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Workbook for Animal Biology
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Epithelial tissues/Epiteelweefsels

Simple epithelium/Eenvoudige epiteelweefsel	Compound epithelium/Saamgestelde epiteelweefsel
Squamous epithelium/Plaveiselepiteel	Transitional epithelium/Oorgangsepiteel
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Columnar epithelium/Silinderepiteel	
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Connective tissue (CT)/Bindweefsel (BW)

True CT/Ware BW	Cartilage/Kraakbeen	Bone/Been	Blood/Bloed
Areolar/Areolêr	Hyaline/Hialien	Compact/Kompakte	
Adipose/Vet	Fibrous/Vesel	Spongy/Spons	
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ASSIGNMENT/WERKSOPDRAG

Complete the table below regarding the locations in the body and functions for the different types of tissues found in vertebrate bodies.
Voltooi die onderstaande tabel met betrekking tot die posisies in die liggaam en die funksies vir die verskillende weefsels wat in die vertebraatliggaam aangetref kan word.

	Type of tissue/ Tipe weefsel	Body location/ Liggaamsposisie	Function(s)/ Funksie(s)
1.1.1	Simple squamous epithelium Eenvoudige plaveiselepiteel		
1.1.2	Cuboidal epithelium Kubiese epiteel		
1.1.3	Columnar epithelium Silinderepiteel		

1.1.4	Ciliated columnar epithelium Gesilieerde silinderepiteel		
1.2.1	Transitional epithelium Oorgangsepiteel		
1.2.2	Stratified squamous epithelium Meerlagige plaveiselepiteel		
2.1	Loose connective tissue Los bindweefsel		
2.2	Adipose tissue Vetweefsel		
2.3.1	Hyaline cartilage Hialienkraakbeen		
2.3.2	Fibrous cartilage Veselkraakbeen		
2.3.3	Elastic cartilage Elastiese kraakbeen		
2.4.1	Compact bone Kompakte been		

2.4.2	Spongy bone Sponsbeen		
2.5	Blood Bloed		
3.1	Senuweeweefsel Nerve tissue		
4.1	Skeletal muscle Skeletspier		
4.2	Smooth muscle Gladdespier		
4.3	Heart muscle Hartspier		
5.1	Cat testis and epididymus Kattestis en -epididimus		
5.2	Cat ovary Katovarium		

1.1.1 Cross section through mammalian duodenum/Dwarssnit deur soogdierduodenum

1.1.2 Cross section through mammalian ileum/Dwarssnit deur soogdierileum

1.1 SELECTED MAMMALIAN ORGANS/GESELEKTEERDE SOOGDIERORGANE

1.1.1 Cross section through mammalian duodenum/Dwarssnit deur soogdierduodenum

Labels: visceral peritoneum (simple squamous epith.); longitudinal muscle (smooth muscle); circular muscle (smooth muscle); submucosa; Brünner glands (cuboidal epith.); muscle mucosa; mucosa; crypts of Lieberkühn; columnar epithelium; goblet cells.

Byskrifte: viseraalperitoneum (eenvoudige plaveiselepit.); lengtespiere (gladde spier); kringspiere (gladde spier); submukosa; Brünner-kliere (kubiese epit.); spiermukosa; mukosa; kripte van Lieberkühn; silinderepiteel; bekerselle.

1.1.2 Cross section through the mammalian ileum/Dwarssnit deur soogdierileum

Labels: visceral peritoneum (simple squamous epith.); longitudinal muscles (smooth muscle); circular muscles (smooth muscle); submucosa; muscle mucosa; mucosa; crypts of Lieberkühn; columnar epithelium; goblet cells.

Byskrifte: viseraalperitoneum (eenvoudige plaveiselepit.); lengtespiere (gladde spier); kringspiere (gladde spier); submukosa; spiermukosa; mukosa; kripte van Lieberkühn; silinderepiteel; bekerselle.

Note/Nota: The biggest difference between the duodenum and ileum is the absence of the Brünner glands in the ileum.
Die grootste verskil tusssen die duodenum en ileum is die afwesigheid van Brünner-kliere in die ileum.

What are the functions of the following structures?/Wat is die funksies van die volgende strukture?

Crypts of Lieberkühn/Kripte van Lieberkühn:

Goblet cells/Bekerselle:

Brünner glands/Brünner-kliere:

The muscle layers in the small intestines/Die spierlae in die dunderm:

1.1.3 Cross section through mammalian liver tissue/Dwarssnit deur soogdierlewerweefsel

1.1.4 Cross section through mammalian tongue/Dwarssnit deur soogdiertong

1.1 SELECTED MAMMALIAN ORGANS/GESELEKTEERDE SOOGDIERORGANE

1.1.3 Section through mammalian liver tissue/Snit deur soogdierlewerweefsel

Labels: liver lobule; central vein (hepatic vein); liver cords; sinusoids; hepatic portal vein; hepatic artery; bile duct (cuboidal epith.)
Byskrifte: lewerlobbetjie; sentrale vene (hepatiese vene); lewerkoorde; sinusoiëde; hepatiese poortvene; hepatiese arterie; galbuisie (kubiese epit.)

