, signs, and treatment, **317**
- Short acting insulin, 358
- Short bowel syndrome, 381, **392**
- Shoulder drop, 463
- Shoulder dystocia, 652
- Shunts
- fetal circulation, 287
 - left-to-right, 303
 - right-to-left, 302
- Sialadenitis, 383, 474
- Sialolithiasis, 383
- Sialyl Lewis^x, 211
- Sickle cell anemia
- causes and findings, **428**
 - ischemic priapism, 669
- Sickle cell disease
- antimetabolites for, 444
 - chromosomal abnormality, 62
 - iron poisoning with, 431
- Sickle cells, 420
- Sick sinus syndrome, **312**
- Sideroblastic anemia
- causes and lab findings, 425
 - RBC inclusions in, 421
 - vitamin B₆ deficiency, 66
- Sigmoid colon, 390
- Sigmoid volvulus, 392
- Signaling pathways
- of endocrine hormones, **341**
 - steroid hormones, **341**
- Signal recognition particle (SRP), 45
- Signet ring cells, 386
- Sign of Leser-Trélat, 224
- Sildenafil, 245, 669
- Silencer (gene expression), 40
- Silent mutation, 38
- Silica
- carcinogenicity, 221
 - inflammation stimulus, 212
- Silicosis, 696
- Silver stain, 123
- Simple pneumothorax physical findings, 698
- Simple vs complex renal cysts, 622
- Simvastatin, 324
- Single nucleotide (point) mutation, 38
- Single nucleotide polymorphisms (SNPs), 52
- Single nucleotide substitutions, 38
- Single strand DNA repair, 37
- Single-stranded binding proteins, 36
- Single umbilical artery, 636
- Sinusitis
- brain abscesses, 176
 - Kartagener syndrome, 47
 - Streptococcus pneumoniae*, 134
- Sinus venarum, 286
- Sinus venosus, horns of, 286
- siRNA (small interfering RNA), 54
- Sirolimus (Rapamycin), immunosuppression, 118
- Sister Mary Joseph nodules, 386
- Sitagliptin, 359
- Situational syncope, 318
- 6-mercaptopurine
- for ulcerative colitis, 389
 - mechanism, use and adverse effects, 444
 - purine synthesis, 34
- Sjögren syndrome
- autoantibody, 113
 - characteristics, complications, and labs, **474**
 - pilocarpine for, 239
- Skeletal muscle
- ACh receptors in, 235
 - atrophy and hypertrophy in, **460**
 - blood flow autoregulation to, 300
 - fiber types and metabolism, **460**
 - glycogen in, 84
 - ossification in, 477
- Skeletal muscle relaxants, **567**
- Skewed distributions, 264
- Skin
- aging effects on, 225
 - blood flow autoregulation to, 300
 - carcinogens affecting, 221
 - collagen in, 48
 - common disorders, **485**
 - drug reactions with, **249**
 - epithelial cell junctions, **482**
 - exocrine glands, **482**
 - extrahepatic manifestations of hepatitis, 171
 - hyperextensible, 49
 - inflammatory diseases, 133
 - layers of, 481
 - nodules in, 319
 - normal microbiota, 174
 - normal microbiota of, 133
 - warfarin-induced necrosis, 433
- Skin cancer
- albinism and, 484
 - Lynch syndrome and, 394
 - paraneoplastic syndromes, 224
 - types and epidemiology, **494**
- Skin disorders/lesions
- blistering, **489**
 - blue/gray deposits, 328
 - café-au-lait spots, 55
 - erythema multiforme, 149
 - Gotttron papules, 224
 - hyperlipidemia signs, 305
 - hyperpigmentation, 360
 - inflammatory bowel disease, 389
 - Kaposi sarcoma, 162
 - kwashiorkor, 69
 - macroscopic terms, **483**
 - microscopic terms, **483**
 - miscellaneous, **492**
 - petechiae, 413
 - pigmentation disorders, **484**
 - scaling, 488
 - scaly, 64

- seborrheic keratoses, 224
- target lesions, 490
- T-cell lymphoma, 435
- telangiectasia, 320, 481
- ulcers, 155
- vascular tumors, **486**
- with carbon monoxide poisoning, 689
- Skin infections
 - bacterial infections, 487
 - HSV1 and HSV2, 487
 - Pseudomonas aeruginosa*, 141
 - viral, 487
- Skip lesions, 389
- Skull thickening, 468
- Slapped cheek rash, 177
- Sleep
 - architecture, **507**
 - physiology and stages, **507**
 - stages of, 333, 507
- Sleep apnea, types of, **697**
- Sleep deprivation, leptin production
 - with, 340
- Sleep disturbance
 - benzodiazepines and, 588
 - sleep terror disorder, **585**
- Sleep terror disorder, **585**
- SLE-like syndrome, procainamide, 326
- Sliding hiatal hernia, 377
- Slime (S) layer (bacteria), 122
- Slipped capital femoral epiphysis
 - avascular necrosis, 469
 - osteonecrosis, 466
- Slow acetylators, 230
- SMAD4 (DPC4) gene, product and associated condition, 220
- Small bowel obstruction, 393
- Small cell carcinoma
 - immunohistochemical stain, 223
 - Lambert-Eaton myasthenic syndrome, 480
 - location and characteristics, 703
 - paraneoplastic syndromes, 224
 - serum tumor marker, 222
- Small interfering RNA (siRNA), 54
- Small intestinal bacterial overgrowth, 393
- Small intestine, migrating motor
 - complexes production, 378
- Small lymphocytic lymphoma/
 - chronic lymphocytic leukemia, 437
- Small molecule inhibitors, naming
 - conventions for, 254
- Small nuclear RNA (snRNA), 40
- Smallpox, 161
- SMN1 mutation, 544
- Smooth/diffuse goiter, 346
- Smooth endoplasmic reticulum, **45**
- Smooth muscle
 - adrenergic receptors in, 236
 - α_1 -blocker relaxation of, 236
 - cell migration and proliferation, 305
 - contraction and relaxation, **460**
 - glomus tumors, 486
 - tumor nomenclature, 216
- Smudge cells, 437
- SNARE proteins, 130, 136
- SNC (substantia nigra pars compacta), 505
- SNRIs (serotonin-norepinephrine reuptake inhibitors)
 - major depressive disorder, 578
 - mechanism and clinical use, **593**
 - snRNP assembly, 544
 - spinal muscular atrophy, 41
- Snuffles, 145
- “Soap bubble” appearance/lesions, 150
- Social anxiety disorder
 - features of, 580
 - SSRIs for, 593
- SOD1 mutations, 544
- Sodium
 - low vs high serum concentration
 - effects, 609
- Sodium channel blockers
 - Class IA, **326**
 - Class IB, 326
 - mechanism, use and adverse effects, **326**
- Sodium channels
 - ciguatoxin effects, 246
 - pacemaker action potential and, 297
- Sodium-cyanide nitroprusside test (urinary), 83
- Sodium-glucose co-transporter 2
 - inhibitors, 359
- Sodium oxybate (GHB), narcolepsy
 - treatment, 585
- Sodium polystyrene sulfonate, 361
- Sodium-potassium pump, **47**
- Sodium stibogluconate, 155, 195
- Sodium urate crystals, 35
- Sofosbuvir, 199
- Solifenacin, 240
- Solitary nucleus of medulla, 299
- Somatic hypermutation, 99
- Somatic mosaicism
 - causes of, 55
 - Sturge-Weber syndrome, 539
- Somatic nerves, male sexual response, 645
- Somatic symptom disorder, 583
- Somatic symptom disorders
 - and related disorders, **583**
 - factitious and malingering
 - comparisons, **583**
- Somatomedin C, effects of, 333
- Somatosensory cortex, 508
- Somatostatin
 - function of, 332
 - secretory cell locations, 379
 - source, action, and regulation of, 378
- Somatostatinoma, 357
- Sonic hedgehog (SHH)
 - basal plate development, 500
- Sorbitol
 - tissue accumulation, 350
- Sorbitol metabolism, **79**
- Sotalol, 328
- Southern blot, 51
- Space of Disse, 374
- Spaghetti and meatballs appearance, 488
- Spasmolytics, **567**
- Spasticity
 - motor neuron lesions and, 543
 - Zika virus, 168
- Spastic paralysis
 - tetanospasmin, 130
 - unvaccinated children, 182
- Spastic paresis, 543
- Specialized transduction, 128
- Special senses
 - aging changes, 225
 - otology, 547
- Specificity (true-negative rate), 260
- Specific learning disorder, 574
- Speckled ANA, **476**
- Spermatocoele, 670
- Spermatocytes, 646
- Spermatogenesis
 - cryptorchidism and, 669
 - features of, **647**
 - regulation of, 646
- Spermatogonia, 646
- Spermatozoa, immobile, 47
- Sperm, ejaculation pathway, 644
- Sphenopalatine artery, epistaxis and, 690
- Spherocytes, 420, 429
- Spherocytosis
 - extrinsic hemolytic anemia, 427
 - hereditary, 428
- Spherule, 149
- Sphincter of Oddi, 378
- Sphingolipidoses, 86
- Sphingomyelinase, 86
- Spigelian hernia, 376
- Spina bifida occulta, 501
- Spinal cord
 - anterior horn degeneration, 41
 - lesions and syndromes of, **544**
 - lower extent, **520**
 - reflexes and nerve roots, 523
 - tracts and functions of, **522**
 - tracts in, **521**
- Spinal cord lesions/syndromes
 - causes of, **544**
 - in multiple sclerosis, 537
- Spinal dysraphism types, 501
- Spinal muscular atrophy
 - presentation, 544
 - splicing of pre-mRNA in, 41
- Spinal nerves, **520**
- Spinal reflexes/nerve roots, clinical
 - reflexes, **523**
- Spinal tract anatomy/function,
 - ascending tracts, **522**
- Spinocerebellar degeneration,
 - abetolipoproteinemia, 92
- Spinocerebellar tracts
 - diseases of, 544
- Spinothalamic tracts
 - Brown-Séquard syndrome, 545
 - in anterior spinal artery occlusion, 544
 - location and functions, 522
 - organization of, 521
 - syringomyelia, 502
- Spirochetes, clinical significance, **144**
- Spironolactone, 627, 676
- Spleen
 - anatomy, **96**
 - embryology, 367
 - in leukemias, 437
 - platelet destruction in, 432
 - platelet storage in, 413
- Splenectomy
 - findings with, 96
 - with autoimmune hemolytic anemia, 429
 - with hereditary spherocytosis, 428
- Splenic artery, 368
- Splenic flexure, 370
- Splenomegaly
 - hairy cell leukemia, 437
 - hereditary spherocytosis, 428
 - myelofibrosis, 437
 - visceral leishmaniasis, 155
- Splenorenal ligament, 368
- Splice site mutation, 38
- Splicing errors, Duchenne muscular
 - dystrophy, 59
- Splinter hemorrhages, 318
- Splitting (ego defense), 571
- Splitting of S2 heart sound, **294**
- Splitting (twinning), 635
- Spondyloarthritis (seronegative), **475**
- Spongiform cortex, 535
- Spongiosis, characteristics/examples, 483
- Spontaneous abortion, *Listeria monocytogenes*, 137
- Spontaneous bacterial peritonitis, **397**
- Spontaneous pneumothorax, 700
- Spore (bacteria), 122
- Spore-forming bacteria, **127**
- Spores (bacteria), 127
- Sporicidal agents, 127
- Sporothrix schenckii*, opportunistic
 - infection, **151**
- Sporotrichosis, 151
- Spot desmosome, 482
- Sprue, vitamin B₁₂ deficiency, 67
- “Spur cells”, 420
- Squalene epoxidase, 195
- Squamous cell carcinoma
 - anus and cervix, 173
 - associated disorders, 494
 - bladder, 157, 158, **624**
 - carcinogens for, 221
 - carcinogens in, 221
 - cervix, 663
 - esophagus, 385
 - head and neck, 690

