

The A to Z of the Major Organs



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Introduction

This book is a reference and illustrated guide to the major organs of the human body. I continue to receive suggestions and feedback in reference to these books and I cannot stress how valuable these are to me. I feel with each book a new level is reached and this is due to constant vigilance. You, who write to me, shape the order of future titles and change the format of the books, so please keep this up!!! It is hoped this book will form another valuable chapter in the A to Z story. Human mechanics is a beautiful thing.

The A to Zs may be viewed on 2 sites –

www.amandasatoz.com and <http://www.aspenpharma.com.au/atlas/student.htm>

Feedback may be left at

anatomy.update@gmail.com / medicalamanda@gmail.com

and it is always appreciated.

Acknowledgement

Thank you Aspenpharmacare Australia for your support and assistance in this valuable project, particularly Mr. Greg Lan, CEO of Aspenpharmacare Australia, Rob Koster and Richard Clement.

Dedication

To those who – don't lock themselves in; those not goal orientated but life orientated and to Paul who did not live to see all of 2013 but who did live every moment. I wish I had dedicated a book to him before it was too late. To whom will I give my 1st A to Z now?

How to use this book

The format of this A to Z book has been maintained. The first section - The Cell lists the cell's major organelles, processes & types in the A to Z way. The second section lists the major organs. So as usual **think of it and then find it** is the motto of **the A to Zs** and continues to be the structure behind the book. How are the major organs considered? First as an organ as a whole; a macroscopic structure, then as a group of organized cells, an histological view and then as a machine doing a specific task, where it is illustrated as a schema. This subject is so large that it was not possible to include everything – good editing cannot be over-rated. So the reproductive organs have been omitted and will be dealt with in their own A to Z, and additional information may found in **the A to Z of the Brain and Cranial Nerves**, **the A to Z of the Heart**, **the A to Z of the Digestive Tract**, and **the A to Z of Hair, Nails & Skin** in particular, but as with all **the A to Zs** this book is complete unto itself.

Thank you

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ISBN 9781921930065

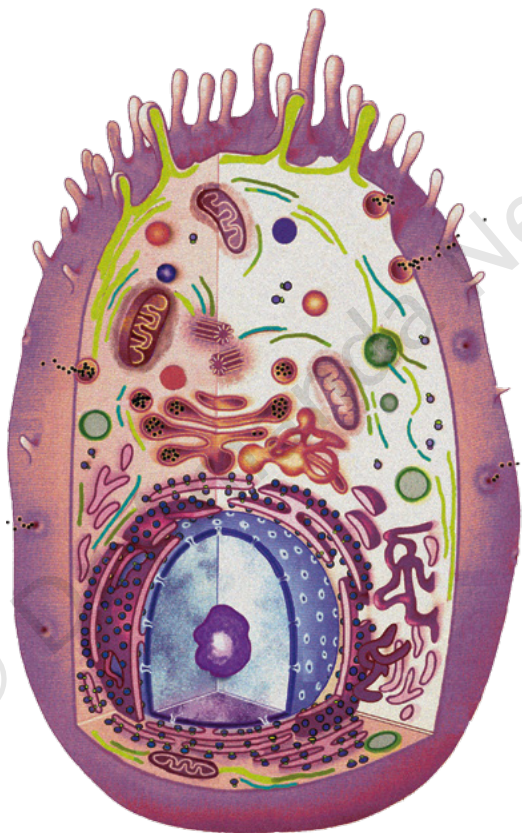


TABLE OF CONTENTS

Introduction	1
Acknowledgement	1
Dedication	1
How to use this Book	1
Table of Contents	3
Abbreviations	6
Common Terms used to describe Organs	8

THE CELL

Organelles

Cell Membranes	20
Centromeres	24
Chromatin	26
Endoplasmic reticulum <i>see Golgi apparatus</i>	
Endosomes <i>see Lysosomes</i>	
Fibres / fibrils / filaments	
Collagen	28
Elastin	34
Golgi apparatus	36
Lysosomes	38
Mitochondria	42
Nuclei	44
Peroxisomes <i>see Vesicles</i>	
Ribosomes	46
Spindles <i>see Centromeres</i>	
Vesicles	49

Processes

Death apoptosis / necrosis	50
Migration	52
Replication meiosis / mitosis	54
Transport endocytosis / exocytosis	56

Epithelial cells

62

Specializations

Adhesion structures	62
Basement membrane (BM)	76
Cilia	78
Villi micro / stereo	80

Types

Glands	84
Sheets / Layers	88

THE ORGANS

Anatomical Position & Planes	90
Position of Organs in body	92
Sites of referred Organ pain	93
Adrenal glands	94
Appendix <i>see also Digestive tract</i>	100
Bladder & Ureter <i>see also Prostate</i>	104
Brain	112
Caecum <i>see Appendix, Colon & Digestive tract</i>	
Colon <i>see also Digestive tract</i>	124
Digestive tract	126
Duodenum <i>see Gallbladder & Digestive tract</i>	
Ear	138
Eye	148
Gall bladder <i>see also Liver</i>	168
Hair follicle <i>see Skin</i>	
Heart	172
Hypothalamus <i>see Brain & Pituitary</i>	
Intestine <i>see Colon & Digestive tract</i>	
Kidney	178
Lacrimal apparatus <i>see Eye</i>	
Liver	190
Lung	200

Lymph node (LN)	214
Pancreas	220
Parathyroids <i>see Thyroid</i>	
Pharynx	228
Pilosebacious unit (AKA Hair follicle) <i>see Skin</i>	
Pineal gland <i>see Brain</i>	
Pituitary gland <i>see also Brain</i>	230
Salivary glands	236
Skin	242
Adnexae	
Hair follicle	242
Nail	246
Regional variations	
Eyelid <i>see Eye</i>	
Finger - Thick	248
Lip - Thin (\pm hairy)	252
Small intestine – jejunum / ileum <i>see Digestive Tract</i>	
Spleen	254
Stomach <i>see also Digestive tract</i>	260
Taste bud <i>see Tongue</i>	
Thymus	262
Thyroid	266
Tongue <i>see also Salivary glands</i>	274
Tonsil <i>see also Lymph Node & Tongue</i>	282
Trachea <i>see Lungs</i>	

Abbreviations

a	= artery	Cr	= cranial
aa	= anastomosis (ses)	CT	= connective tissue
AA	= amino acid	CVS	= cardiovascular system
Ab	= antibody	DCT	= distal convoluted tubules
ACTH	= adrenocorticotrophic hormone / adrenal cortical hormone	DNA	= deoxyribonucleic acid
ADH	= antidiuretic hormone	DT	= digestive tract
adj.	= adjective	diff.	= difference(s)
ADP	= adenosine diphosphate	dist.	= distal
Ag	= antigen	DM	= dura mater
AKA	= also known as	DT	= digestive tract
alt.	= alternative	E	= energy
AMP	= adenosine monophosphate	e.g.	= example
ANS	= autonomic nervous system	EAM	= external acoustic meatus
ant.	= anterior	EAS	= external anal sphincter
AS	= Alternative Spelling, generally referring to the diff. b/n British & American spelling	ec	= extracellular (outside the cell)
ATP	= adenosine triphosphate	ext.	= extensor (as in muscle to extend across a joint)
B	= blood	GA	= Golgi apparatus
bb	= basal bodies	GALT	= gut associated lymphoid tissue
bc	= because	GB	= gall bladder
BF	= blood flow	GH	= growth hormone
BM	= basement membrane / basal lamina / terminal lamina	GIT	= gastro-intestinal tract
b/n	= between	Gk.	= Greek
BP	= blood pressure	GM	= grey matter
br	= branch	gld	= gland
BS	= Blood Supply	H	= hormone
CC	= cerebral cortex	H&E	= haematoxylin & eosin
c.f.	= compared to	HP	= high pressure
CH	= cerebral hemispheres	IAM	= internal acoustic meatus
CL	= corpus luteum	IAS	= internal anal sphincter
CM	= cellular membrane / plasma membrane	ic	= intracellular (inside the cell)
CN	= cranial nerve	Jc	= junctional complex
CNS	= central nervous system	jt(s)	= joints = articulations
CO	= cardiac output	L	= lumbar / left
Co	= coccygeal	L&R	= left and right
CP	= cervical plexus	LI	= large intestine
collat.	= collateral	lig	= ligament
		LP	= lamina propria
		LT	= lymphoid tissue
		Lt.	= Latin