Briefly describe the direction of blood flow through a liver lobule/Beskryf kortliks die rigting waarin bloed deur die lewer vloei:

1.1.4 Cross section through mammalian tongue/Dwarssnit deur soogdiertong

Labels: stratified squamous epith. [stratum basale (basal membrane); stratum germinativum (Malpighian layer); stratum granulosum (granular layer); stratum lucidum (hyaline layer); stratum corneum (horny layer); free surface]; papillae; taste buds; supporting cells; sensory cells; nerve; epidermis; dermis.

Byskrifte: saamgestelde meerlagige plaveiselepit. [stratum basale (basaalmembraan); stratum germinativum (Malpighi laag); stratum granulosum (korrellaag); stratum lucidum (helderlaag); stratum corneum (horinglaag); vry oppervlak]; papille; smaakbekertjies; steunselle; sensoriese selle; senuwee; epidermis; dermis.

1.1.5 Model of mammalian kidney/Model van soogdiernier

1.1.6 Section through mammalian kidney/Snit deur soogdiernier

1.1 SELECTED MAMMALIAN ORGANS/GESELKTEERDE SOOGDIERORGANE

1.1.5 Model of mammalian kidney/Model van soogdiernier

Labels: cortex; medulla; pyramid; calyx; pelvis; ureter; nephron; glomerulus; capsule of Bowman; distal convoluted tubule; descending limb of loop of Henlé; ascending limb of loop of Henlé; proximal convoluted tubule; collecting ducts.

Byskrifte: korteks; medulla; piramiede; kaliks; pelvis; ureter; nefron; glomerulus; kapsel van Bowman; distale kronkelbuis; dalende been van die lus van Henlé; stygende been van die lus van Henlé; proksimale kronkelbuis; versamelbuisies.

1.1.6 Section through mammalian kidney/Snit deur soogdiernier

Labels: cortex; medulla; glomerulus; capsule of Bowman; collection of loops of Henlé and collecting ducts; distal and proximal convoluted tubules; pelvis; renal artery; renal vein; ureter; adipose tissue; transitional epithelium; simple squamous epithelium (endothelium of blood vessels).

Byskrifte: korteks; medulla; glomerulus; kapsel van Bowman; versameling van die lusse van Henlé en versamelbuisies; distale - en proksimale kronkelbuisies; pelvis; renale arterie; renale vene; ureter; vetweefsel; oorgangsepiteel; eenvoudige plaveiselepiteel (endoteel van bloedvate).

1.2.1 Section through a moveable joint/Snit deur ’n beweeglike gewrig

1.2.2 Compact bone (dry ground) to show the Haversian system/Kompakte been (droog geslyp) om Haverse stelsel aan te toon.

1.2 MORE TISSUES/NOG WEEFSELS

1.2.1 Section through a moveable joint/Snit deur 'n beweeglike gewrig

Labels: cartilage; chondrocytes; lacunae; capsules; nucleus; matrix (chondrine); spongy bone; trabeculae (remnants of compact bone, after the rest has been eaten away by osteoclasts, which cannot be seen); bone marrow consisting of marrow cells and fat cells; matrix; osteocytes; lacunae; remnants of Haversian systems; skeletal muscle.

Byskrifte: chondrosiete; lakunas; kapsels; kern; matriks (chondrien); sponsbeen; trabekulas (oorblyfsels van kompakte been, nadat die res deur die osteoklaste weg gevreet is, osteoklaste kan nie waargeneem word nie); beenmurg bestaande uit murg- en vetselle; matriks; osteosiete; lakunas; oorblyfsels van die Haverse stelsels; skeletspier.

Why is bone provided with blood vessels but not cartilage?/Waarom is been van bloedvate voorsien, maar nie kraakbeen nie?

1.2.2 Compact bone (dry ground) to show the Haversian system/Kompakte been (droog geslyp) om Haverse stelsel aan te toon.

Labels: lacunae that house osteocytes; canaliculi that house protoplasmic extensions of osteocytes; bone lamellae; Haversian canals; matrix, Volkmann channel.

Byskrifte: lakunas wat die osteosiete huisves; kanalikuli waarin die protoplasmiese uitlopers van die osteosiete voorkom; beenlamellae; Haverse kanale; matriks; Volkmannkanaal.

What does the inorganic component of compact bone consist of?/Waaruit bestaan die anorganiese komponent van kompakte been?