- Squamous cell carcinoma (*continued*)
 lungs, 703
 of skin, 494
 oral, 383
 penis, 669
 PTH-related peptide (PTHrP)
 functions, 336
 vaginal, 662
- Squamous epithelium
 epithelial histology, 644
 vulvar pathology, 661
- Squamous metaplasia, Vitamin A, 64
- Squatting (auscultation of heart),
 295, 302
- Squirt sign, 391
- SRY gene, 639
 ssDNA, 160
- SSRIs (selective serotonin reuptake
 inhibitors)
 anxiety disorders, 580
 atypical depression, 578
 drug reactions with, 248
 major depressive disorder, 578
 major depressive disorder
 (peripartum onset), 578
 mechanism, use and adverse
 effects, **593**
 obsessive-compulsive disorder, 580
 panic disorder, 580
 phobias, 580
 SIADH with, 342
 ssRNA
 viral genomes, 160
- Stable angina, 308
- Stable (quiescent) cells, 44
- Staghorn calculi, 617
- Stains, **123**
- Standard deviation, dispersion/
 variability, 264
- Standard error of the mean, 264
- Standing Valsalva (strain phase), 295
- Stanford type A aortic dissection, 307
- Stanford type B aortic dissection, 307
- Stapedius muscle, 638
- Stapes (ossicles), 547
- Staphylococcal scalded skin
 syndrome, 487
- Staphylococcal toxic shock syndrome
 (TSS), 133
- Staphylococcus aureus*
 acute infective endocarditis, 318
 brain abscess, 176
 bronchopneumonia, 701
 bullous impetigo, 487
 food poisoning, 174
 hospital-associated infections, 181
 in cystic fibrosis, 58
 inflammatory breast disease, 667
 lung abscesses, **702**
 medical significance, **133**
 nasal colonization, 174
 osteomyelitis, 176
 pigment production, 126
 postsurgical prophylaxis, 193
 psoas abscess, 463
 skin infections, 487
 toxin production, 131
- Staphylococcus epidermidis*
 biofilm production, 126
 characteristics of, **133**
 healthcare-associated infections,
 181
 normal skin microbiota, 174
 osteomyelitis, 176
 vancomycin for, 186
- Staphylococcus pyogenes*
 necrotizing fasciitis, 487
 skin infections, 487
- Staphylococcus saprophyticus*
 acute cystitis, 619
 characteristics of, **133**
 kidney stones and, 617
 urinary tract infections, 178
- Starling curves, **290**
- Starling forces, 301
- Start and stop codons, **42**
- Startle myoclonus, 535
- Starvation
 ketone bodies in, 88
 leptin production, 340
 phases of, 89
- STAT3 mutation, 114
- Statins
 acute coronary syndrome
 treatments, 315
 drug reactions with, 248, 249
 mechanism and adverse effects,
 324
- Statistical distribution, **264**
- Statistical hypothesis testing
 common tests, 266
 confidence interval, 266
 outcomes, **265**
 terminology, 264
- Statistical tests, common, 266
- Statistical vs clinical significance, **265**
- Status epilepticus, 531, 562
- Steady state, 229
- Steatorrhea
 abetalipoproteinemia, 92
 chronic pancreatitis, 404
 malabsorption syndromes, 63
 malabsorption syndromes and, 388
 octreotide effect, 407
 with orlistat, 407
- Steatosis (hepatic), 398
- Steatotic liver disease, **398**
- Steep sign (x-ray), 167
- Stellate ganglion, 704
- Stem cells
 defect in aplastic anemia, 427
 paroxysmal nocturnal
 hemoglobinuria, 428
- STEMI
 manifestations of, 308
- Steppage gait, 457
- Sterile pyuria, 619
- Sterilization/disinfection methods,
199
- Steroid diabetes, 350
- Steroids
 acute pancreatitis, 404
 berylliosis, 696
 binding globulins, 341
 multiple sclerosis treatment, 537
 synthesis of, 45
- Stevens-Johnson syndrome
 drug reaction and, 490
 sulfa drug allergies, 249
 with anticonvulsants, 560
- Stimulant laxatives, 408
- Stimulants, intoxication and
 withdrawal, 588
- St. John's wort
 cytochrome P-450 interaction, 251
- Stomach
 carcinogens affecting, 221
 ghrelin production, 378
 histology, 369
 secretin effect on, 379
- Strabismus, 552, **555**
- Strategies
 clinical vignette, 21
 test-taking, 20–21
- Stratified analysis, 263
- “Strawberry cervix”
Trichomonas vaginalis, 155
 vaginitis, 178, 179
- Strawberry tongue
 scarlet fever, 134, 177
- Streak gonads, 640
- Streptococcus* spp
 septic arthritis, 474
- viridans group, **134**
- Streptococcus agalactiae* (group B
 strep)
 characteristics of, **135**
 hippurate test for, 135
- Streptococcus aureus*
 septic arthritis, 474
- Streptococcus gallolyticus*, 135
- bacteremia, 135
 characteristics of, **135**
 infective endocarditis, 318
- Streptococcus mutans*, 174
- Streptococcus pneumoniae*
 characteristics of, **134**
 chloramphenicol, 188
 otitis media, 547
 types of pneumonia with, 701
- Streptococcus pyogenes*
 signs and symptoms, 177
 toxin production, 131
- Streptococcus pyogenes*
 erysipelas, 487
- Streptococcus pyogenes* (group A strep)
 characteristics of, **134**
- Streptolysin O, 131
- Streptomycin, 187
- Stress cardiomyopathy, 315
- Stress incontinence, 618
- Stress-related disorders, **581**
- Stretch receptors, 504
- Striated muscle, tumor nomenclature,
 216
- Striatum
 dopamine second messenger
 functions, 237
 functions of, 511
- Stridor, inspiratory, 167
- “String of beads” appearance (renal
 artery), 304
- Stroke
 central poststroke pain, **529**
 coagulation factor inhibitors, 441
 eclampsia, 660
 hemorrhagic intraparenchymal,
 530
 homocystinuria, 83
 hypertension, 304
 ischemic, types of, 525
 lesion area and symptoms, **526**
 sickle cell anemia, 428
 syphilis, 145
 thrombolytic drugs with, 442
- Stroke volume
 equation for, 290
 factors affecting, 289
- Strongyloides* spp, 155
- Strongyloides stercoralis*
 disease, transmission and
 treatment, 156
- Struma ovarii, 346
- Struvite (magnesium ammonium
 phosphate) stones, 125
- ST segment, 298
- ST-segment elevation MI (STEMI)
 acute coronary syndrome
 treatments, 315
 diagnosis of, 310
 ECG localization of, **310**
 NSTEMI comparison, 310
- Studying for USMLE Step 1 exam
 timeline for, 14–17
- Study materials, 17–18
- Study schedule, 14–18
- Sturge-Weber syndrome,
 presentation, 539
- Stylohyoid ligament, 638
- Stylohyoid muscle, 638
- Styloid process, 638
- Stylopharyngeus, 638
- Subacute combined degeneration,
 67, 544
- Subacute granulomatous thyroiditis,
 213, 345
- Subacute infective endocarditis, 318
- Subacute sclerosing panencephalitis
 (SSPE), 167
- Subarachnoid hemorrhage
 aneurysms, 530
 cause and effects of, 528
 nimodipine for, 323
- Subarachnoid space, 506
- Subclavian steal syndrome, **307**