LIF	= left iliac fossa	subcut.	= subcutaneous (just under the skin)
LP	= lamina propria	supf	= superficial
LUQ	= left upper quadrant	SVC	= superior vena cava
LV	= left ventricle	T	= thoracic / tissue
m	= muscle	T3	= tri-iodothyronine
med.	= medial	T4	= thyroxine
mem	= membrane	TNF	= tumour necrosis factor
mito	= mitochondrion (a)	t-RNA	= transfer RNA / transport RNA
mm	= mucus membrane	TSH	= thyroid stimulating hormone / thyrotropic hormone
m-RNA	= messenger RNA	tw	= terminal web
mv	= microvillus (i)	V	= vein
N (s)	= nerve(s)	v	= very
NAD	= normal (size, shape)	WM	= white matter
NAD	= no abnormality detected	w/n	= within
NM	= nuclear membrane / nucleolemma	w/o	= without
NR	= nerve root origin	wrt	= with respect to
NS	= nerve supply / nervous system	ZA	= zonula adherens
NT	= nervous tissue	ZO	= zonula occludens / tight junction
nv	= neurovascular bundle	&	= and
PAS	= periodic acid-schiff stain	∩	= intersection with
PCT	= proximal convoluted tubules		
pl.	= plural		
PN	= peripheral nerve		
post.	= posterior		
proc.	= process		
prox.	= proximal		
RA	= right atrium		
R	= right / resistance		
RIF	= right iliac fossa		
RNA	= ribonucleic acid		
rRNA	= ribosomal RNA		
RUQ	= right upper quadrant		
RV	= right ventricle		
SC	= spinal cord		
SI	= small intestine		
sing.	= singular		
SN	= spinal nerve		
SP	= sacral plexus		
SS	= signs and symptoms		

Common terms used to describe Organs

A

Adenoid glandular

Alveolus air filled cavity e.g. tooth socket *adj. alveolar* (as in air filled bone in the Maxilla).

Anions negatively charged atoms or radicals e.g. $C1^-$, OH^-

Annulus fibrosis the peripheral fibrous ring around the intervertebral disc.

Aperture an opening or space between bones or within a bone.

Apocrine secretions which take off the cytoplasm of the apex of the cell as well

Areola small, open spaces as in the areolar part of the Maxilla may lead or develop into sinuses.

Arytenoid ladle or pitcher (arytenoid cartilages move in and out like ladle with changing sounds).

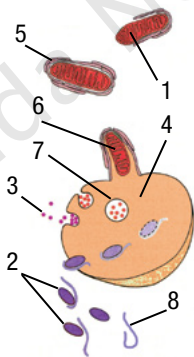
Atrium waiting room,

Attrition tooth wear and tear.

Autocrine secretions of the cell influence other like cells and its own function.

Autophagy the digestion of organelles (1) and other internal structures (2) or substances (3) by the cell itself via lysosomes (4). If the particles are large **Macroautophagy** they must first be internalized by ER (5) before they fuse with the lysosome (6) - otherwise as with smaller proteins - they are directly incorporated into the lysosome (7) - **Microautophagy** or have a "chaperone" protein (8) which transports them to the lysosome.

Axial refers to the head and trunk (vertebrae, ribs and sternum) of the body.



B

Biogenesis the development or formation of... e.g. biogenesis of an organelle may result from the fusion of several components \pm their further modification.

Buccal (*BUK-al*) pertaining to the cheek.

C

Canal tunnel / extended foramen as in the carotid canal at the base of the skull *adj. canular* (canicule - small canal).

Cataract (*KAT-ar-akt*) opacity of the lens in the eye - may occur in the centre - nuclear, under the capsule subcapsular or in the cortex cortical.

Cations positively charged atoms or radicals e.g. NAD^+ , Na^+ , H^+ , Ca^{++}

Caput / Kaput the head or of a head, *adj. capitata = having a head (c.f. decapitate)*

Capitus AKA Capitus* *adj. pertaining to the Head.*

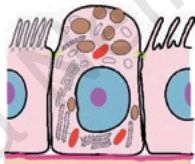
Caveolin membrane-bound proteins involved in receptor-dependant endocytosis *pl. caveolae.*

Cavity an open area or sinus w/n a bone or formed by two or more bones (*adj. cavernous*) may be used interchangeably with fossa. Cavity tends to be more enclosed fossa a shallower bowl like space (Orbital fossa-Orbital cavity).

Cephalic pertaining to the head.

Cervicus AKA Cervicis* *adj. pertaining to the neck*

Clara cells "clear and famous" cells - the bulging cells seen in bronchioles which function as stem cells and replace the lining and alveolar cells. These cells produce surfactant and ↓ the surface tension on the surface of the alveoli and ease the entrance of the air.



Codon a series of 3 nucleic bases which "code for the attachment of a particular AA in the synthesis of a protein - part of the the genetic code - note that the code for AAs in the mitochondria vary from "the genetic code".

Colon term used interchangeably with LI but actually only consisting of 4 parts - the ascending + transverse + descending + sigmoid colons – not including the caecum or appendix.

Concha (*KONG-ku*) a shell shaped bone as in the ear or nose (*pl. conchae adj. chonchoid*) old term for this turbinate.

Constrictor to squeeze - generally referring to a muscle's action where it decreases the size of an opening (as in Pharynx), different from sphincter, it does not stop the passage of a substance just modifies it.

Convolved twisted and turning as in the renal tubules.

Cornu a horn (as in the Hyoid).

Corona a crown. *adj. coronary, coronoid or coronal*; hence a coronal plane is parallel to the main arch of a crown which passes from ear to ear (*c.f. coronal suture*).

Cranium the cranium of the skull comprises all of the bones of the skull except for the mandible.

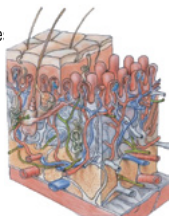
Crest prominent sharp thin ridge of bone formed by the attachment of muscles particularly powerful ones e.g. Temporalis/Sagittal crest.

Cribiform / Ethmoid a sieve or bone with small sieve-like hole.

Cricoid a ring

-crine to secrete

Cutus (*KEW-tis*) skin - *adj. cutaneous* it has come to refer only to the epidermis.



F

Facet (*FASS-et*) a face, a small bony surface (occlusal facet on the chewing surfaces of the teeth) seen in planar joints.

Fascia (*FASH-uh*) face / layers of CT.

Fascicle (*FAS-ik-el*) small bundle.

Fauces (*FOR-seez*) jaws or throat.

Fibril a small fibre or filament at least 10X smaller than the main type of fibrous structure and a smaller part of a larger structure as in myofibril.

Filament a single thread or strand which may be thick or thin but is not made up of obvious multiple units as may be the case in a fibre.

Fibre ASA fiber see also Filament a rope or long strand of material - may have multiple monomeric units joined together or filaments woven together in its makeup and appear as a single unit in biology there are 4 main types - the collagens; the elastins, the fibrillins and the fibronectins, but the most important by far is the collagen group *adj. fibrillar*.

Fissure (*FISH-er*) a narrow slit or gap from cleft.

Flexure a fixed bend generally due to a tether by lig. or mesentery to the peritoneal wall as in the Hepatic flexure of the LI.

Foramen a natural hole in a bone usually for the transmission of BVs &/or Ns. (*pl. foramina*).