1.2.3 Cross section through C-shaped cartilage rings of trachea/Dwarssnit deur C-vormige kraakbeenringe in tragea.

1.2.4 Loose connective tissue (areolar connective tissue)/Los bindweefsel (areolêre bindweefsel)

1.2 MORE TISSUES/NOG WEEFSELS

1.2.3 Cross section through C-shaped cartilage rings of trachea/Dwarssnit deur C-vormige kraakbeenringe in tragea.

Labels: cartilage; chondrocytes; lacunae; capsules; nucleus; matrix (chondrine); ciliated columnar epithelium; goblet cells; adipose tissue; simple squamous epithelium lining blood vessels (endothelium).

Byskrifte: kraakbeen; chondrosiete; lakunas; kapsels; kern; matriks (chondrien); gesilieerde silinderepiteel; bekerselle; vetweefsel; enkelvoudige plaveiselepiteel wat bloedvate uitvoer (endoteel).

1.2.4 Loose connective tissue (areolar connective tissue)/Los bindweefsel (areolêre bindweefsel)

Labels: bundles of collagenous fibres (white fibres); network of elastic fibres (yellow fibres); matrix (amorphous ground substance); mast cells (the smaller, darker stained structures); macrophages (the larger, lighter stained structures).

Byskrifte: bondels kollageenvesels (witvesels); netwerk van elastiese vesels (geelvesels); matriks (amorfe grondstof); mastselle (die kleiner, donkerder gekleurde strukture); makrofage (die groter, ligter gekleurde strukture).

Note/Nota: Neither the fibroblasts nor their nuclei can be seen due to the staining method./ Die fibroblaste en hulle kerne kan as gevolg van die kleuringstegniek, nie waargeneem word nie.

1.2.5 Blood smear/Bloedsmeer

1.2.6 Drawing of nerve cell model/Tekening van senuweeselmodel.

1.2 MORE TISSUES/NOG WEEFSELS

1.2.5 Blood smear/Bloedsmeer

Labels: red blood cells (erythrocytes) without nuclei; white blood cells (leukocytes) with nuclei lymphocytes; monocytes; neutrophylls.

Byskrifte: roobloedselle (eritrosiete) sonder kerne; witbloedselle (leukosiete) met kerne limfosiete; monosiete; neutrofille.

1.2.6 Drawing of nerve cell model/Tekening van senuweeselmodel.

Labels: cell body (centron); axon; dendrite; myelin sheath (medullary sheath); neurilemma; axial cylinder (axoplasm); nodes of Ranvier; Schwann cells.

Byskrifte: selliggaam (sentron); akson; dendriet; miëlienskede (medullaskede); neurilemma; assilinder (aksoplasma); knope van Ranvier; Schwann-selle.

Note/Nota: The myelin sheath occurs only in the peripheral nervous system which means that myelin sheaths occur around the axon of motoric nerve cells and both axons and dendrites of sensory nerve cells.
Die miëlienskede kom slegs in die periferale senuweestelsel voor wat beteken dat die miëlienskede rondom die akson van motoriese senuweeselle en beide die aksons en dendriete van sensoriese senuweeselle voorkom.

1.2.7 Skeletal muscle (striated muscle)/Skeletspier (gestreepte spier)

longitudinal section (ls)/lengtesnit (ls) | cross section (cs)/dwarssnit (ds)

1.2.8 Cardiac muscle (longitudinal section)/Hartspier (lengtesnit)

1.2 MORE TISSUES/NOG WEEFSELS

1.2.7 Skeletal muscle (striated muscle)/Skeletspier (gestreepte spier)

Labels: fasciculus (on cs); muscle fibre, syncytium (each muscle fibre is a syncytium, because it possesses more than one nucleus.); peripherally placed nuclei (on cs); darker coloured striations; sarcolemma; sarcoplasm, myofibril.

Byskrifte: fasikulus (op ds); spiervesel, sinsitium (elke spiervesel is ’n sinsitium, omdat dit meer as een kern bevat.); kerne op die omtrek (op ds); donkerder gekleurde strepies; sarkolemma; sarkoplasma, miofibril.