- Subcutaneous emphysema, 691
- Subcutaneous fat
 - erythema nodosum in, 492
 - skin layers, 481
- Subcutis layer, 481
- Subdural hematomas, 528
- Subendocardium, infarction, 206
- Subgaleal hemorrhage, 527
- Sublimation, 571
- Submucosa (digestive tract), 369
- Submucosal nerve plexus (Meissner), 369
- Submucosal polyps, 394
- Subscapularis muscle, 451
- Substance P, 532
- Substance use disorder, **585**
- Substance use, teratogenicity of, 632
- Subthalamic nucleus, lesions, 524
- Subunit vaccines, 109
- Succimer, heavy metal toxicity, 247
- Succinate dehydrogenase, 65
- Succinylcholine, 566
- Succinyl-CoA
 - gluconeogenesis, 76
 - TCA cycle, 74
- Sucking reflex, 523
- Sucralfate, mechanism and clinical use, **406**
- Sudden acute respiratory syndrome, 164
- Sudden cardiac death
 - characteristics of, 308
 - hereditary channelopathies, 312
 - with myocarditis, 320
- Sudden death
 - cardiac death, 315
 - cocaine use, 589
 - sleep apnea, 697
- Sudeck point, 206
- Suicide
 - confidentiality issues and, 269
 - physician-assisted, 272
 - risk factors for death, **579**
 - risk with panic disorders, 580
- Sulbactam, 185
- Sulfadiazine
 - mechanism, use and adverse effects, 190
 - Toxoplasma gondii*, 153
- Sulfa drugs
 - adverse effects, **251**
 - DRESS with, 249
 - drug reactions with, 250
 - megaloblastic, 249
 - rash with, 249
- Sulfamethoxazole (SMX), 190
- Sulfapyridine, 407
- Sulfasalazine
 - mechanism, clinical use and adverse effects, **407**
- Sulfatides, 138
- Sulfisoxazole, 190
- Sulfonamides
 - Bordetella pertussis*, 141
 - cytochrome P-450 interaction, 251
 - drug reactions with, 249
 - glucose-6-phosphate dehydrogenase deficiency, 77
 - hemolysis in G6PD deficiency, 249
 - mechanism, use and adverse effects, **190**
 - Nocardia treatment, 137
 - pregnancy contraindication, 199
 - trimethoprim, 190
- Sulfonylureas
 - disulfiram-like reaction with, 250
 - mechanism and adverse effects, 359
- Sulfur granules, 126
- Sumatriptan
 - cluster headaches, 532
 - mechanism, use and adverse effects, 562
- Sunburn, 492
- Sunburst pattern (x-ray), 471
- Superantigens, 133
 - causing shock, 131
- Superficial burn, 493
- Superficial partial-thickness burn, 493
- Superficial peroneal nerve, 457
- Superior gluteal nerve, 457
- Superior mesenteric artery/syndrome
 - embryology of, 364
 - intestinal obstruction with, **370**
- Superior oblique muscle, 555
- Superior rectus muscle, 555
- Superior vena cava (SVC)
 - embryologic derivation of, 286
- Superior vena cava syndrome
 - cause, presentation and treatment, **704**
 - lung cancer, 704
- Pancoast tumor, 704
- thymoma, 96
- with lung cancer, 703
- Supination
 - deficit in Erb palsy, 452
 - forearm, 450
- Supine hypertension, 241
- Supine hypotensive syndrome, **661**
- Supportive therapy, 590
- Suppression (defense mechanism), 571
- Suprachiasmatic nucleus, circadian rhythm, 508
- Supracondylar fracture, 450
- Supraoptic nucleus
 - secretions of, 331, 508
- Suprascapular nerve, 451
- Supraspinatus muscle, 451, 452
- Supraventricular tachycardia
 - adenosine for diagnosing, 328
 - β -blocker use, 244
- Suramin, 153, 195
- Surface ectoderm derivatives, 631
- Surface F protein, 166
- Surfactant synthesis
 - atelectasis with lack of, 699
 - thyroid hormone effects, 335
- Surgical contraception, 675
- Surgical neck of humerus, 458
- Surrogate decision-maker, 268, **269**
- Survival motor neuron protein, 544
- Survival over time estimates, **259**
- Sustained angiogenesis, 217
- Suvorexant, 562
- Swallowing
 - motor innervation, 516, 519
 - tongue movement in, 364, 519
- Swan-Ganz catheter, 300
- Swan neck deformity, 472
- Swarming, 178
- Sweat glands, innervation of, 234
- Sydenham chorea, 319
- Sympathetic nervous system
 - denervation of face, 555
 - gastrointestinal innervation by, 371
 - male sexual response, 645
 - receptor targets, 234
- Sympatholytics
 - α_2 -agonists, **243**
 - α -blockers, **243**
 - β -blockers, **244**
- Sympathomimetics
 - actions and applications of, **241**
 - direct, 241
 - indirect, 241
 - micturition control, 236
 - physiologic effects of, **242**
- Synaptophysin
 - tumor identification, 223, 542
- Synaptophysin, tumor identification, 223
- Syncope
 - atrial tumors, 320
 - during exercise, 315
 - types and causes, **318**
 - with aortic stenosis, 296
 - with true ventricular aneurysm, 314
- Syncytiotrophoblasts, 634, 651
- Syndrome of apparent
 - mineralocorticoid excess
 - renal disorder features, 605
 - renal tubular defects, 604
- Syndrome of inappropriate
 - antidiuretic hormone secretion (SIADH)
 - aldosterone, 342
 - atrial natriuretic peptide, 342
 - brain natriuretic peptide, 342
 - characteristics, findings, treatment and causes, **342**
 - conivaptan, 360
 - diuretic use, 342
 - drugs causing, 248
 - paraneoplastic syndrome, 224
 - renal disorders feature, 605
- Synergistic drug effects, 234
- Synthases, 71
- Syphilis
 - clinical significance, **145**
 - diagnosis, **146**
 - features of tertiary, 179
 - fetal infection, 180
 - heart disease with, 319
 - painless chancre (primary), 179
 - symptoms with secondary, 179
 - TORCH infection, 180
- Syphilitic heart disease, **319**
- Syringomyelia, **502**
- Systemic amyloidosis, 208
- Systemic juvenile idiopathic arthritis, **474**
- Systemic lupus erythematosus
 - antiphospholipid syndrome and, 476
 - autoantibody, 113
 - glomerulonephritis with, 614
 - HLA subtypes, 98
 - mixed connective tissue disease, 476
 - presentation and findings, **476**
 - Raynaud phenomenon, 480
 - Type III hypersensitivity, 111
- Systemic mycoses
 - azoles, 195
 - caseous necrosis, 205
 - endemic location, pathologic features, **149**
 - treatment, 194
- Systemic primary carnitine
 - deficiency, 87
- Systemic sclerosis, mixed connective tissue disease, 476
- Systemic vascular resistance, in shock, 317
- Systemic venous emboli, 303
- Systolic dysfunction
 - heart failure with reduced ejection fraction, 316
- Systolic ejection, 292
- Systolic heart murmurs, 296
- T**
- Tabes dorsalis
 - spinal cord lesions with, 544
 - syphilis, 145, 179
- Tachyarrhythmia
 - isoproterenol for evaluating, 241
 - thyroid storm, 346
- Tachycardia
 - narrow complex, **311**
 - phenacyclidine, 589
 - phenoxymethamine, 243
 - stimulants and, 588
 - thyroid hormones, 360
 - wide complex, **312**
 - β -blockers for supraventricular, 244
- Tachyphylactic drug effects, 234
- Tacrolimus
 - drug reactions with, 248
 - immunosuppression, 118
- Tadalafil, 245, 672
- Taenia solium*
 - disease, transmission and treatment, 157
 - neurocysticercosis, 158
 - praziquantel, 157

- Takayasu arteritis
 - subclavian steal syndrome, 307
- Takotsubo cardiomyopathy, 315
- Tamm-Horsfall mucoprotein, 612
- Tamoxifen
 - drug reactions with, 248
 - estrogen receptor modulator, 674
 - mechanism, use and adverse effects, **446**
- Tamsulosin, 236, 243, **676**
- T- and B-cell activation, **101**
- Tardive dyskinesia
 - drugs causing, 250, 591
 - treatment, 564
- Target cells, 96, 420, 428
- “Target sign” (imaging), 392
- Tarsal tunnel syndrome, 457
- Tartrate-Resistant Acid Phosphatase
 - stain, 437
- Taste
 - cortical stroke, 526
 - cranial nerve lesions, 546
 - cranial nerve nuclei, 516
 - cranial nerves and, 519
 - drugs affecting, 191, 195
 - thalamic nuclei, 508
 - tongue development, 364
- TATA box, 40
- Taxane naming convention, 252
- Taxanes
 - mechanism, use and adverse effects, 445
 - microtubule effects of, 46
- Tay-Sachs disease, 86
- Tazobactam
 - mechanism, 185
 - Pseudomonas aeruginosa*, with piperacillin, 141
- T-cell differentiation, 106
- T cells
 - activation, 101, 218
 - anergy, 101
 - cell surface proteins, 108
 - cytokines secreted by, 106
 - cytotoxic, 100
 - defect, presentation, and findings, 114
 - diabetes mellitus, 351
 - differentiation of, **100**
 - disorders of, 115
 - exhaustion/dysfunction, 218
 - functions of, 99, **415**
 - glucocorticoid effects, 119
 - hypersensitivity reactions, 111
 - infections in immunodeficiency, 116
 - in thymus, 96
 - maturation, 94
 - neoplasms of, 435
 - regulatory, **100**
 - spleen, 96
 - transplant rejections, 117
- Tea-colored urine, 430
- “Teardrop” RBCs, 420, 438
- Teeth
 - congenital syphilis, 145
 - dentinogenesis imperfecta, 49
 - discoloration, 188, 199, 249
 - opalescent teeth, 49
 - osteogenesis imperfecta, 49
- Telangiectasias
 - basal cell carcinomas, 494
 - hereditary hemorrhagic, **320**
- Telencephalon, 500
- Tellurite agar, 124
- Telomerase, **36**
- Telophase, 44
- Telotristat, 357
- Temazepam, 562
- Temperature control, mechanisms
 - for, 300
- Temperature sensation, receptors, 504
- Temporal lobe, 508
- Temporal lobe brain abscess, 176
- Temporomandibular disorders, 465
- Tenapanor, 408
- Tendinopathy (rotator cuff), 451
- Tendinous xanthomas, 92, 305
- Tendon damage, 249
- Tendons, collagen in, 48
- Tenecteplase (TNK-tPA), 442
- Teniposide, 445
- Tennis elbow, 462
- “Tennis rackets” (Birbeck granules), 439
- Tenofovir, 604
 - drug reactions with, 250
 - HIV therapy, 197
- Tenosynovitis, 474
- Tension headaches, 532
- Tension pneumothorax
 - physical findings, 698
 - presentation and treatment, 700
- Tensor fascia latae muscle, 455
- Tensor tympani muscle, 638
- Tensor veli palatini muscle, 638
- Teratogenicity
 - ACE inhibitors, 628
 - angiotensin II receptor blockers, 628
 - griseofulvin, 195, 199
 - in organogenesis, **632**
 - leflunomide, 496
 - lithium, 592
 - medications, **632**
 - methimazole in pregnancy, 360
 - ribavirin, 199
 - Vitamin A, 64
 - with anticonvulsants, 560
- Teratoma
 - hormone levels with, 671
 - immature, 664
 - sacroccygeal, 670
 - testicular, 671
- Terazosin, 243, 672
- Terbinafine, **195**
- Terbutaline, 241
- Teres minor, 451
- Terminal complement deficiencies
 - (C5-C9), 105
- Termination (protein synthesis), 43
- Tertiary hyperparathyroidism, 349
- Tertiary syphilis
 - findings with, 145
 - thoracic aortic aneurysm with, 306
- Tesamorelin, HIV-associated
 - lipodystrophy, 332
- Testes
 - descent of, **642**
 - immune privilege, 97
 - mumps virus, 167
 - progesterone production, 648
- Testicular atrophy
 - alcohol use disorder, 590
 - muscular dystrophy, 59
- Testicular cancer
 - hormone levels with, 671
 - serum tumor marker, 222
- Testicular germ cell tumors, serum
 - markers for, 222
- Testicular lymphoma, 671
- Testicular torsion, **669**
- Testicular tumors
 - gynecomastia, 667
 - non-germ cell, 671
 - types and characteristics, **670**
- Testing agencies, 23
- Testis-determining factor, 639
- Testosterone
 - in bilateral cryptorchidism, **669**
 - inhibition of synthesis, 195
 - Leydig cell secretion, 646
 - mechanism, use and adverse effects, **676**
 - Sertoli cells, 646
 - source and function, 653
- Testosterone-secreting tumors, 656
- Test-taking strategy, 20–21
- Tetanospasmin effects, 130
- Tetanus (lockjaw), 182
- Tetany
 - electrolyte disturbances, 609
 - hypocalcemia, 609
 - hypoparathyroidism, 348
- Tetrabenazine, 252, 574
- Tetracaine, 565
- Tetracyclines
 - drug reactions with, 249, 250
 - drug reactions with expired, 250
 - mechanism and clinical use, **188**
 - pregnancy contraindication, 199
 - protein synthesis inhibitors, 187
 - pseudotumor cerebri and, 536
 - teratogenicity of, 188, 632
- Tetrahydrobiopterin (BH4)
 - deficiency, 82
- Tetrahydrofolates, 73
- Tetrahydrofolic acid (THF), 66
- Tetralogy of Fallot, 285, 302
- Tetradotoxin, 246
- Tezacaftor
 - in cystic fibrosis, 58
- TGF- β
 - in acute inflammation, 210
 - in wound healing, 212
 - scar formation, **214**
- Th1 cells, cytokine secretion, 106
- Th2 cells, cytokine secretion, 106
- Thalamus
 - functions and nuclei of, **508**
 - limbic system and, 509
- Thalassemia
 - gene deletions and clinical outcomes, 424
 - iron poisoning with, 431
 - target cells with, 420
- Thalidomide teratogenicity, 632
- Thayer-Martin agar, 124
- Theca interna cells, 646
- Theca lutein cysts, 659, 663
- Thecoma, 665
- Thelarche, 654
- Thenar muscles, 450, 453, 463
- Theophylline, 245, 704
- Therapeutic index, **233**
- Therapeutic privilege, 268
- Therapeutic window
 - lithium, 587
 - safety and, 233
- Thiamine, 64, 82
- Thiamine pyrophosphate (TPP), 64, 73
- Thiazide diuretics
 - drug reactions with, 249
 - electrolyte excretion effects, 625
 - heart failure, 316
 - hypertension treatment, 321
 - mechanism, use and adverse effects, **627**
- Thionamides, mechanism, clinical
 - use and adverse effects, **360**
- Thiopurines, mechanism, use and
 - adverse effects, 444
- Thioridazine, 591
- Third-degree (complete) AV block, 313
- Thirst center, primary polydipsia and, **342**
- Thoracic aortic aneurysm, 306
- Thoracic outlet syndrome, 452, 703
- Threadworms, 156
- Threonine, 79
- Threonine kinase, 220
- Thrombin, 442
- Thrombocyte disorders, **432**
- Thrombocytes (platelets), **413**
- Thrombocytopenia
 - Class IA antiarrhythmics, 326
 - drugs causing, 249
 - ganciclovir, 196
 - linezolid, 189
 - recombinant cytokines, 119
 - Shiga toxin, 143
 - Wiskott-Aldrich syndrome, 115
- Thrombocytosis, 96
- Thrombogenesis, **417**