Fossa a pit, depression, or concavity, on a bone, or formed from several bones as in temporomandibular fossa - shallower and more like a "bowl" than a cavity.

Fovea (*FOH-vee-ar*) a small pit (usually smaller than a fossa) - as in the fovea of the occlusal surface of the molar tooth.

Free radicals unbound charged ions or molecules - highly reactive *see also Radicals*.

G

GALT a general term for all the lymphoid tissue associated with the GIT.

Gastric belly (as in the belly of a muscle).

Gingiva gum.

Gland epithelial cells which secrete material that has an effect on other cells.

Glottis pertaining to the vocal cords and structures involved in the production of the voice *pl. glottidis*.

Glycan a sugar.

Glycosylation attachment of 1 or more sugars to a molecule.

Gomphosis (*GOM-foh-sis*) joint b/n the roots of the teeth and the jaw bones *pl. gomphoses*.

Groove long pit or furrow.

H

H&E routine stain used in histology - demonstrates most organelles based on their affinity for acid & bases in contrasting blue (staining basophilic or acid substances) & pink (strongly staining bases or acidophilic substances) colours.

Haematochezia bright red clots of blood in the stools.

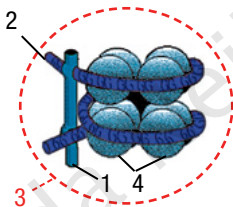
Haem (AS Heme) chemical compound consisting of iron ion in the centre of a large organic ring.

Haematoxylin ASA Hematoxylin a dye extracted from the logwood tree; oxidised it forms haematein, a blue coloured complex with metal ions notably cell nuclei.

Hamus a hook hence the term used for bones which "hook around other bones or where other structures are able to attach by hooking - hamulus = a small hook.

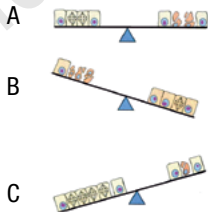
Hepatomegaly enlargement of the liver

Histone an alkaline hydrophilic protein(1) used to organize the long DNA string (2) into structural units - nucleosomes (3), by coiling them around the 8 unit histone core (4) structure shortening the average 1.8m of DNA strand to 90µm. Active genes are less bound up in the histone core than inactive genes and they play a role in gene expression and suppression *see also Nucleosome*.



Holocrine secretions which involve the death of the cell with substance liberation.

Homeostasis (*HOH-me-oh-stay-sis*) condition of cells in organs or tissues where loss of the units (cells usually) is equal to the formation of new units **A** - most disease states can be simplified to belong to an inequality b/n cell proliferation & loss either ↑ in loss as in atrophy **B** or ↑ in proliferation as in cancer **C**



Hormones substances secreted by endocrine glands.

Hyoid U-shaped.

I

Incisura a notch

Incus anvil

Inferior under

Inter between *adj. intercalated*

Intercalated - e.g. intercalated discs or ducts inserted b/n other structures.

Intra within

Introitus an orifice or point of entry to a cavity or space.

Ions - charged atoms *see also Free Radicals*

-- ve charge - anions - generally non-metal

+ ve charge - cations generally metal

L

Labia pertaining to the lips (*adj. labial*) may be oral or vulval lips.

Lacerum something lacerated, mangled or torn e.g. foramen lacerum small sharp hole at the base of the skull often ripping tissue in trauma.

Lacrima (*LAK-rim-u*) related to tears and tear drops (*adj. lacrimal*).

Lambda (*LAM-duh*) from the Greek letter a capital 'L' and written as an inverted V (*adj. lambdoid*) and used to name the point of connection between the 3 skull bones Occiput and the 2 Temporal bones.

Lamina a plate or layer as in the lamina of the vertebra a plate of bone connecting the vertical and transverse spines (*pl. laminae*).

Lamina propria (LP) proper layer, background T surrounding major specialized cell masses in an organ - often loose areolar T: a combination of CT, immune cells, BVs, lymphocytes & Ns.

Lens the solid structure in the eye which focuses the incident light contains capsule cortex and nucleus - the hardening of the nucleus is primarily responsible for presbyopia.

Levator to raise - generally in reference to the actions of muscles.

Ligament a band of tissue which connects bones (articular ligaments) or viscera - organs (visceral ligaments). A ligament is a tie or a connection originally *sing. ligamentum pl. ligamenta* from ligate or to tie up generally composed of collagen fibres.



Ligand a small molecule, that forms a complex with a biomolecule to serve a biological purpose. Often used as a signal triggering molecule, binding to a protein which alters its shape to allow attachment of another protein often an H.

Linea (*lin-EE-uh*) a line as in the Nuchal lines of the Occipitum.

Lingual (*ling-GEW-al*) pertaining to the tongue.

Lipofuscin protein which accumulates in a cell with age, related to the breakdown of fats &/or proteins.

Lymph (*LIMpf*) excess fluid & proteins left behind from the capillaries as they move from the arterial to the venous side.

M

macro- large

Malar cheek

Malleus hammer (as in the ear ossicle).

Mandible from the verb to chew, hence, the movable lower jaw; *adj. mandibular.*

Masseter to chew

Maxilla the jaw-bone; now used only for the upper jaw; *adj. maxillary.*

Meatus a short passage; *adj. meatal* as in external acoustic meatus connecting the outer ear with the middle ear.

Meibum an oily secretion from the Meibomian glands (AKA tarsal glands) of the eye to lubricate the cornea.

megaly- enlargement

Meiosis (*MY-oh-sis*) germ cell division where the genetic material is halved as a device for future fertilization.

Mental relating to the chin (mentum = chin *not mens = mind*).

Merocrine secretions which are due to exocytosis.

Mesial along the dental arch in the direction of the medial plane anteriorly (opposite to Distal).

micro- small pertaining to structures which are able to be viewed under the microscope.

Molecule a neutral group of atoms held together by ionic or covalent bonds - however it is often also a term used for a charged polyatomic group which are technically *Radicals*.

Monomers individual units of a larger structure - usually with the building up of extracellular fibres e.g. collagen *see also Polymers.*

Mucosa (*MEW-koh-zuh*) tissue in the GI tract immediately beneath the epithelial lining.

Mucous *adj. of mucus* as in mucous glands – glands which produce mucus.

Mucus (*MEW-kus*) substance excreted by Mucous glands to lubricate food or protect mucosal surfaces.

Muscularis Mucosa (mm) term for the muscle layer in the mucosa separating the mucosa from the submucosa.

N

Naris nostrils *pl. Nares*

Notch an indentation in the margin of a structure.

Nucha the nape or back of the neck *adj. nuchal.*

Nucleolus (*NEWK-lee-oh-lus*) a small unbound collection of RNA w/n the nucleus which varies in size, shape and presence due to the activity of the cell. It is the site of rRNA synthesis and dispersment, and the assembly of ribosomes. It appears as a darkly staining spot(s) in the nucleus *pl. nucleoli*

Nucleosome a coil of DNA wrapped around a histone core as a form of organized packing *see also Histone.*

O

Occiput the prominent convexity of the back of the head Occipitum = Occipital bone
adj. occipital.

Occlusion opposition of the teeth when closed = bite.

Orbit a circle; the name given to the bony socket in which the eyeball rotates;
adj. orbital.

ORGAN - A GROUP OF TISSUES & CELLS WHICH ARE BOUND TOGETHER TO PERFORM A SPECIFIC FUNCTION.

Orifice (*or-EE-fiss*) an opening.

Ossicle small bone – generally referring to the bones in the ear.

P

Palate a roof *adj. palatal or palatine.*

Papilla (e) outpouching – point generally with an opening (c.f. the duodenal papilla.)

Paracrine substances secreted which only have local effects - as in the pilo-sebaceous unit hair follicle.

Parenchyma (*PA-ren-KY-muh*) main component of an organ when it is highly cellular e.g. the liver.

Parietal (*pa-RYE-et-al*) pertaining to the outer wall of a cavity from paries, a wall.