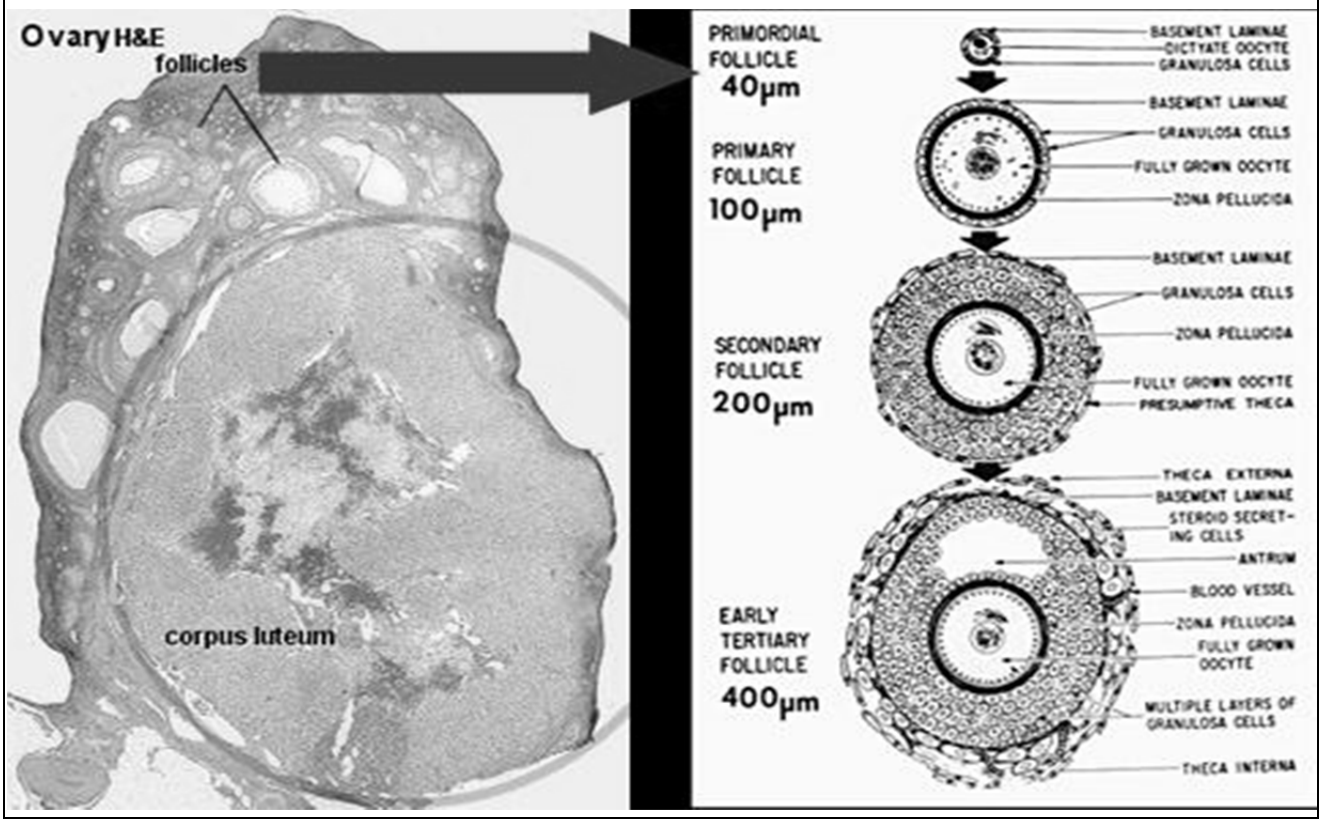
1.2.8 Cardiac muscle (longitudinal section)/Hartspier (lengtesnit)

Labels: syncytium (the entire heart is a syncytium, because all the multi nucleated muscle fibres are connected to each other by bridges.); centrally placed nuclei; darker coloured striations; intercalated disks; sarcolemma; sarcoplasm.

Byskrifte: sinsitium (die hele hart is ’n sinsitium, omdat die multikernige spiervesels met mekaar, dmv bruggies, in verbinding is.); kern sentraal in die vesel; donkerder gekleurde strepies; interkalêre skyfies; sarkolemma; sarkoplasma.

1.2.9 Cat testis and epididymus/Kattestis en -epididimis

1.2.10 Cat ovary (cross section)/Katovarium



1.2 MORE TISSUES/NOG WEEFSELS

1.2.9 Cat testis and epididymus/Kattestis en -epididimis

Labels: epididymis; vasa efferentia with pseudo-ciliated columnar epithelial cells; mature sperm cells; testis; interstitial cells (cells of Leydig); seminiferous tubules; germinal epithelial cells; spermatogoniums; spermatocytes (primary & secondary); spermatids; spermatozoa (immature); Sertoli cells (are unclear, their nuclei can be seen sometimes).

Byskrifte: epididimis; vasa efferensia met pseudo-gesilieerde silinderepiteel; volwasse spermselle; testis; interstisiële selle (selle van Leydig); semenbuisies; kiemepiteel; spermatogoniums; spermatosiete (primêre & sekondêre); spermatiede; spermatosoë (onvolwasse); Sertoli-selle (is onduidelik, hulle kerne kan soms waargeneem word).

1.2.10 Cat ovary (cross section)/Katovarium

Labels: stroma; oogonium; primary follicle; secondary follicle; primary oocyte; tertiary follicle; secondary oocyte; anthrum; Graafian follicle; corpus luteum (luteal body); cumulus oophorus.

Byskrifte: stroma; oögonium; primêre follikel; sekondêre follikel; primêre oösiet; tersiêre follikel; sekondêre oösiet; antrum; follikel van Graaf; corpus luteum (luteaalliggaam); kumulus oöforus.