- Thrombolytic drugs
 - mechanism, use and adverse effects, **442**
 - naming conventions, 253
 - tPA use as, 419
 - Thrombophilias, hereditary, **433**
 - Thrombopoietin, clinical use, 119
 - Thrombopoietin, signaling pathways, 341
 - Thrombosis
 - agents causing, 249
 - celecoxib, 496
 - contraceptive and hormone replacement, 249
 - homocystinuria, 83
 - Thrombotic microangiopathies, **432**, 660
 - Thrombotic stroke, 525
 - Thrombotic thrombocytopenic purpura, 432
 - Thromboxane A₂ (TXA), 417
 - Thrush
 - Candida albicans*, 150
 - hairy leukoplakia vs, 487
 - in SCID, 115
 - nystatin, 194
 - “Thumbprint” sign (imaging) colonic ischemia, 393
 - “Thumb sign” (x-ray), 140
 - “Thunderclap headache”, 530
 - Thymic aplasia, defects, presentation, and findings, 114
 - Thymic hyperplasia, 480
 - Thymic shadow
 - in severe combined immunodeficiency, 115
 - in thymic aplasia, 114
 - Thymidine kinase, 196
 - Thymidylate synthase (dTMP), inhibition of, 34
 - Thymine
 - in nucleotides, 33
 - production, 33
 - Thymoma, 96
 - myasthenia gravis and, 224, 480
 - paraneoplastic syndromes, 224
 - Thymus
 - benign neoplasm, 96
 - derivation of, 637
 - Immune system organs, **96**
 - T cell differentiation, 100
 - T cell origination in, 415
 - Thymus-dependent antigens, 103
 - Thymus-independent antigens, 103
 - Thyroglossal duct, 330
 - Thyroglossal duct cyst, 330
 - Thyroid adenoma, **346**
 - Thyroid cancer
 - diagnosis and treatment, **347**
 - metastasis, 219
 - undifferentiated/anaplastic carcinoma, 347
 - Thyroid, carcinogens affecting, 221
 - thyroid carcinoma oncogene, 220
 - Thyroid development, **330**
 - Thyroid disease, hypothyroidism vs hyperthyroidism, **344**
 - Thyroidectomy, 347
 - Thyroid follicular cells, 330
 - Thyroid gland dysgenesis, 345
 - Thyroid hormones
 - in toxic multinodular goiter, 346
 - receptor acetylation, 32
 - source, function, and regulation, **335**
 - synergism with GH, 335
 - Thyroidization of kidney, 619
 - Thyroid peroxidase
 - functions of, 335
 - Thyroid stimulating hormone (TSH)
 - secretion of, 331
 - Thyroid-stimulating immunoglobulin (TSI), in Graves disease, 335
 - Thyroid storm, causes and findings, 346
 - Thyrotoxic myopathy, 344
 - Thyrotoxicosis
 - cardiomyopathy with, 315
 - β-adrenergic effects, 335
 - Thyrotropin-releasing hormone (TRH)
 - function, 332
 - Thyroxine-binding globulin (TBG), 335
 - Thyroxine (T₄), 335, 343
 - TIBC (total iron-binding capacity)
 - lab values in anemia, 423
 - microcytic anemia, 424
 - Tibial nerve, 456, 457
 - Ticagrelor, 442
 - Tidal volume (TV), 682
 - Tigecycline, mechanism, use and adverse effects, **188**
 - Tight junctions, 482, 506
 - Tildrakizumab, 498
 - Timolol, 244, 327, 568
 - Tinea, 488
 - Tinea capitis, 488
 - Tinea corporis, 488
 - Tinea cruris, 488
 - Tinea pedis, 488
 - Tinea unguium, 488
 - Tinea versicolor, 488
 - Tinel sign, 463
 - Tinidazole, 152
 - Tinnitus
 - quinidine and, 326
 - with aspirin, 496
 - Tiotropium, 240, 704
 - Tirofiban, 417, 442
 - Tissue factor activation, 131
 - Tissue invasion (cancer), 217
 - Tissue mediators
 - in wound healing, 212
 - Tizanidine, 243, 567
 - TNM staging system, **216**
 - Tobacco smoking
 - aneurism risks, 530
 - atherosclerosis and, 305
 - atypical antidepressants for
 - cessation, 594
 - bupropion for cessation, 594
 - carcinogenicity, 221
 - carcinogenicity of, 703
 - cessation pharmacotherapies, **594**
 - effects of maternal smoking, **366**
 - esophageal cancer risk, 385
 - hypertension risk with, 304
 - lung cancer, 703
 - menopause onset, 653
 - pancreatic adenocarcinoma risk, 405
 - pulmonary fibrosis association, 694
 - renal cell carcinoma, 623
 - stomach cancer and, 386
 - teratogenic effects of, 632
 - transitional cell carcinoma, 624
- Tobramycin, 187
 - Tocolytics, 241, **675**
 - Tocopherol, 68
 - Tocotrienol, 68
 - Toddler development, 572
 - Togaviruses, structure and medical importance, 164
 - Tolbutamide, 359
 - Tolcapone, 563
 - Toll-like receptors (TLRs), 97, 210
 - Tolterodine, 240
 - Tolvaptan, clinical use, 342, 360
 - Tongue
 - development and innervation of, **364**
 - ectopic thyroid tissue in, 330
 - fissuring of, 474
 - movement in swallowing, 519
 - pharyngeal arch derivation, 638
 - ulcers, 149
 - Tonic-clonic (grand mal) seizure, 531
 - Tonic seizure, 531
 - Tonsils
 - immune system organ, 94
 - pharyngeal pouch derivation, 637
 - Tophus formation, 473
 - TOP II (DNA gyrase)
 - etoposide/teniposide effects, 36
 - fluoroquinolones effects, 36
 - Topiramate
 - drug reactions with, 250
 - mechanism and adverse effects, 560
 - migraine headaches, 532
 - TOP IV
 - fluoroquinolones effect, 36
 - Topoisomerase inhibitors
 - mechanism, use, and adverse effects, **445**
 - naming conventions for, 252
 - Topoisomerase (TOP) I
 - irinotecan/topotecan action, 36
 - Topotecan, 445
 - TORCH infections, **180**
 - Torsades de pointes
 - causal agents for, 247
 - description and treatment, 312
 - electrolyte disturbances, 609
 - magnesium for, 328
 - with antiarrhythmics, 326, 328
 - Torsemide, 626
 - Torus (buckle) fracture, 467
 - Total anomalous pulmonary venous return, 302
 - Total lung capacity, 682
 - Total parenteral nutrition (TPN), 403
 - Total peripheral resistance, 291
 - Touch
 - deep static, 504
 - fine/light, 504
 - Tourette syndrome
 - presentation, 574
 - sympatholytics for, 243
 - Toxic epidermal necrolysis (TEN), 490
 - Toxicity
 - causes and treatments, **247**
 - endotoxins and exotoxins, 129
 - of aspirin, 496
 - seafood toxins, **246**
 - Toxic megacolon
 - Clostridioides difficile*, 136
 - inflammatory bowel disease, 389
 - Toxic multinodular goiter, causes and findings, 346
 - Toxic shock–like syndrome, 131, 134
 - Toxic shock syndrome
 - staphylococcal, 133
 - toxin, 131
 - Toxins
 - Escherichia coli* strains, 143
 - exotoxins, 128
 - lysogenic phage encoding, 128
 - myocarditis with, 320
 - seafood (ingested), **246**
 - Toxocara* spp, infection routes, 155
 - Toxocara canis*, disease, transmission and treatment, 156
 - Toxoids, 108, 109, 129
 - Toxoplasma* spp, brain abscess, 176
 - Toxoplasma gondii*
 - CNS infections, 153
 - in HIV positive adults, 173
 - TORCH infection, 180
 - Toxoplasmosis
 - prophylaxis, 193
 - pyrimethamine, 195
 - TP53 gene
 - gene product and condition, 220
 - mutations, 150
 - tPA, stroke treatment, 525
 - Tracheal deviation, 698
 - Tracheoesophageal anomalies, **366**
 - Tracheoesophageal fistula (TEF), 366
 - Traction bronchiectasis, 694
 - Tramadol, **567**
 - drug reactions with, 250
 - “Tram-track” appearance, 615
 - Transcription factor, 220
 - Transcription factor motif, 69
 - Transduction (bacterial genetics), 128
 - Transference, **570**