Parotid (*pa-ROT-id*) pertaining to a region beside or near the ear.

Pars a part of

Peri- around surrounding

Perikymata transverse ridges and the grooves on the surfaces of teeth.

Periodontum CT membrane surrounding the tooth to allow for support and cushioning of tooth movements with mastication.

Periosteum layer of fascial tissue connective tissue on the outside of compact bone not present on articular (joint) surfaces *see endostium.*

Peristalsis the automatic coordinated contraction & relaxation of the GIT smooth muscle triggered by the presence of a food bolus & propagated by the internal NS of the GIT the Auerbach & Myenteric plexi – directing food in one direction.

Peroxisome vesicles .2-.5µm containing dense particle involved in the catabolism of fatty acids and the synthesis of plasma proteins & cholesterol. They contain relevant enzymes to help in this process and are commonest in hepatocytes and only have a single lipid layer - different from most ic membrane bound vesicles.

Petrous pertaining to a rock / rocky / stony *adj. petrosal*

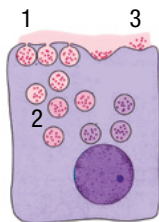
phago (*FAY-goh*) to eat

Phagocytosis the active ingestion of larger particles and their digestion and inactivation w/n the cell.

Phosphorylation addition of 1 or more phosphate radicals to a structure - usually protein

pilo- hair

Pinocytosis (*pyn-OH-sy-toh-sis*) the dynamic formation of small vesicles (1) endosomes (2) in the cell to ingest material (3) *adj. pinocytic.*



The A to Z of Major Organs

Plasma is blood w/o its cellular components *see also Serum*

Plica (e) (*PLEE-ku/kay*) fold (s) generally fixed folds with a CT stem to fix their shape – cannot be flattened as in SI.

Polymers repeated "monomer" units as in several monomers of the collagen fibre placed together but not enough to be a complete fibre *see also Monomer*.

Presbyopia (*PREZ-by-oh-pee-uh*) shortsightedness associated with age - inability to focus on close items.

Process a general term describing any marked projection or prominence as in the mandibular process.

Proximal closer to the axial skeleton (*opposite to Distal*).

Pseudophakic implanted prosthetic lens in the eye (generally due to cataracts).

R

Radicals charged atomic particles or charged polyatomic groups which may be bound to larger molecules or freely disassociated and "unbound"- *free radicals* - refer to an unbound charged ions or molecules - and are highly reactive.

Raphe (*RAF-ay*) line of joint b/n 2 halves, generally of bone or muscles for example a fibrous raphe in the tongue allowing for muscle insertion.

Recess a secluded area or pocket; a small cavity set apart from a main cavity.

Rectus straight, erect

Referred pain AKA reflected pain pain perceived in a different location from its site of origin.

Rhinus/rhino- (*RYE-noh*) pertaining to the nose.

Ridge elevated bony growth often roughened.

Rima Glottidis space b/n the vocal cords.

Rostral towards the anterior/front (of the brain).

Rotundum round

Ruga (e) (*ROO-gu/gay*) folds – generally more mobile and less structured than Plicae – can be flattened as in the Stomach.

S

Sagittal (*SAJ-it-tal*) an arrow, the sagittal suture is notched posteriorly, making it look like an arrow by the lambdoid sutures.

Sclerosis hardening *adj sclerotic*

Senescence signs associated with aging e.g. in a cell the accumulation of lipofuscin is related to age.

Septum a division

Serum (blood) is blood plasma w/o the clotting factors i.e. it is acellular fluid with fewer proteins and cannot clot.

Sinus a space usually w/in a bone lined with mm, such as the frontal & maxillary sinuses in the head, (also, a modified BV usually vein with an enlarged lumen for blood storage & containing no or little muscle in its wall). Sinuses may contain air, blood, lymph, pus or serous fluid depending upon location and health of the subject *adj. sinusoid*.

Skull the skull refers to all of the bones that comprise the head.

Spine a thorn *adj. - spinous* descriptive of a sharp, slender process/protrusion commonly used regarding the spinous processes of the vertebral bodies.

Sphincter ring of muscle around a tube or opening, generally but not always, composed of skeletal muscle. generally used to prevent the passage of a substance.

splanchno- (*SPLANK-noh*) **pertaining to the gut**

Splanchnocranium the splanchnocranium refers to the facial bones of the skull.

Splenomegaly - enlargement of the spleen.

-stoma **to do with the mouth**

Stroma (*STROH-mu*) underlying T background may have various structures but is often equivalent to lamina propria (LP).

sub- **under**

Subcutaneous under the skin, but has come to mean dermal - ie subepithelial.

Submucosa layer common to all the parts of the DT deep to the mucosa.

Sulcus long wide groove often due to a BV indentation.

Suture the saw-like edge of a cranial bone that serves as joint b/n bones of the skull.

Sulcus (i) (*SUL-kus/kee*) furrow cf in the brain

Superior above

syn- (*SIN*) **together i.e. the close proximity of or fusion of 2 structures**



T

Telomere end piece of the chromosome arms (1) which stabilizes the chromosome (2). If this is removed the cell becomes unstable and apoptosis may ensue; shortening is linked to senescence.

Temporal refers to time and the fact that grey hair (marking the passage of time) often appears first at the site of the temporal bone from the consideration of wisdom in the temple.

Tendon a tie or cord of collagen fibres connecting muscle with bone (as opposed to articular ligaments which connect bone with bone).

Tensor to stretch - generally referring to the action of a muscle which pulls something tighter.

Terminal web - fibrillar roof just beneath the CM (1) of epithelial cells composed of actin fibrils (2) & their links (3) to give structure to the cell surface, present in most epithelial cells.

Throat (*THROHT*) common term for pharynx and may incorporate the larynx as well as in sore throat

Tonsil little pole

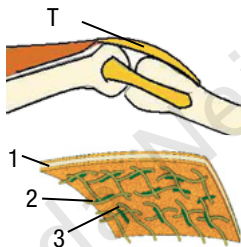
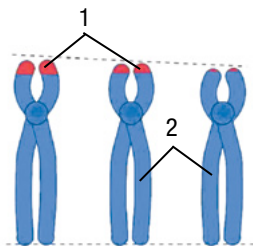
Trachea (*TRAK-ee-uh*) rough

Transverse to go across.

Tuberosity a large rounded process or eminence, a swelling or large rough prominence often associated with a tendon or ligament attachment.

Tubules small tubes.

Turbinate a child's spinning top, hence shaped like a top; an old term for the nasal conchae.



U

Uvea (*YOU-vee-uh*) the combination of the iris + ciliary body + choroid plexus as a single entity - the BF b/n these 3 structures is continuous and so any pathology tends to involve all 3 at the same time.

Uvula (*YOUV-you-luh*) little grape

V

Vagina (*vaj-EYE-nuh*) a sheath; hence, invagination is the acquisition of a sheath by pushing inwards into a structure, and evagination is similar but produced by pushing outwards **adj. vaginal.**

Vertebra turning point.

Vesicle (*VEEZ-ik-el*) any membrane enclosed bubble w/n a cell - generally with the same bilipid layered as the CM and so it is possible for the vesicle to generate a separate internal environment w/n the cell - the cell's organelles are forms of vesicles.

W

Wormian bone extrasutural bone in the skull.