NOTES/NOTAS

CHAPTER 2 KINGDOM PROTOZOA
HOOFSTUK 2 RYK PROTOZOA

Living matter/Lewende materiaal

Empire/Emperium: Procaryota (Monera)	Empire/Emperium: Eucaryota
	Kingdom/Ryk: Archezoa Kingdom/Ryk: Protozoa } Protista Kingdom/Ryk : Chromista
	Kingdom/Ryk: Plantae
	Kingdom/Ryk: Fungi
	Kingdom/Ryk: Animalia

Kingdom/Ryk: Protozoa

Diagnostic characteristics/Diagnostiese kenmerke
1 Acellular/Asellulêr
2 Microscopical small/Mikroskopies klein

2.1 **Phylum/Filum:** Rhizopoda

Diagnostic characteristics/Diagnostiese kenmerke:
1 Locomotion and feeding by means of pseudo–podia/Voortbeweging en voeding d.m.v. pseu–dopodiums.
2 One type of nucleus/Een tipe kern.

Class/Klas: Lobosea

Diagnostic characteristics/Diagnostiese kenmerke:
1 Pseudopodia lobose/Gelobde pseudopodiums.

Genus: *Amoeba*

2.2 **Phylum/Filum:** Apicomplexa

Diagnostic characteristics/Diagnostiese kenmerke:
1 Have no organelles for movement/Het geen organelle vir voortbeweging nie.
2 All are parasitic/Almal is parasiete.

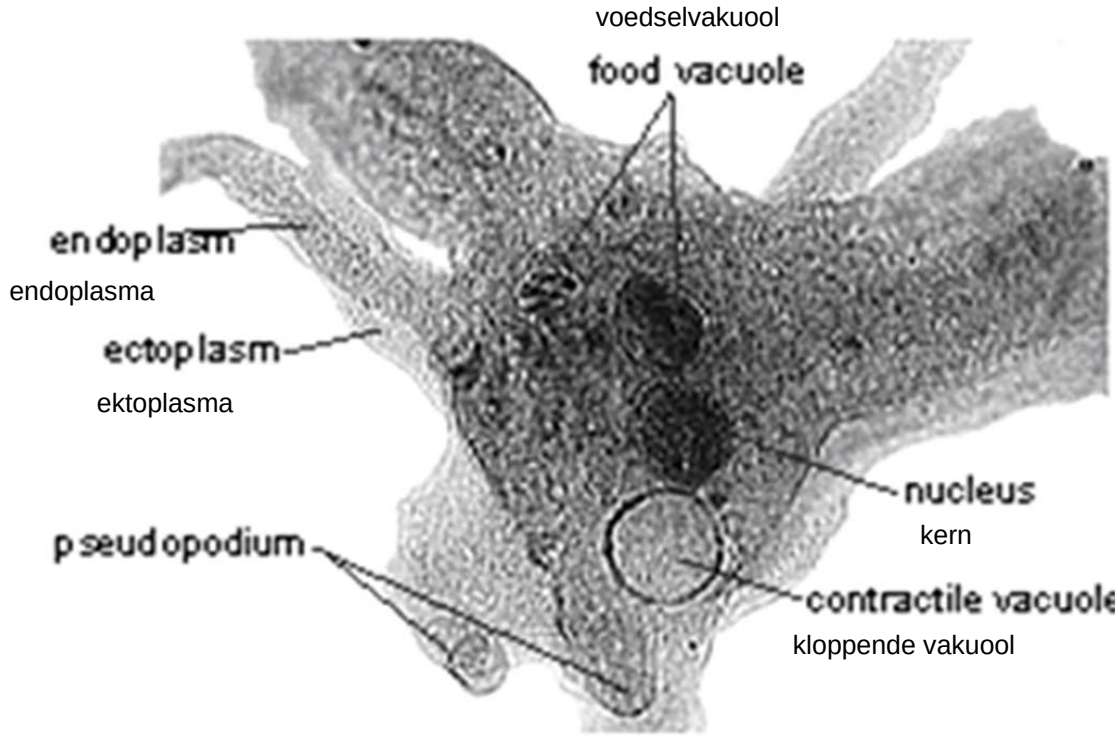
Class/Klas: Sporozoa

Diagnostic characteristics/Diagnostiese kenmerke:
1 With infective sporozoites/Met infektiewe spo–rosoïete.
2 With one or two hosts/Met een of twee gas–here.

Genus: *Plasmodium*

2.1 **PHYLUM/FILUM: RHIZOPODA**

2.1.1 *Amoeba* (whole mount/heelmontering)



2.1 **PHYLUM/FILUM: RHIZOPODA**

2.1.1 *Amoeba* (whole mount/heelmontering)

Labels: cell membrane (plasmalemma); ectoplasm; endoplasm; nucleus; food vacuoles; contractile vacuole; pseudopodia.