- Transferrin
 - acute phase reactants, 209
 - free radical injury, 206
 - indirect measure of, 423
 - iron study interpretation, 423
 - lab values in anemia, 423
- Transformation (bacterial genetics), 128
- Transformation zone (cervix)
 - dysplasia, 663
 - histology of, 644
- Transfusion-related acute lung injury, 112
- Transgender, 584
- Transient ischemic attack, 525
- Transitional cell carcinomas, 221, 624
- Transition mutation, 38
- Transjugular intrahepatic
 - portosystemic shunt (TIPS), 372
- Transketolase
 - vitamin B₁ and, 64
- Translocations
 - Burkitt lymphoma, 435
 - Down syndrome, 61
 - fluorescence in situ hybridization, 53
 - follicular lymphoma, 435
 - in protein synthesis, 43
 - Mantle cell lymphoma, 435
 - Robertsonian, 61
- Transpeptidase inhibitor, naming
 - conventions, 252
- Transpeptidases, 122
- Transplants
 - immunosuppressants, 118
 - rejection types, pathogenesis and features, 99, **117**
- Transposition of great arteries, 285, 304
- Transposon (bacteria), 129
- Transtheoretical model of change, **586**
- Transthyretin, 209
- Transthyretin amyloidosis, 208
- Transudate, pleural effusion, 699
- Transversalis fascia, 377
- Transversion mutation, 38
- Transversus abdominis, 456
- Tranlycypromine, 593
- Trapezium bone, 453
- Trapezoid bone, 453
- TRAP (tartrate-resistant acid phosphatase), tumor
 - identification, 223
- Trastuzumab, 247, 446
- Trauma and stress-related disorders, **581**
- Trauma-informed care, 271
- Traumatic aortic rupture, **307**
- Traumatic pneumothorax, 700
- Travelers' diarrhea, 143, 175
- Trazodone, mechanism, use and toxicity, 594
- Treacher Collins syndrome, 638
- "Tree bark" appearance, 319
- Trematode infections, disease,
 - transmission and treatment, **157**
- Trematodes, **157**
- Tremor
 - immunosuppressants, 118
 - intention, 524, 533
 - resting, 524
 - types of, 533
- Trench fever, 158
- Treponema* spp
 - dark-field microscopy, 144
 - Gram stain for, 123
- Treponema pallidum*
 - sexual transmission, 179
 - syphilis, 145
- Triamterene, 627
- Triazolam, 562
- Tricarboxylic acid cycle (TCA)
 - ethanol metabolism, 70
 - metabolic site, 72
 - products and cofactors, **75**
 - pyruvate metabolism, 75
 - rate-determining enzyme for, 71
- Triceps reflex, 523
- Triceps surae, 457
- Trichinella spiralis*, disease,
 - transmission and treatment, 156
- Trichinosis, 156
- Trichomonas* spp
 - metronidazole, 191
 - vaginitis, 178
- Trichomonas vaginalis*
 - sexually transmitted infection, 179
 - signs/symptoms, 178
 - transmission and treatment, 155
- Trichomoniasis, 179
- Trichophyton* spp, 488
- Trichotillomania, 580
- Trichuris trichiura, i./., transmission
 - and treatment, 156
- Tricuspid atresia, 285, 302
- Tricuspid regurgitation, 292
 - heart murmur with, 296
- Tricuspid valve closure, 292
- Tricyclic antidepressants
 - drug reactions with, 250
 - in multiple sclerosis treatment, 537
 - mechanism, use and adverse effects, **593**
 - naming convention for, 252
 - overdose and treatment, 587
 - torsades de pointes, 247
 - toxicity treatment, 247
- Trientine
 - Wilson disease, 402
- Trifluoperazine, 591
- Trigeminal nerve (CN V)
 - functions of, 519
 - lesion of, 546
 - neuralgia, **532**
- Triglycerides
 - acute pancreatitis, 404
 - familial dyslipidemias, 92
 - pancreatitis, 92
 - transport and metabolism, 91
 - Von Gierke disease, 85
- Trihexyphenidyl, 240, 563
- Triiodothyronine (T₃), 335
- Trimethoprim-sulfamethoxazole (TMP-SMX)
 - for *Pneumocystis jirovecii*, 151
 - mechanism, use and adverse effects, 190
 - prophylactic use, 193
- Trimethoprim (TMP)
 - mechanism, use and adverse effects, **190**
 - purine and pyrimidine synthesis, 34
- Trimming (protein synthesis), 43
- Trinucleotide repeat expansion
 - diseases, 54, 60
- Triple-blind study, 257
- "Triple bubble" (X-ray), 366
- Triptans
 - for migraine headaches, 532
 - mechanism, use and adverse effects, **562**
- Triquetrum bone, 453
- Trismus (lockjaw), 130
- Trisomies (autosomal)
 - hCG levels, 652
 - horseshoe kidney with, 597
 - myotonic dystrophy, 59
 - ventral wall defect association, 365
- Trisomy 13 (Patau syndrome)
 - findings, 61
 - hCG in, 652
 - omphalocele association with, 365
- Trisomy 18 (Edwards syndrome)
 - findings, 61
 - hCG in, 652
 - omphalocele association with, 365
- Trisomy 21 (Down syndrome)
 - findings, 61
- tRNA, structure and charging, **42**
- Trochlear nerve (CN IV)
 - damage to, 556
 - function and types, 519
 - ocular motility, 555
 - palsy, 558
- Tropheryma whipplei*
 - GI disease with, 388
 - stain for, 123
- Trophozoite ring, 154
- Tropical sprue, **388**
- Tropicamide, organ system and
 - applications, 240
- Troponins
 - diagnosis of MI, 310
 - levels with angina and MI, 308
 - muscle contraction, 459
- Trousseau sign, 348, 609
- Trousseau syndrome
 - description, **224**
 - pancreatic cancer, 405
- "True" diverticulum, 390
- True-negative rate, 260
- True-positive rate, 260
- True ventricular aneurysm, 314
- Truncal ataxia, with
 - medulloblastoma, 542
- Truncus arteriosus, **286**
- Trypanosoma brucei*
 - CNS infections, 153
 - treatment, 195
- Trypanosoma cruzi*
 - nifurtimox for, 195
 - visceral infections, 155
- Trypanosomes, stains for, 123
- Trypomastigote, 153
- Trypsin, 380
- Trypsinogen, secretion of, 380
- Tryptase, 414
- Tryptophan, 35, 79
- TSC1/TSC2 genes, product and
 - associated condition, 220
- TSST-1, 133
- t-test, 266
- T-tubule membrane, 459
- Tuberculoid leprosy, 139
- Tuberculosis
 - description, **138**
 - erythema nodosum, 492
 - psaos abscess with, 463
- Tuberin protein, 220
- Tuberoeruptive xanthomas, 92
- Tuberoinfundibular pathway, 509
- Tuberous sclerosis
 - characteristics of, 539
 - chromosome association, 62
- Tuberous sclerosis (TSC1 and TSC2)
 - chromosomal abnormality, 62
- Tubo-ovarian abscess, pelvic
 - inflammatory disease, 181
- Tubuloglomerular blood flow, 600
- Tubulointerstitial nephritis, 620
- Tularemia, 147
- Tumor identification
 - chromogranin, 223
 - immunohistochemical stains, **223**
 - S-100, 494
 - serum markers, **222**
 - TRAP (tartrate-resistant acid phosphatase), 223
 - vimentin, 223
- Tumorigenesis, Bcl-2 protein, 204
- Tumor (inflammation), 209
- Tumor lysis syndrome, **440**
- Tumor necrosis factor (TNF), 209, 211, 213
- Tumor necrosis factor (TNF)
 - inhibitors, mechanism, use and adverse effects, **498**
- Tumor necrosis factor- α
 - effects of, 106
- Tumor nomenclature
 - benign vs malignant, **216**
 - by cell type, **216**
 - striated muscle, 216
- Tumors, grade vs stage, **216**
- Tumor suppressor genes
 - cell cycle regulation, 44