X

xero- (*ZAIR-oh*) **dry**

Xerostoma dry mouth

Appendix

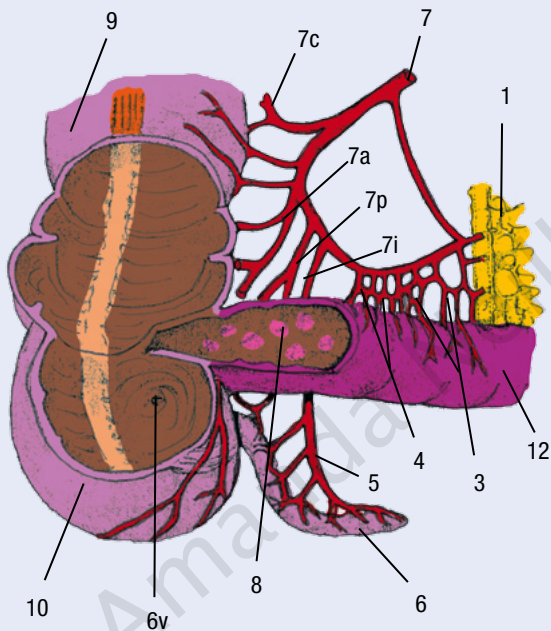
Macroscopic view

Anterior - wall cut away from the caecum and the mesentery removed

Schema of possible appendix positions

The appendix is a blind intestinal tube located in the RIF, at the ilocaecal junction. The BS comes from the mesentery which supports it and gives it mobility - allowing the organ to swing around in front of and behind the LI. This may compromise the BS and function of the organ causing an inflammatory response - appendicitis. Because of its location an inflamed appendix may affect other organs in the vicinity such as the ovary.

- 1 Mesentery (cut)
- 2 Ileum
- 3 straight arteries = arteriae rectae
- 4 arterial arcades
- 5 Appendicular a
- 6 Appendix v = appendix orifice
- 7 Ileocolic artery
Brs –
 - a = ant. caecal a
 - c = colic a
 - i = ileal a
 - p = post. caecal a
- 8 Lymphatic follicles = Peyers' patches
- 9 Ascending colon
- 10 Caecum
- 11 Appendix (8-10cm) positions
 - i = iliac
 - p = pelvic
 - r = retrocaecal - corresponds to McBirney's point 2/3 of the line from the ASIS to the umbilicus



p

i

i

r



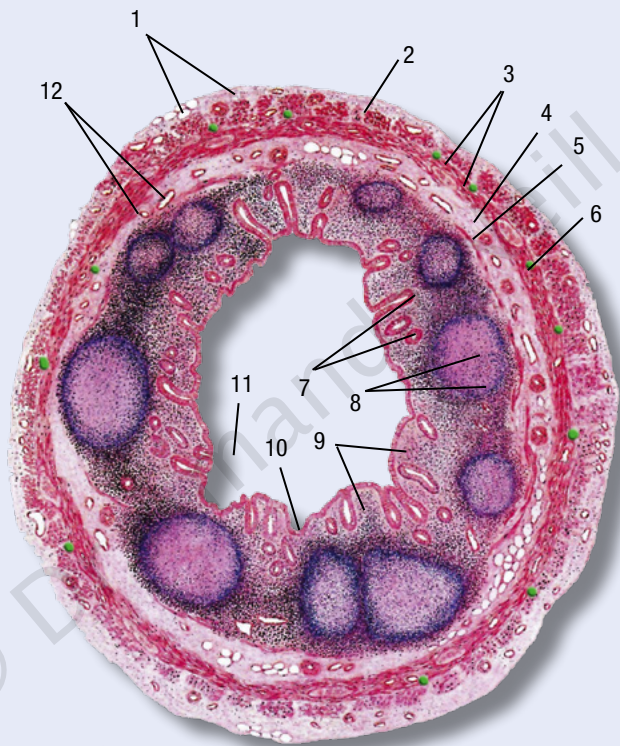
Appendix

Histology

Transverse section LP H&E - showing most of the basic structures

The appendix is a blind intestinal tube located at the ilocaecal junction. It appears to be vestigial, but in other animals is involved in the digestion of cellulose via its stored bacteria. The mucosa has numerous lymphoid follicles & GALT.

- 1 peritoneal mesothelium + adipose cells
- 2 serosa
- 3 muscularis externa - consisting of 2 layers of smooth m, outer longitudinal & inner circular
- 4 submucosa
- 5 muscularis mucosa - 2 thin layers smooth m inner circular & outer longit. smooth m
- 6 parasympathetic ganglia of the myenteric plexus
- 7 intestinal glands in the mucosa
- 8 germinal centre of lymphoid nodule part of the GALT
- 9 loose lymphoid T in the LP of the mucosa
- 10 lining columnar epithelium - filled with goblet cells
- 11 lumen
- 12 arterioles & venules of the mucosa



Bladder

Macroscopic view

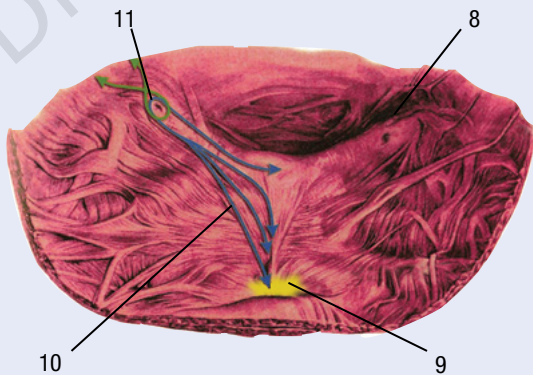
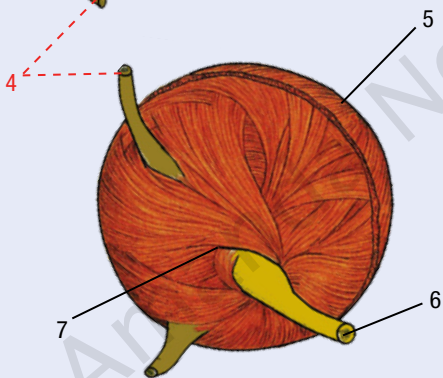
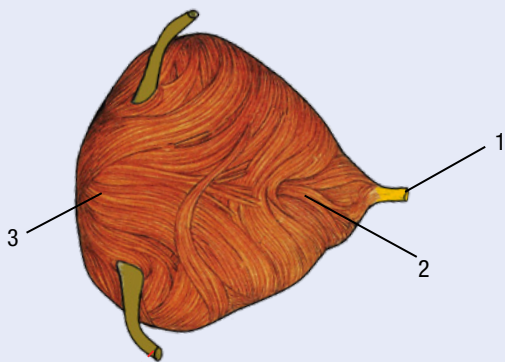
Superior - male

Inferior - female

Internal - female - showing trigone

The bladder is a bag of multi-layered smooth muscle lined with a waterproof epithelium. It both fills and empties from the base, in the trigone, and as such any obstruction in that area will cause both filling and emptying problems. The normal bladder can contain up to 1.5 litres, which is restricted by abdominal P and may be expanded up to 3 litres if flow is obstructed.

- 1 median umbilical lig.
- 2 body
- 3 fundus
- 4 ureter
- 5 external muscle layer
- 6 urethra
- 7 physiological sphincter of the bladder -
pulls the urethra post.
- 8 ureteric orifice
- 9 urethral orifice
- 10 sphincteric muscles - which open the ureters
- 11 sphincteric muscles - which open the urethra



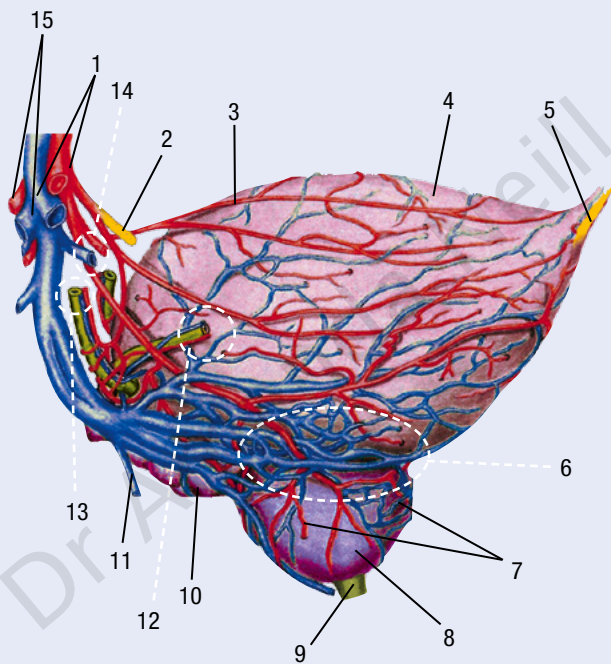
Bladder

Macroscopic view

Lateral - male - BS

The bladder is a collapsible bag which has a copious anastomotic BS intimately related to the adjacent structures - prostate in the male - vagina and uterus in the female.