Byskrifte: selmembraan (plasmalemma); ektoplasma; endoplasma; kern; voedselvakuool; kloppende vakuool; pseudopodiums.

What are the functions of the pseudopodia?/Wat is die funksies van die pseudopodiums?

What is the function of the contractile vacuole?/Wat is die funksie van die kloppende vakuool?

2.2 **PHYLUM/FILUM: APICOMPLEXA**

2.2.1 Human blood smear/Menslike bloedsmeer

2.2.2 Make a diagrammatic representation of the life cycle of *Plasmodium.*/Maak 'n diagrammatiese tekening van die lewensiklus van *Plasmodium*.

2.2 **PHYLUM/FILUM: APICOMPLEXA**

2.2.1 A human blood smear to show some of the asexual stages of *Plasmodium*/'n Menslike bloedsmeer om die ongeslagtelike stadia van *Plasmodium* te vertoon.

Labels: merozoites, trophozoites and the signet ring stage in human erythrocytes (red blood cells); schizont.

Byskrifte: merosoïete, trofosoïete en die seëlringstadium in menslike eritrosiete (rooibloedselle); skisont.

Plasmodium has two hosts, man and the *Anopheles*-mosquito. How would you decide which is the final host and which the intermediate host?
Plasmodium het twee gashere, die mens en die *Anopheles*-muskiet. Hoe sou mens besluit watter gasheer die finale gasheer en watter een die tussengasheer is?

NOTES/NOTAS

CHAPTER 3 KINGDOM ANIMALIA (Acoelomata & Pseudocoelomata)
HOOFSTUK 3 RYK ANIMALIA (Acoelomata & Pseudocoelomata)

Animalia

Acoelomata	**Pseudocoelomata**	**Coelomata**
Animals without a body cavity/ Diere sonder 'n liggaamsholte.	Animals with a body cavity not lined with mesoderm./Diere met 'n liggaamsholte wat nie met mesoderm uitgevoer is nie.	Animals with a body cavity which is lined with mesoderm—true coelom./Diere met 'n liggaamsholte wat met mesoderm uitgevoer—ware seloom.
• Cnidaria • Platyhelminthes	• Nematoda	• Annelida • Arthropoda • Chordata

3.1 **Phylum/Filum:** Cnidaria

Diagnostic characteristics/ Diagnostiese kenmerke:

1. Radially symmetric/Radiaal simmetries
2. Diploblastic/Diploblasties
3. With a gastrovascular cavity/ Met 'n gastrovaskulêre holte

Class/Klas: Hydrozoa

Diagnostic characteristics/ Diagnostiese kenmerke:

1. With polyps and medusae/Met poliepe en medusas
2. Coelenteron undivided/ Selenteron onverdeeld
3. Without a stomodeum/ Sonder 'n stomodeum

Genus: *Hydra*

3.2 **Phylum/Filum:** Platyhelminthes

Diagnostic characteristics/ Diagnostiese kenmerke:

1. Body flattened dorsoventrally/ Ligg. dorsoventraal afgeplat
2. Without a coelom/Sonder 'n seloom
3. Triploblastic/Triploblasties

Class/Klas: Cestoda

Diagnostic characteristics/ Diagnostiese kenmerke:

1. Body covered by a living tegument/Liggaam bedek met lewende tegument
2. With suckers and/or hooks/Met suiers en/of hakies
3. Digestive system is absent/ Spysverteringstelsel is afwesig
4. Body divided into proglottids/ Ligg. in proglottiede verdeel

Genus: *Taenia*

3.3 **Phylum/Filum:** Nematoda

Diagnostic characteristics/ Diagnostiese kenmerke:

1. Body is cigar shaped/Ligg. is sigaarvormig
2. Body is covered by a thick cuticle/Ligg. is met 'n dik kutikula bedek
3. With longitudinal muscles only/Met slegs lengtespiere
4. With sensory cilia only/Met slegs sensoriese silia

Class/Klas: Secernentia

Diagnostic characteristics/ Diagnostiese kenmerke:

1. Phasmids usually present/ Fasmiede gewoonlik teenwoordig
2. Males with bursa/ Mannetjies met 'n bursa
3. Amphids op lip region/ Amfiede op die lipstreek

Genus: *Ascaris*

3.1 **PHYLUM/FILUM: CNIDARIA**

3.1.1 Whole mount of *Hydra*/Heelmontering van *Hydra*

3.1.2 Longitudinal section through *Hydra*/Lengtesnit deur *Hydra*

3.1 **PHYLUM/FILUM: CNIDARIA**

3.1.1 Whole mount of *Hydra*/Heelmontering van *Hydra*

Labels: tentacles; mouth; hypostome; foot (basal disc); asexual bud.

Byskrifte: tentakels; mond; hipostoom; voet (basaalskyf); ongeslagtelike knop.