- gene product and associated condition, **220**
- mutations, 44
- Tunica albuginea, 669
- Tunica vaginalis, 642
- Turcot syndrome, 394
- Turner syndrome
 - aneuploidy, 54
 - cardiac defect association, 304
 - characteristics of, 655
 - chromosome abnormality, 62
 - coarctation of aorta and, 304
 - females with, 59
- T wave (ECG), 298
- 21-hydroxylase, 339
- 22q11 deletion syndromes, 114, 304
- Twin concordance study, 256
- Twinning, timeline and types, **635**
- Twin-twin transfusion syndrome, **635**
- Two-component toxin, 130
- 2-naphthylamine, 221
- Type 1 vs type 2 diabetes mellitus, **351**
- Type I collagen, 48
- Type I error (α) (statistical testing), 265
- Type I hypersensitivity reaction, antibody-mediated, 110
- Type II collagen, 48
- Type II error (β) (statistical testing), 265
- Type II hypersensitivity reaction
 - antibody-mediated, 110
 - organ transplants, 117
 - pemphigus vulgaris/bullous pemphigoid, 489
 - rheumatic fever, 319
- Type III collagen, 48
- Type III hypersensitivity reaction
 - fibrinoid necrosis, 205
 - immune complex, 111
 - infection-associated
 - glomerulonephritis, 614
 - SLE, 476
- Type I skeletal muscle fibers, 460
- Type IV collagen, 48
- Type IV hypersensitivity
 - cell-mediated, 99
- Type IV hypersensitivity reaction
 - cell-mediated, 111
 - contact dermatitis, 485
 - graft-versus-host disease, 117
- Typhoid fever, 142
- Typhus, 147, 148
- Tyrosinase, 484
- Tyrosine catabolism/catecholamine synthesis, **81**
- Tyrosine in phenylketonuria, 82
- Tyrosine kinase
 - BTK* gene and, 114
 - endocrine hormone signaling pathways, 341
 - in cell growth, 212
 - inhibitor naming convention, 254
- in multiple endocrine neoplasias, 356
- in oncogene function, 220
- insulin receptor binding, 358
- insulin receptor binding effects, 338
- Tzanck test, 163
- TΨC sequence, 42
- U**
- UBE3A (Chromosome 15), 56
- Ubiquitination, 43
- Ubiquitin-proteasome pathway/system, 46, 202
- UDP-glucuronosyltransferase, 401
- Ulcerative colitis
 - autoantibody, 113
 - manifestations of, 389
 - spondyloarthritis association, 475
 - sulfasalazine for, 407
- Ulcers (gastrointestinal)
 - bismuth/sucralfate for, 406
 - complications, **387**
 - Curling, 386
 - Cushing, 386
 - extent of, 369
 - flask-shaped, 152
 - obstruction of GI tract, 387
 - palatal/tongue, 149
- Ulcer (skin)
 - characteristics/examples, 483
- Ulcers (skin)
 - Raynaud syndrome, 480
 - squamous cell carcinoma, 494
- Ulipristal, 675
- Ulnar claw, 450, 454
- Ulnar finger deviation, 472
- Ulnar nerve, injury and presentation, 450, 454, 463
- Umbilical cord
 - blood flow in, **636**
 - late separation of, 115
 - postnatal derivative of arteries, 286
 - umbilical vein postnatal derivative, 286
- Umbilical hernia, congenital, 365
- Umbilicus, portosystemic anastomosis, 372
- UMP synthase, 426
- Unambiguous genetic code, 35
- Unbalanced translocations, 62
- Uncal transtentorial herniation, 543
- Uncinate process, 367
- Unconjugated (indirect)
 - hyperbilirubinemia, 400
- Undifferentiated/anaplastic thyroid carcinoma, 347
- Undulant fever, 141, 147
- “Unhappy triad” (knee injuries), 464
- Unilateral periorbital swelling, 155
- Unilateral renal agenesis, 597
- Uniparental disomy, 55
- Universal electron acceptors, **73**
- Universal genetic code, 35
- Unnecessary procedure requests, 272
- Unstable angina
 - ECG with, 308
 - manifestations of, 308
 - treatments, 315
- Unvaccinated children
 - H influenzae meningitis* in, 176
 - organisms affecting, **182**
- Upper extremities
 - nerve injury and presentation, **450–498**
 - neurovascular pairing in, 458
 - syringomyelia effects on, 502
- Upper motor neuron
 - Babinski sign in adults, 523
 - effects of injury, 543
 - facial nerve lesion, 546
 - facial paralysis, 526
 - in amyotrophic lateral sclerosis, 544
 - in cerebral palsy, 545
 - lesion signs, 543
 - pathways of, 522
- Urachal cyst, 636
- Urachus, 286, 636
- Uracil
 - in nucleotides, 33
 - methylation of, 33
- Urea breath test, *Helicobacter pylori* diagnosis, 144
- Urea cycle
 - amino acids in, **80**
 - metabolic site for, 72
 - ornithine transcarbamylase deficiency, **80**
 - ornithine transcarbamylase deficiency and, 81
 - rate-determining enzyme, 71
- Ureaplasma* spp, Gram stain for, 123
- Urease-positive organisms, **125**
- Uremia, 621
- Uremic platelet dysfunction, 432
- Ureteric bud, 596
- Ureteropelvic junction
 - development of, 597
- Ureters
 - course of, **599**
 - damage in gynecologic procedures, 599
- Urethra
 - BPH, 672
 - genitourinary trauma, 645
- Urethritis
 - chlamydia, 179
 - Chlamydia trachomatis*, 146
 - reactive arthritis, 475
- Urge incontinence
 - drug therapy for, 240
 - treatment, 236
- Urgency incontinence, 618
- Uric acid
 - kidney stones, 617
 - Lesch-Nyhan syndrome, 35
 - Von Gierke disease, 85
- Urinalysis
 - acute cystitis, 619
 - casts in urine, 612
 - urine pH (RTA), 611
 - with kidney injury, 620
- Urinary incontinence
 - drug therapy for, 240
 - ephedrine for, 241
 - mechanism, associations and treatment, **618**
- Urinary retention
 - atropine, 240
 - bethanechol, 239
 - bethanechol for, 236
 - delirium, 575
 - neostigmine for, 239
 - sympathetic activity, 236
 - treatment, 236
- Urinary tract infections
 - antimicrobial prophylaxis, 193
 - BPH, 671
 - catheterization, 181
 - enterovesical fistulae, 389
 - nosocomial, 143
 - organisms causing, **178**
- Urinary tract obstruction
 - hydronephrosis, 618
 - pyelonephritis, 619
- Urine
 - cast types and significance, **612**
 - dark, 105
 - drug elimination in, 231
 - polydipsia and DI, 342
 - pregnancy test, 652
 - red/orange crystals in, 35
 - tea-colored, 430
 - turns black on air exposure, 82
 - weak acids, 231
 - weak bases, 231
- Urine protein electrophoresis, in plasma cell dyscrasias, 436
- Urobilinogen
 - extravascular hemolysis, 427
 - intravascular hemolysis, 428
- Urogenital sinus, 639
- Uromodulin, 612
- Uroporphyrin, 430
- Urosepsis, 619
- Urothelial carcinoma (bladder), **624**
- Urticaria
 - dermatologic terms, 483
 - mast cell degranulation, 485
 - scombroid poisoning, 246
 - sulfa drug allergies, 251
- USMLE Step 1 exam
 - check-in process, 7
 - clinical vignette strategies, 21
 - content areas covered in, 2
 - leaving exam early, 8
 - overview of, 2
 - passing rates for, 8
 - practice exams for, 9, 18–19
 - registering for, 5–6
 - rescheduling, 6
 - score notifications for, 6
 - scoring of, 9–10

- USMLE Step 1 exam (*continued*)
 testing agencies, 23
 testing locations, 6
 test-taking strategies, 20–21
 time budgeting during, 7–8
 types of questions on, 8
- Ustekinumab, 498
- Uterine conditions
 neoplastic, 666
 non-neoplastic, 666
- Uterine cycle, 650
- Uterine (Müllerian duct) anomalies, **640**
- Uterine procidentia, 643
- Uterine rupture, **658**
- Utero-ovarian ligament, 643
- Uterosacral ligament, 643
- Uterus
 anomalies of, **640**
 collagen in, 48
 epithelial histology, 644
 zygote implantation, 651
- Uterus didelphys, 640
- Uveitis
 glaucoma, 551
 inflammatory bowel disease, 389
 in sarcoidosis, 695
 seronegative spondyloarthritis, 475
 types of, **553**
- U wave in ECG, 298
- V**
- V_{max} , 228
- V1-receptors, 333, 341
- V2-receptors, 333, 341, 360
 vaccination/vaccines
 mRNA, 109
- Vaccination/vaccines
 B-cell disorders, 114
Bordetella pertussis, 141
 Ebola contacts, 169
Haemophilus influenzae, 140
 influenza, 166
 meningococci, 140
 mumps virus, 167
 pneumococcal, 96, 134
 postsplenectomy, 96
 PPSV23, 103
 rabies virus, 169
 refusal of, 273
 rotavirus, 165
Salmonella typhi (ty-VI), 142
 toxoids as, 129, 137
 vaccine types, **109**
 yellow fever, 168
- Vagal nuclei, **516**
- Vagina
 anaerobic bacteria overgrowth, 147
 candidiasis treatment, 194
 common infections, **178**
 epithelial histology, 644
 postcoital bleeding, 663
 tumors of, **662**
- Vaginitis, 155, 178, 179
- Vagus nerve (CN X)
 baroreceptors/chemoreceptors
 and, 299
 cardiac glycoside effects, 326
 diaphragm innervation, 681
 functions of, 519
 gastrointestinal innervation by, 371
 lesions of, 546
 pharyngeal arch derivation, 638
- Valacyclovir
 mechanism and use, 196
- Valganciclovir
 mechanism and use, 196
- Valgus stress test, 454
- Validity (accuracy), 261, 266
- Valine
 classification of, 79
 maple syrup urine disease, 79
- Valproate
 cytochrome P-450 interaction, 251
 drug reactions with, 248
 mechanism and adverse effects, 560
 migraine headaches, 532
 pancreatitis with, 248
- Valsalva maneuver, 295, 669
- Valsartan, 628
- Valvular disease
 pressure-volume loops with, **293**
 types of anomalies, 285
- Vancomycin
 DRESS with, 249
 drug reactions with, 247, 249
 infusion reaction, 247
 mast cell degranulation, 414
 mechanism and clinical use, **186**
 prophylactic use, 193
- Vanishing bile duct syndrome, 117
- Vardenafil, 245
- Varenicline, use and toxicity, 594
- Variable expressivity, 54
- Variance, 264
- Varicella zoster virus
 HHV-3 transmission and clinical
 significance, 162
 immunodeficient patients, 116
 rash and clinical presentation, 177
 skin infections, 487
 vesicles with, 483
- Varices
 acute GI bleeding with, 387
 anorectal, 372
 esophageal, 372
 gastrointestinal system, 372
 β -blocker use for bleeding, 244
- Varicocele, **669**
- Varus stress test, 454
- Vasa previa, 657
- Vasa vasorum (syphilis), 145
- Vascular dementia, 535
- Vasculitides, **479**
 extrahepatic manifestations of
 hepatitis, 171
 granulomatous inflammation, 213
 intraparenchymal hemorrhage, 528
 risk with hepatitis B and C, 171
- Vasculopathy, noninflammatory, 481
- Vasoactive intestinal polypeptide (VIP), source and action
 of, 378
- Vasodilators
 aortic dissection, 307
 nitrates as, 322
- Vasogenic edema (cerebral), 525
- Vasopressin
 in septic shock, 333
 in SIADH, 342
 second messenger functions, 237
 secretion of, 331
- Vasopressors, 291
- Vasospastic angina, 308
- Vasovagal syncope, 318
- VATER/VACTERL defects, 366
- VCAM-1 protein, 211
- V(D)J recombination, 97
- VDJ recombination defect, 115
- VDRL test
 false positive results, 146
 syphilis, 145
- Vector-borne illnesses, **148**
- Vecuronium, 566
- Vegetations, 318
- Vegetative state, 529
- VEGF, 212
- Velocardiofacial syndrome, 114
- Velpatasvir, 199
- Vemurafenib, 447
- Venlafaxine, 580, 581, 593
- Venous drainage
 reproductive organs, 642
- Venous return, 291
- Venous sinus thrombosis (dural), **514**
- Venous thrombosis, atypical, 105
- Venous ulcer (lower extremity), **491**
- Ventilation (lungs), **683**
- Ventilation/perfusion mismatch, **685**
- Ventilator-assisted life support, **269**
- Ventral (abdominal) wall defects, **365**
- Ventral anterior nucleus (thalamus), 508
- Ventral lateral nucleus (thalamus), 508
- Ventral optic radiation (Meyer loop), 557
- Ventral posterolateral nucleus (thalamus), 508
- Ventral posteromedial nucleus (thalamus), 508
- Ventral tegmentum, 505
- Ventricles (heart)
 embryologic development, 285
- Ventricular action potential, 297
- Ventricular aneurysm, true, 309
- Ventricular fibrillation, 312
- Ventricular filling
 early diastole, 292
 ECG and, 298
- Ventricular free wall rupture, 314
- Ventricular myocytes, 299
- Ventricular noncompliance, 292
- Ventricular pseudoaneurysm, 314
- Ventricular septal defect
 congenital, 303
 cri-du-chat syndrome, 62
 Down syndrome, 304
 heart murmurs with, 296
 morphogenesis, 285
- Ventricular system (CNS), **515**
- Ventricular tachycardia, description
 and treatment, 312
- Ventriculomegaly (brain), 536
- Ventromedial nucleus (hypothalamus)
 leptin effects on, 340
 satiety, 508
- Verapamil
 antiarrhythmic effects of, 328
 headache therapy, 532
 mechanism, use and adverse
 effects, 323
- Verrucae, 485
- Verrucous lesions, 149
- Vertebral compression fractures, 467
- Vertebral landmarks, for
 gastrointestinal innervation,
 371
- Vertebrobasilar insufficiency,
 subclavian steal syndrome,
 307
- Vertical gaze palsy, 542
- Vertigo
 peripheral vs central, **548**
 subclavian steal syndrome, 307
- Vesicles
 characteristics/examples, 483
 dermatitis herpetiformis, 490
 herpes simplex virus-2, 180
 varicella zoster virus, 162, 487
- Vesicourachal diverticulum, 636
- Vesicoureteral reflux, **598**, 618
- Vesicular monoamine transporter (VMAT), 564
- Vesicular tinea pedis, 488
- Vesicular trafficking proteins, 45
- Vestibular schwannomas, 539
- Vestibulocochlear (CNVIII), function
 and type, 519
- VHL gene
 deletion of, 539
 product and associated condition,
 220
- Vibration sense
 high-frequency, 504
 low-frequency, 504
 thalamic relay of, 508
- Vibrio cholerae
 clinical significance, **144**
 toxin in, 130
 watery diarrhea, 175
- Vibrio parahaemolyticus, 174
- Vibrio vulnificus, 144, 174
- Vilazodone, 594