- 1 int. iliac a & v
- 2 obliterated umbilical a
- 3 superior vesical a
- 4 fundus
- 5 median umbilical lig
- 6 vesical venous plexus
- 7 prostate brs from inf. vesical a & v
- 8 prostate
- 9 urethra
- 10 seminal vesicles
- 11 middle rectal v
- 12 ductus deferens + a
- 13 ureter + uteric a & v
- 14 inf vesical uteric a & v
- 15 inf. gluteal a & v





Bladder

Histology

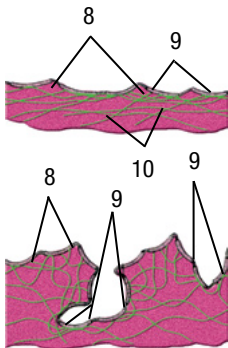
LP - H&E showing the full depth of the bladder wall

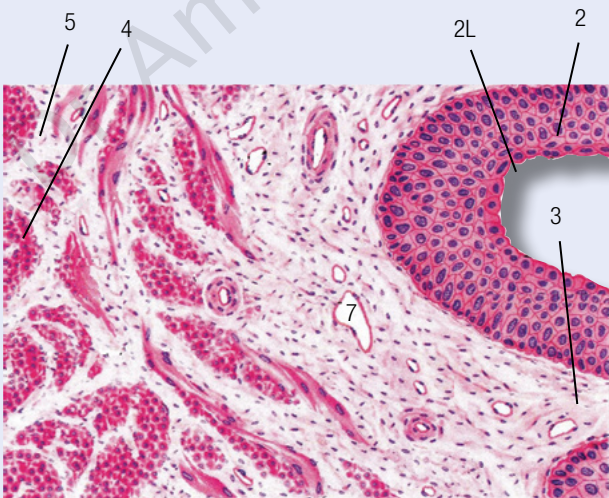
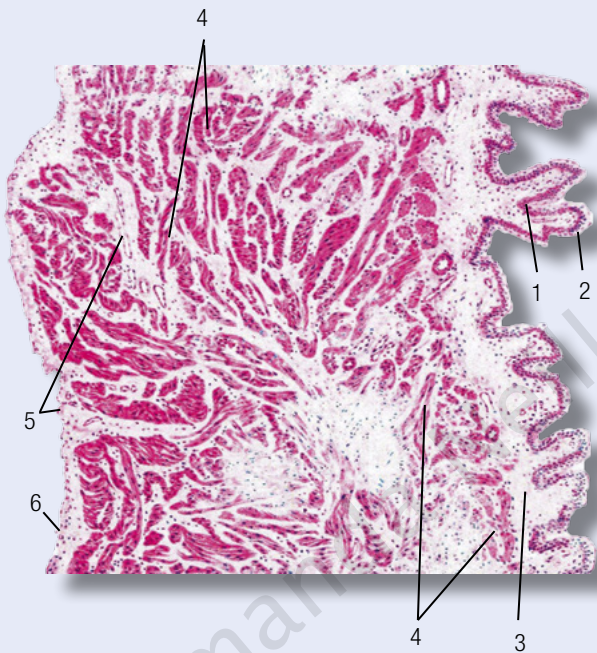
HP - H&E showing the bladder lining and mucosa

Schema - flattened full bladder / empty bladder surface cell changes

The bladder has an internal lining of tightly bound multilayered cuboidal epithelial cells = transitional epithelium. These cells stretch out flat when there is a volume change w/o developing gaps and so protect the underlying T from the toxic urine. This is due to the thickened apex CM and the extensive filaments in the tw, which form invaginations in the relaxed bladder and flatten when it is stretched. With each urination some of the inner cells are shed with the urine.

- 1 mucosal folds
- 2 transitional epithelium
 - L luminal layer of transitional epi - note mitosis is possible throughout the layers
- 3 LP
- 4 muscularis externa, multiple bundles of smooth m
- 5 surface CT & CT septa
- 6 serosa & peritoneal mesothelium
- 7 veins & lymphatics of the LP
- 8 interplaque areas of the CM
- 9 plaques & invaginated plaques
- 10 filaments





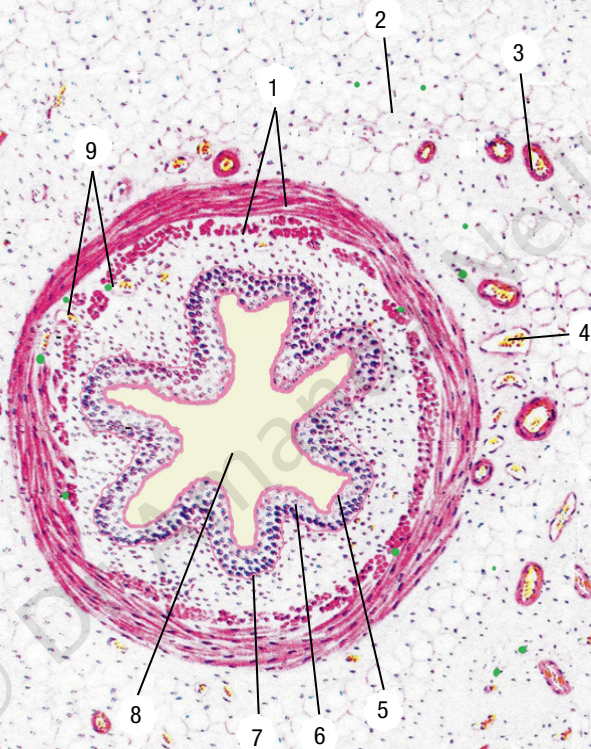
Bladder Ureter

Histology

Transverse section LP H&E - showing most of the basic structures

The ureter transports the urine from the renal pelvis to the bladder by peristalsis.

- 1 outer circular & inner longitudinal layers of smooth muscle
- 2 adipose T surrounding the ureter and supporting the BS & NS
- 3 arteriole
- 4 venule
- 5 surface membrane
- 6 transitional epithelium - multilayered expandable and waterproof
- 7 BM
- 8 lumen
- 9 Ns b/n the muscle layers and in the adventitia