3.1.2 Longitudinal section through the body of *Hydra*/Lengtesnit deur die liggaam van *Hydra*

Labels: tentacles; mouth; cnidocytes on the tentacles; gastrovascular cavity (coelenteron); ectoderm (which cannot be called the epidermis yet); endoderm (gastrodermis); mesoglea.

Byskrifte: tentakels; mond; knidosiete op die tentakels; gastrovaskulêre ruimte (selenteron); ektoderm (wat nog nie as epidermis bekend kan staan nie); endoderm (gastrodermis); mesoglea.

Explain why it can be said that *Hydra* feeds both intra and extra cellularly?/Verduidelik waarom dit gesê kan word dat *Hydra* beide intra- en ekstrasellulêr voed?

What are the function(s) of the cnidocytes?/Wat is die funksie(s) van die knidosiete?

3.1 **PHYLUM/FILUM: CNIDARIA**

3.1.3 Cross section through the testis of *Hydra*/Dwarssnit deur die testis van *Hydra*

3.1.4 Cross section through the ovary of *Hydra*/Dwarssnit deur die ovarium van *Hydra*

3.1 **PHYLUM/FILUM: CNIDARIA**

3.1.3 Cross section through the testis of *Hydra*/Dwarssnit deur die testis van *Hydra*

Labels: ectoderm; endoderm (gastrodermis); mesoglea; gastrovascular cavity (coelenteron); testis; spermatogonia; spermatocytes; spermatids; spermatozoa.

Byskrifte: ektoderm; endoderm (gastrodermis); mesoglea; gastrovaskulêre holte (selenteron); testis; spermatogonia; spermatosiete; spermatiede; spermatosoë.

3.1.4 Cross section through the ovary of *Hydra*/Dwarssnit deur die ovarium van *Hydra*

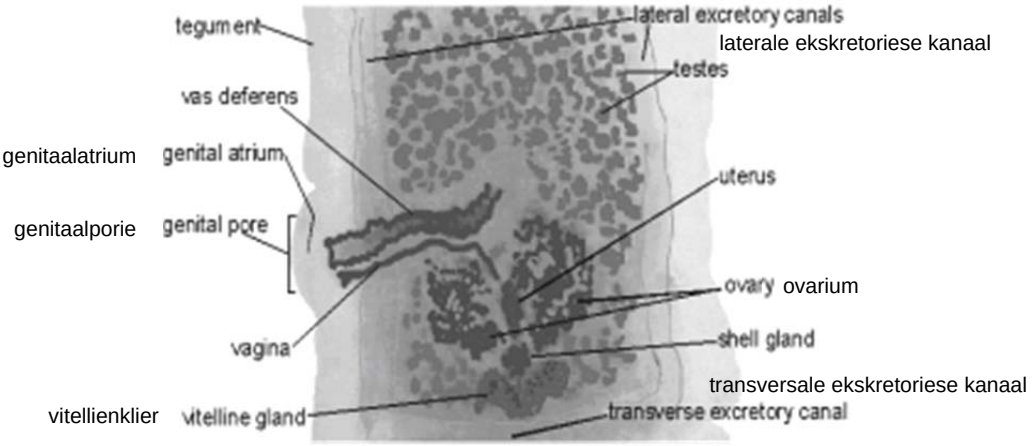
Labels: ectoderm; endoderm (gastrodermis); mesoglea; gastrovascular cavity (coelenteron); ovary; developing ovum; yolk droplets.

Byskrifte: ektoderm; endoderm (gastrodermis); mesoglea; gastrovaskulêre holte (selenteron); ovarium; ontwikkelende ovum; dooierdruppels.

3.2 **PHYLUM/FILUM: PLATYHELMINTHES**

3.2.1 The scolex of *Taenia* (whole mount)/Die skoleks van *Taenia* (heelmontering)

3.2.2 The mature proglottid of *Taenia* (whole mount)/Die volwasse proglottied van *Taenia* (heelmontering)



3.2.3 The gravid proglottid of *Taenia* (whole mount)/Die ryp proglottied van *Taenia* (heelmontering)

3.2 **PHYLUM/FILUM: PLATYHELMINTHES**

3.2.1 The scolex of *Taenia* (whole mount)/Die skoleks van *Taenia* (heelmontering)

Labels: scolex; suckers; hooks; rostellum; neck; proliferation region (strobilation region).

Byskrifte: skoleks; suiers; hakies; rostellum; nek; proliferasiestreek (strobilasiestreek).

3.2.2 The mature proglottid of *Taenia* (whole mount)/Die volwasse proglottied van *Taenia* (heelmontering)

Labels: tegument; proglottid; genital pore (sexual opening); genital atrium; lateral excretory canals; transverse excretory canals; penis (cirrus); vas deferens; vagina; yolk gland (vitelline gland); shell gland; ovaries; uterus.