- Vimentin
cytoskeletal element, 46
tumor identification, 223
- Vinblastine, **445**
- Vinca alkaloids
mechanism, use and adverse effects, 445
microtubule effects of, 46
- Vincristine
drug reactions with, 250
mechanism, use and adverse effects, 445
toxicities of, 445
- Vinyl chloride carcinogenicity, 221, 486
- Violaceous facial erythema, 477
- Violaceous lesions, 318
- “Violin string” adhesions, 181
- VIPomas
MEN1 syndrome, 356
octreotide for, 407
regulatory substances, 378
- Viral Antigen Test (RAT), 169
- Viral DNA polymerase inhibitor, naming conventions, 252
- Viral infections
acute pericarditis, 319
anemias with, 427
constrictive pericarditis with, 319
enteritis, 388
of skin, 487
Reye syndrome association, 398
T-cell deficiencies, 116
- Viral structures
envelopes, **160**
general features, **159**
genomes, **160**
- Virchow node, 386
- Virchow triad, 321
- Viridans group streptococci
biofilm production, 126
characteristics of, **134**
normal microbiota, 174
subacute infective endocarditis, 318
- Virilization, 339
- Virulence factors
bacterial, **127**
Bordetella pertussis, 141
Staphylococcus aureus, 133
- Viruses
causing meningitis, 176
diarrhea, 175
genetic/antigenic shift/drift, 166
genetics, **159**
in immunodeficiency, 116
myocarditis, 320
receptors for, **163**
stain for identification, 123
structure of, 159
- Visceral leishmaniasis, 155
- Viscosity (blood), 291
- Vision disturbances
Alport syndrome, 615
cytomegalovirus, 162
drug-related, 250
glaucoma, **551**
idiopathic intracranial hypertension and, 536
Toxocara canis, 156
- Vision, thalamic relay for, 508
- Visual cortex, 508, 555
- Visual field defects
drug-related, 250
idiopathic intracranial hypertension, 536
saccular aneurysms and, 526
types of, **557**
with stroke, 526
- Visual hallucinations, 576
- Vital capacity, 682
- Vitamin and mineral absorption, **381**
- Vitamin A (retinol)
drug reactions with, 250
function, deficiency and excess, **64**
idiopathic intracranial hypertension, 536
measles morbidity and mortality, 167
storage of, 374
- Vitamin B₁ (thiamine)
alcohol use disorder, 590
functions and disorders, **64**
solubility, 63
Wernicke-Korsakoff syndrome, 590
Wernicke-Korsakoff syndrome treatment, 590
- Vitamin B₂ (riboflavin)
function and deficiency, **65**
pyruvate dehydrogenase complex, 74
solubility, 63
- Vitamin B₃ (niacin)
function, deficiency and excess, **65**
pyruvate dehydrogenase complex, 74
solubility, 63
- Vitamin B₅ (pantothenic acid)
function and deficiency, **65**
pyruvate dehydrogenase complex and, 75
solubility, 63
- Vitamin B₆ (pyridoxine), **65**
deficiency with isoniazid, 192
for sideroblastic anemia, 425
functions and deficiency, **66**
in homocystinuria treatment, 83
solubility, 63
- Vitamin B₇ (biotin), 66
activated carriers, 73
function and deficiency, **66**
pyruvate metabolism, 66
solubility, **63**
- Vitamin B₉ (folate), 66
absorption of, 381
anemia with deficiency, 426
depletion with anticonvulsants, 560
function and deficiency, **66**
in homocystinuria treatment, 83
solubility, 63
- Vitamin B₁₂ (cobalamin), **66**
absorption of, 381
causes and effects of deficiency, 426
deficiency, 157, 158
function and deficiency, **67**
homocystinuria treatment, 83
in small intestinal bacterial overgrowth, 393
malabsorption, 406
methylmalonic acidemia, 83
solubility, 63
subacute combined degeneration and, 544
- Vitamin B₁₂, 67
- Vitamin C (ascorbic acid), 67
functions, deficiency and excess, **67**
in wound healing, 212
methemoglobin treatment, 247, 688
solubility, 63
- Vitamin D (calciferol), 68
functions, regulation, and deficiency/excess, **68**
hypocalcemia with, 348
osteomalacia/rickets, 468
osteoporosis and, 467
production and functions, 607
- Vitamin deficiencies
chronic pancreatitis and, 404
with malabsorption syndromes, 388
- Vitamin E
abetalipoproteinemia treatment, 92
acanthocytes with, 420
deficiency in abetalipoproteinemia, 92
functions, deficiency, and excess, **68**
solubility of, 63
- Vitamin K
coagulation disorder, 431
deficiency and coagulation, 419
function and deficiency, **69**
vitamin E interaction, 68
warfarin toxicity treatment, 247
- Vitamin K–dependent coagulation, **419**
- Vitamins
dietary supplementation, **63**
fat soluble, **63**
water soluble, **63**
- Vitelline duct, **636**
- Vitelline duct cyst, 636
- Vitiligo, 484
- Vitreous body, collagen in, 48
- VKORC1 gene, 441
- VLDL (very low-density lipoprotein), 92
- VMAT inhibitor naming conventions, 252
- Volume contraction, from diuretics, 625
- Volume of distribution (V_d), 229
- Volumetric flow rate, 291
- Voluntary movement
basal ganglia and, 511
spinal tracts for, 522
- Volvulus
Meckel diverticulum, 391
onchocerca, 155
presentation, **392**
- Vomiting
annular pancreas, 367
area postrema and, 506
biliary colic, 403
bilious, 366, 391
chemotherapy-induced, 506
Histoplasma capsulatum, 173
in stroke, 526
MI and, 309
nonbilious projectile, 366
posttussive, 130, 141, 182
toxic shock syndrome, 133
trichinosis, 156
vitamin C toxicity, 67
- Vomiting center
location and function, **506**
receptors input for, 506
- Von Gierke disease, 85
- Von Hippel-Lindau disease
chromosome association, 62
genetics and presentation, 539
tumor suppressor genes, 220
- Von Willebrand disease, 417, 433
- Voriconazole, 150, 195
- Vortioxetine, mechanism, use and toxicity, 594
- Vulnerable child syndrome, **573**
- Vulva
carcinoma, 661
epithelial histology, 644
- Vulvar pathology, **661**
- Vulvovaginitis
Candida spp, 178
opportunistic infection, 150

W

- Waardenburg syndrome, 484
- WAGR complex/syndrome, 624
- “Waiter’s tip”, 452
- Waiver (of informed consent), 268
- Waldenström macroglobulinemia
clinical features, 436
- “Walking pneumonia”, 148
- Wallenberg syndrome, 527
- Warburg effect, 217
- Warfarin
griseofulvin and, 195
heparin comparison, 441
mechanism, use and adverse effects, **441**
PT measurement, 431
reversal of, 442
teratogenicity of, 632
toxicity treatment, 247, 419
- Warm autoimmune hemolytic anemia, 429