The Brain

Microscopic view

Inferior view - looking up onto the undersurface of the brain

Lateral view - looking at the side of the brain

Posterior view - looking at the back of the brain

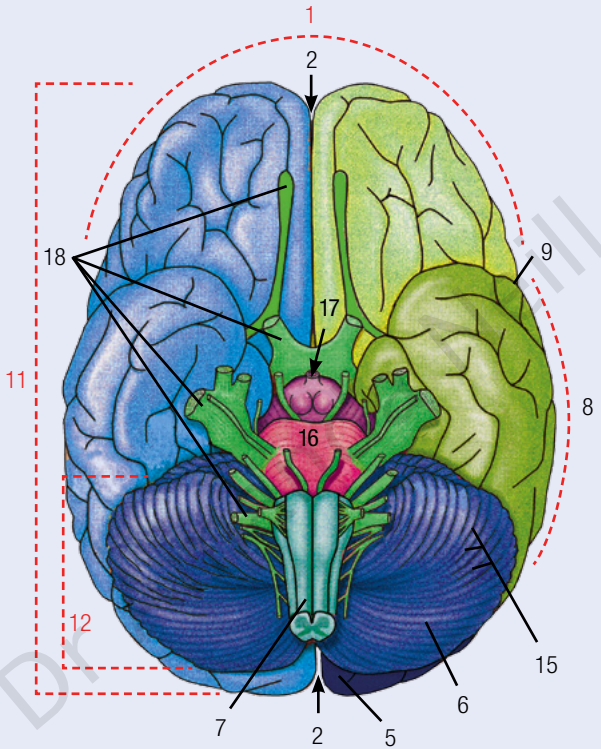
Lateral view - showing the hidden GM

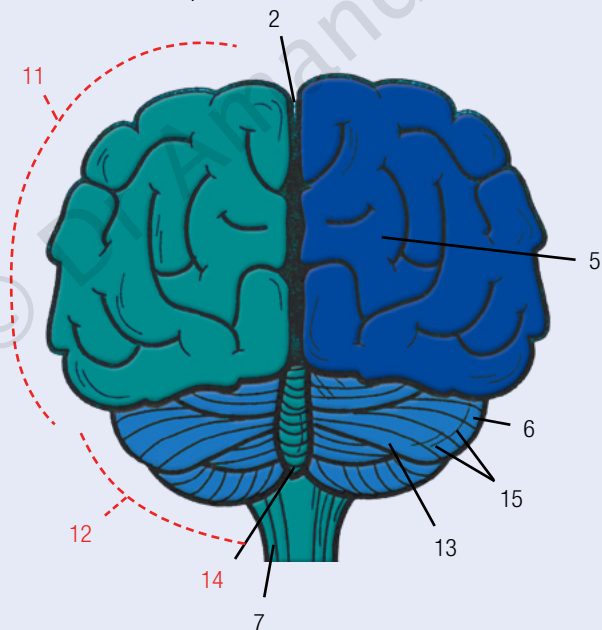
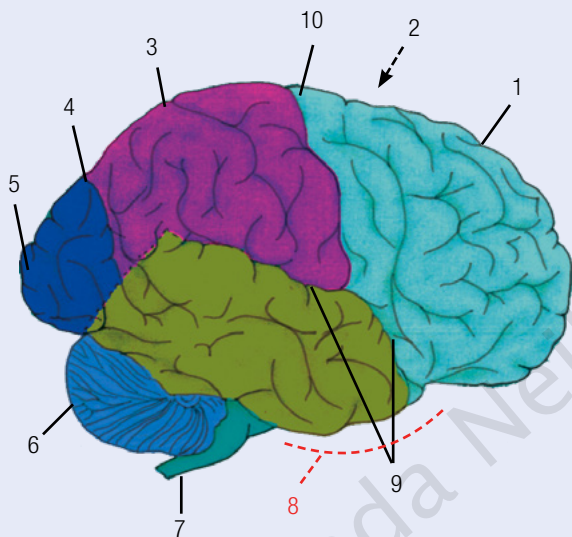
The brain consists of the CEREBRUM, CEREBELLUM, MIDBRAIN, and HIND BRAIN which leads to the SC.

The CEREBRUM overlies most of the brain and consists of 5 lobes named according to the bones which they underly, the hidden GM - the INSULA is buried under the overgrowth of the other cerebral lobes.

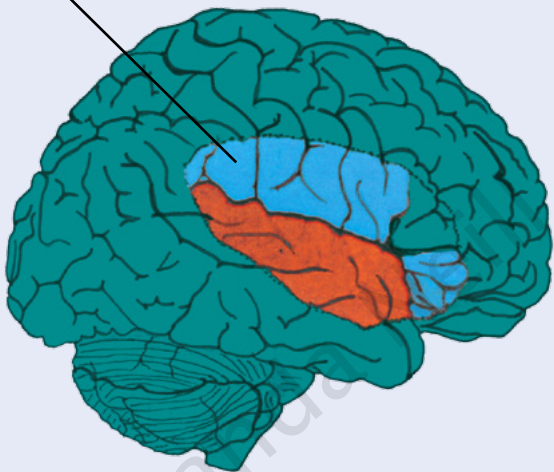
The outer GM is arranged as a series of folds to maximize the surface area: the gyri are the convex folds and the sulci, the fissures or grooves b/n them. They are named according to their anatomical position.

- 1 Frontal lobes - mainly for thinking & planning
- 2 Longitudinal fissure - Separates the 2 CHs
- 3 Parietal lobe - mainly for integration of sensory input
- 4 Parietal sulcus = Occipital fissure
- 5 Occipital lobe - for vision
- 6 Cerebellum
- 7 SC coming from the brainstem (Hindbrain)
- 8 Temporal lobe - mainly for language, memory & emotion
- 9 Lateral fissure = Sylvian fissure
- 10 Central sulcus = Central fissure
- 11 CH
- 12 Cerebellar hemisphere
- 13 Posterior lobe of the cerebellum
- 14 Vermis = (worm)
- 15 Folia - small gyri and sulci of the cerebellum
- 16 Pons = (bridge)
- 17 Infundibulum = (funnel) of the pituitary (removed)
- 18 Cranial Ns
- 19 Operculum - GM over the Insula
- 20 Insula = GM hidden under Cerebrum overgrowth

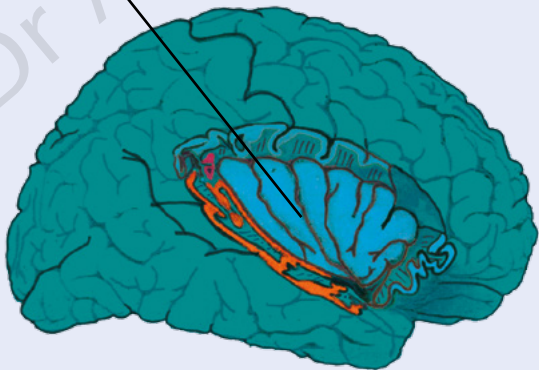




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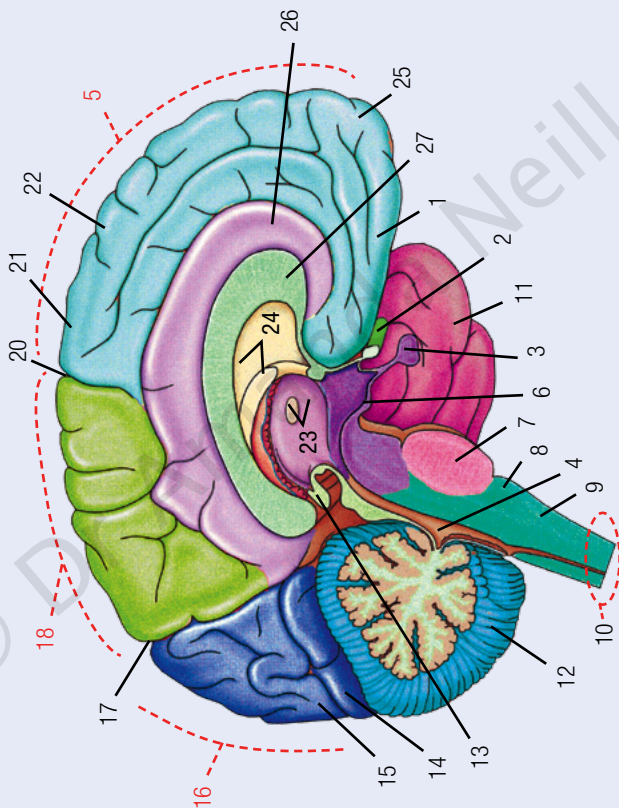


The Brain

Microscopic view

Median - midsagittal plane

- 1 Gyrus rectus – straight gyrus
- 2 Optic structures = CN II
- 3 Pituitary gland
- 4 IVth ventricle
- 5 Frontal lobe
- 6 Mammillary body
- 7 Pons
- 8 Olive
- 9 Hindbrain
- 10 SC + spinal canal
- 11 Temporal lobe
- 12 Cerebellum
- 13 Pineal body (= gland)
- 14 Lingual gyrus
- 15 Calcarine sulcus
- 16 Cuneus
- 17 Parieto-occipital sulcus
- 18 Precuneus
- 19 Post-central gyrus
- 20 Central sulcus
- 21 Paracentral gyrus = Precentral gyrus
- 22 Medial frontal = marginal gyrus
- 23 Thalamus + intermediate body
- 24 Fornix + Septum pellucidum
- 25 Minor gyri and sulci
- 26 Cingulum
- 27 Corpus callosum



The Brain

Macroscopic view

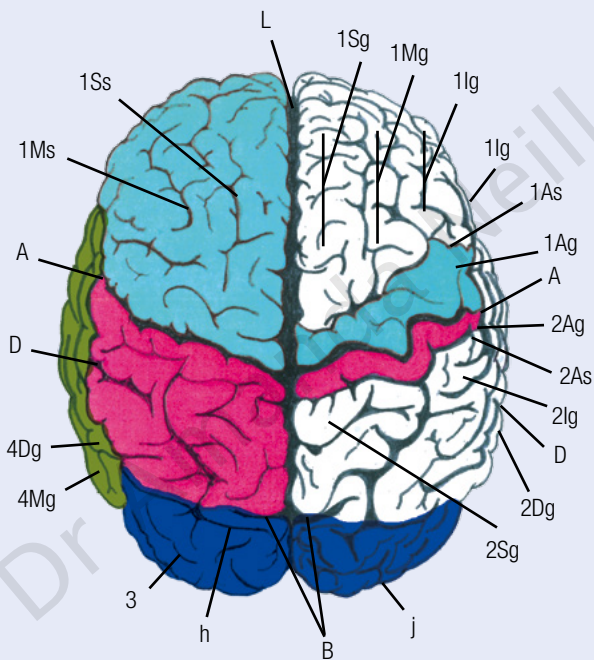
Superior - looking down on the brain from above

The Cerebrum is covered in GM with 4 major lobes and a covered area of GM - the Insula or 5th lobe.

- 1 **FRONTAL LOBE**
- 2 **OCCIPITAL LOBE**
- 3 **PARIETAL LOBE**
- 4 **TEMPORAL LOBE**
- 5 **INSULA**

Because of the overgrowth of the GM the brain creates additional area by forming large folds - GYRI (g) separated by fissures - SULCI (s)

- | | |
|--|---|
| A central sulcus = Rolandic fissure b/n the frontal and parietal lobes | 1Ag pre-central gyrus
MOTOR |
| B parieto-occipital sulcus | 2Ag post central gyrus
SENSORY |
| C preoccipital notch | 2lg inferior parietal gyrus
(lobule) |
| D lateral sulcus = Sylvian fissure b/n the temporal and the frontal + parietal lobes | 2Sg superior parietal gyrus
(lobule) |
| E stem of the lateral sulcus | 1Sg superior frontal gyrus |
| L longitudinal sulcus = longitudinal fissure b/n the R and L CH | 1Fg mid frontal gyrus |
| <i>further subdivided w/n the lobes by minor sulci</i> | 1lg inferior frontal gyrus |
| j lunate sulcus | 4Dg superior temporal gyrus |
| h transverse occipital sulcus | 4lg inferior temporal gyrus |
| i inferior temporal sulcus | 4Mg mid temporal gyrus |
| l intra parietal sulcus | |
| k associated rami of the lateral sulcus | |



Brain

Glia & BBB

Schema

LP of overall glia in the GM

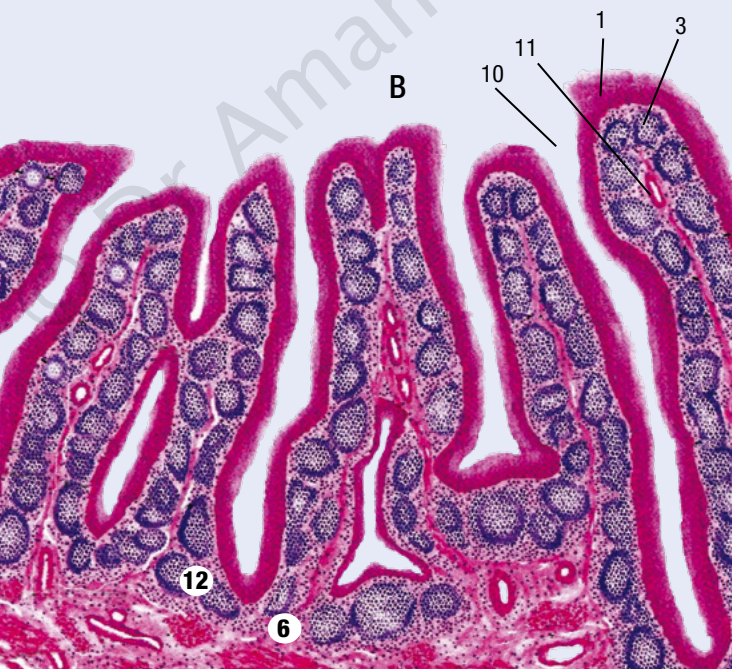
HP of the BBB

The brain is a very protected organ forming its own environment via a special BBB and special supportive cells called glial cells. These cells interact with the meninges, neurons, BVs and influence their environment - helping with the neuron's health, nourishment, repair and ability to send and receive electrical signals.

- 1 BM of the endothelium - of the cerebral BV
- 2 foot process of the astrocyte
- 3 BM
- 4 glial limitans - formed from the subpial foot processes of the astrocytes - sealing the GM from the CSF surrounding the brain
- 5 astrocytes
- 6 digodendrocytes = Schwann cells in the CNS
- 7 neuron
- 8 microglia = fibroblast in the CNS
- 9 ependyma
- 10 ventricle
- 11 BV - note the BM is thickened and covered internally and externally
- 12 pericyte
- 13 sulcus
- 14 gyrus
- 15 pia mater
- 16 endothelium of the cerebral capillaries showing Tj

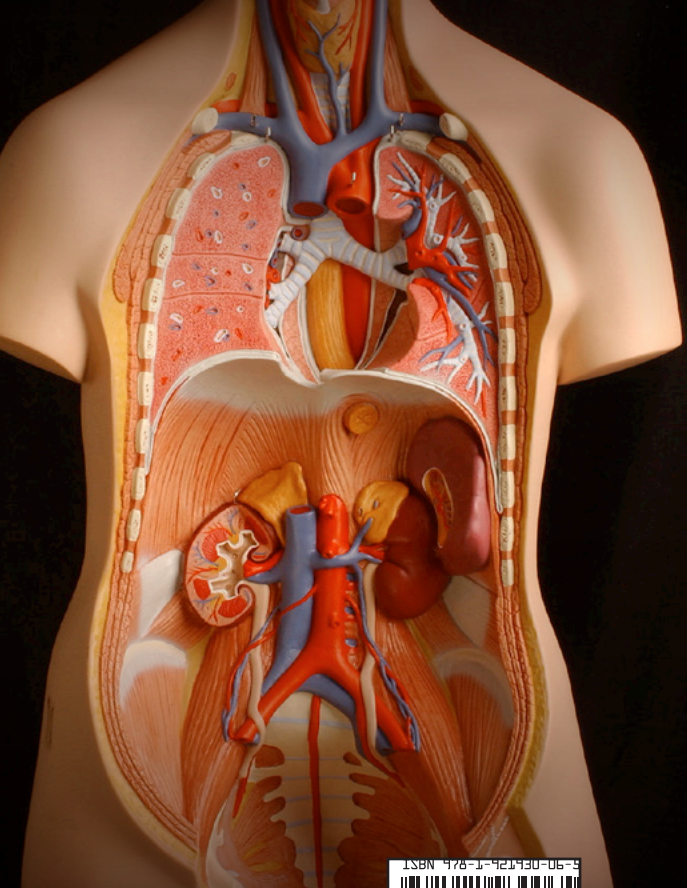


A



B

The A to Z of Major Organs



The A to Zs

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