- Warthin-Finkeldey giant cells, 167
 Water aerosols, 181
 Waterhouse-Friderichsen syndrome, 140, 353
 Water restriction, as diabetes insipidus treatment, 342
 Watershed areas/regions
 anterior spinal artery, 544
 blood supply to, 206
 cerebral arteries, **513**
 colon, 370
 femoral head, 469
 ischemic stroke, 525
 Water-soluble vitamins, **63**
 Waxy casts in urine, 612
 WBC casts in urine, 619
 Weakness
 motor neuron signs, 543
 spinal cord lesions, 544
 “Wear and tear” pigment, 225
 Weber syndrome, 526
 Weight gain
 danazol, 676
 with mirtazapine, 594
 Weight loss
 chronic mesenteric ischemia, 393
 diabetes mellitus, 350, 351
 glucagonoma, 357
 Histoplasma capsulatum, 173
 orlistat for, 407
 pancreatic cancer, 404
 polymyalgia rheumatica, 173, 477
 renal cell carcinoma, 623
 sleep apnea treatment, 697
 Weil disease, 145
 Werdnig-Hoffmann disease, 544
 Wernicke encephalopathy, **64**, 590
 Wernicke-Korsakoff syndrome
 alcohol use disorder, 590
 brain lesions with, 524
 Vitamin B₁ (thiamine), 64
 Wernicke (receptive) aphasia, 526, 529
 Western blot, 51, 52
 Western equine encephalitis
 medical importance, 164
 West Nile virus, 164
 Wet beriberi, 64, 315
 Wheal, characteristics/examples, 483
 Wheals, characteristics/examples, 485
 Whipple disease, 388
 Whipple triad, 357
 Whipworm, 156
 Whispered pectoriloquy, 698
 White blood cells (WBCs),
 leukemias, 437
 White matter
 demyelinating disorders, 538
 in adrenoleukodystrophy, 46
 multiple sclerosis, 537
 Whooping cough
 Bordetella pertussis, 141
 pertussis toxin, 130
 Wickham striae, 492
 Wide complex tachycardias, **312**
 Wide splitting, 294
 Williams syndrome, **63**, 304
 Wilms tumor
 chromosomal abnormality, 62
 neuroblastomas vs, 354
 tumor suppressor genes, 220
 Wilson disease
 chromosome association, 62
 copper metabolism, **402**
 copper metabolism in, 49
 free radical injury, 206
 Winged scapula
 injury and deficits, 452
 stab wounds, 452
 Winters formula, 609
 “Wire looping” of capillaries, 614
 Wiskott-Aldrich syndrome
 defect, presentation, and findings, 115
 inheritance, 59
 Wobble, in genetic coding, 35
 Wolff-Chaikoff effect, 335, 345, 346
 Wolffian (mesonephric) duct, 639
 Wolff-Parkinson-White syndrome, **311**
 Woolsorter’s disease, 135
 “Word salad”, 576
 Work of breathing, **682**
 “Worst headache of my life”, 530
 Wound healing
 keratinocytes, 212
 mediators and roles in, **212**
 phases and effector cells in, 212
 platelet-derived growth factor, 212
 zinc deficiency effects, 69
 Woven bone, 461, 468
 Wright effect (genetics), 55
 Wright-Giemsa stain, 413
 Wright stain
 spirochetes, 144
 Wrist drop
 lead poisoning, 425
 with nerve injury, 450
 Wrist region
 bones and fractures, **453**
 injuries to, **463**
 Written advance directives, 268
WT1 gene, product and associated condition, 220
WT1/WT2 mutations, 624
Wuchereria bancrofti, disease,
 transmission and treatment, 156
X
 Xanthelasma, 305, 559
 Xanthine
 in nucleotides, 33
 Xanthomas
 familial dyslipidemias, 92
 hyperlipidemia signs, 305
 palmar, 92
 tuberoeruptive, 92
 Xeroderma pigmentosum, 37
 Xerophthalmia, 64
 Xerosis cutis, 64
 Xerostomia, 239, 243, 474
 X-inactivation (lyonization), Barr
 body formation, 59
 X-linked (Bruton)
 agammaglobulinemia,
 defects, presentation, and
 findings, 114
 X-linked dominant inheritance, 57
 X-linked recessive disease
 ornithine transcarbamylase
 deficiency, 81
 X-linked recessive diseases
 adenosine deaminase deficiency,
 35
 adrenoleukodystrophy, 46
 agammaglobulinemia, 114
 of β -oxidation, 46
 G6PD deficiency, 428
 glucose-6-phosphate dehydrogenase
 deficiency, 77
 hyper-IgM syndrome, 115
 listing of, **59**
 Menkes disease, 49
 Wiskott-Aldrich syndrome, 115
 X-linked recessive inheritance, 57
 X-ray/imaging findings
 bamboo spine, 475
 Bird’s beak sign, 383
 bone-in-bone, 468
 Codman triangle, 471
 Coffee bean sign, 392
 “coin” lesion, 703
 pencil-in-cup, 475
 Steeple sign (x-ray), 167
 String sign, 389
 Sunburst pattern, 471
 X-rays (teratogenicity), 632
Y
 Yellow fever, liver effects of, 374
 Yellow fever virus, 164
 medical importance, **168**
 Yellow-tinged vision, 250
Yersinia spp, reactive arthritis, 475
Yersinia enterocolitica, **142**, 175
Yersinia pestis, disease and
 transmission, 147
 Yolk sac tumor
 hormone levels with, 671
 marker for, 664
 ovarian, 664
 serum tumor marker, 222
 testicular, 671
Z
 Zafirlukast, 704
 Zaleplon, 562
 Zanamivir, mechanism and use, **196**
 Zellweger syndrome, 46
 Zenker diverticulum, **391**
 Zero-order elimination, 230
 Zidovudine, 197
 Ziehl-Neelsen stain, 123
 Zika virus, medical importance, 164, **168**
 Zileuton, 704
 Zinc
 function and deficiency effects, **69**
 in wound healing, 212
 Wilson disease treatment, 402
 Zinc fingers, 69
 Ziprasidone, 591
 Zirconium cyclosilicate, 361
 Zoledronate, 496
 Zollinger-Ellison syndrome
 duodenal ulcer, 387
 effects and diagnosis, **357**
 gastrin in, 378
 MEN1 syndrome, 356
 proton pump inhibitors for, 406
 Zolpidem, 562
 Zona fasciculata, 340
 Zoonosis, 147
 Zoonotic diseases, **147**
 Zymogens, 380

▶ NOTES

About the Editors



Tao Le, MD, MHS

Tao developed a passion for medical education as a medical student. He has edited more than 15 titles in the *First Aid* series. In addition, he is Founder and Chief Education Officer of USMLE-Rx for exam preparation and ScholarRx for sustainable, global medical education. As a medical student, he was editor-in-chief of the University of California, San Francisco (UCSF) *Synapse*, a university newspaper with a weekly circulation of 9000. Tao earned his medical degree from UCSF in 1996 and completed his residency training in internal medicine at Yale University and fellowship training at Johns Hopkins University. Tao subsequently went on to cofound Medsn, a medical education technology venture, and served as its chief medical officer. He is currently chief of adult allergy and immunology at the University of Louisville.



Vikas Bhushan, MD

Vikas is a writer, editor, entrepreneur, and retired teleradiologist. In 1990 he conceived and authored the original *First Aid for the USMLE Step 1*. His entrepreneurial endeavors included a student-focused medical publisher (S2S), an e-learning company (medschool.com), and an ER teleradiology practice (24/7 Radiology). Trained on the Left Coast, Vikas completed a bachelor's degree at the University of California Berkeley; an MD with thesis at UCSF; and a diagnostic radiology residency at UCLA. His eclectic interests include cryptoeconomics, information design, and avoiding a day job. Always finding the long shortcut, Vikas is an adventurer, knowledge seeker, and occasional innovator. He and his spouse, Jinky, are avid kiteboarders and worldschoolers, striving to raise their three children as global citizens.



Anup Chalise, MBBS, MS, MRCSEd

Anup is a Registrar working in General Surgery at North Middlesex University Hospital, London. He is also currently working on projects with ScholarRx, including Flash Facts and Qmax. In his free time, he likes to travel for photography. He is currently looking to pursue training to integrate AI in medical education, and further his surgical training simultaneously.



Jaimie Rogner, MD, MPH

Jaimie is a second-year psychiatry resident at NewYork-Presbyterian/Weill Cornell Medical Center. She attended Northeastern University as an undergraduate and earned her Master of Public Health at the State University of New York (SUNY) Downstate Medical University and medical degree at SUNY Upstate Medical University. After two years of an Internal Medicine/Pediatrics residency at the University of Rochester, she made a pivot to psychiatry. Her hope is to work with individuals in the correctional system as well as refugees and immigrants. Outside of medicine, she likes to indulge in nature, podcasts, live music, and cheering on her favorite athletes and sports teams.



Carolina Caban Rivera

Carolina is an MD/PhD student at the Lewis Katz School of Medicine at Temple University. She completed her doctoral dissertation in neuroscience in May 2023 and is interested in pursuing a residency in dermatology. Carolina is an advocate for immigrant health, and outside of medicine, she enjoys yoga, candle-making, and rollerblading.



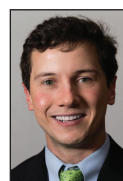
Caroline Coleman, MD

Caroline is an academic hospitalist at the Atlanta Veterans Affairs Medical Center and an adjunct professor of medicine at Emory University School of Medicine. She earned her undergraduate degree in Economics at the University of Georgia and her medical degree at Emory University School of Medicine, and completed her internal medicine residency training at the J. Willis Hurst Internal Medicine Residency Program at Emory University School of Medicine in 2023. Her clinical duties include teaching teams on the wards as well as rotating on the inpatient POCUS and procedure service.



Kimberly Kallianos, MD

Originally from Atlanta, Kimberly graduated from the University of North Carolina at Chapel Hill in 2006 and from Harvard Medical School in 2011. She completed her radiology residency and fellowship at UCSF and is currently an Assistant Professor of Clinical Radiology at UCSF in the cardiac and pulmonary imaging section.



Sean Evans, MD

Sean is a second-year internal medicine resident at Emory University School of Medicine. He earned his undergraduate degree at the University of Georgia and spent two years at the National Institutes of Health as a research fellow before earning his medical degree at Emory. He is interested in pursuing a career in medical oncology, and outside of medicine enjoys running, reading, and yoga.