Byskrifte: tegument; proglottied; genitaalporie (geslagsopening); genitaalatrium; laterale ekskresiekanaal; transversale ekskresiekanale; penis (sirrus); vas deferens; vagina; dooierklier (vitellienklier); dopklier; ovariums; uterus.

3.2.3 The gravid proglottid of *Taenia* (whole mount)/Die ryp proglottied van *Taenia* (heelmontering)

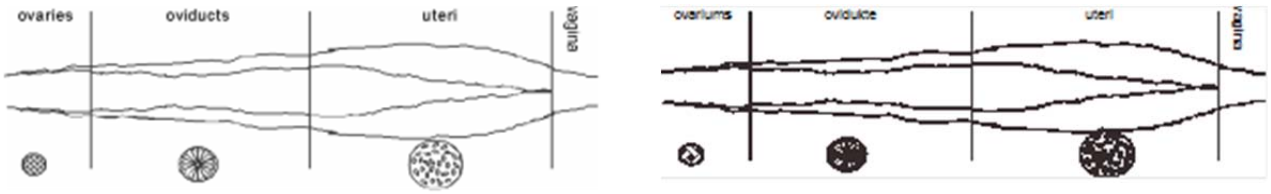
Labels tegument; proglottid; genital pore; lateral and transverse excretory canals; penis; vas deferens; vagina; uterus filled with eggs.

Byskrifte tegument; proglottied; genitaalporie; laterale and transversale ekskresiekanale; penis; vas deferens; vagina; uterus met eiers gevul.

How is *Taenia* adapted to its way of life as an internal parasite?/Hoe is *Taenia* as inwendige parasiet by sy lewenswyse aangepas?

3.3 **PHYLUM/FILUM: NEMATODA**

The figure below represents the female reproductive tract of *Ascaris*. The system consists of two very long but convoluted ducts. In the drawing the ducts are drawn out to indicate the consecutive regions. Underneath there is a representation of the cross section through that particular region. Use this figure to interpret the cross section.
Die onderstaande figuur verteenwoordig die vroulike voortplantingstelsel van *Ascaris*. Die stelsel bestaan uit twee baie lang, maar gekronkelde buise. Die buise in die tekening is uitgerek sodat die opeenvolgende streke aangedui kan word. Onderaan is 'n dwarssnit deur elke streek. Gebruik hierdie skets om die dwarssnit te interpreteer.



3.3.2 Cross section through the female *Ascaris*/Dwarssnit deur die *Ascaris*-wyfie

3.3.3 Cross section through the male *Ascaris*/Dwarssnit deur die *Ascaris*-mannetjie

3.3 **PHYLUM/FILUM: NEMATODA**

3.3.1 Whole mounts of male and female *Ascaris* in bioplastic/Heelmonterings van *Ascaris*-mannetjies en -wyfies in bioplastiek.
Study these examples carefully. You do not need to make a labelled drawing but you must be able to answer the following questions:/Bestudeer hierdie voorbeelde deeglik. U hoef nie 'n benaamde tekening te maak nie, maar u moet die volgende vrae kan beantwoord:

Labels: ectoderm; endoderm (gastrodermis); mesoglea; gastrovascular cavity (coelenteron); testis; spermatogonia; spermatocytes; spermatids; spermatozoa.

Byskrifte: ektoderm; endoderm (gastrodermis); mesoglea; gastrovaskulêre holte (selenteron); testis; spermatogonia; spermatosiete; spermatiede; spermatosoë.

What are the differences between the male and female *Ascaris*?/Wat is die verskille tussen die *Ascaris*-mannetjie en -wyfie?

What is the function of the hook at the posterior end of the male *Ascaris*?/Wat is die funksie van die hakie posterior op die *Ascaris*-mannetjie?

3.3.2 Cross section through the female *Ascaris*/Dwarssnit deur die *Ascaris*-wyfie

Labels: ectoderm; endoderm (gastrodermis); mesoglea; gastrovascular cavity (coelenteron); ovary; developing ovum; yolk droplets cuticle; epidermis (syncytium); dorsal nerve; ventral nerve; lateral field; excretory canals; longitudinal muscle layer; pseudocoel (body cavity); intestine (lined with columnar epithelium); muscle arms; uterus; oviduct; ovary.

Byskrifte: kutikula; epidermis (sinsitium); dorsaalsenuwee; ventraalsenuwee; laterale veld; ekskresiekanale; lengtespiere; pseudoseel (liggaamsholte); intestinum (uitgevoer met silinderepiteel); spierarms; uterus; oviduk; ovarium.

3.3.3 Cross section through the male *Ascaris*/Dwarssnit deur die *Ascaris*-mannetjie

Labels: cuticle; epidermis (syncytium); dorsal nerve; ventral nerve; lateral field; excretory canals; longitudinal muscle layer; pseudocoel (body cavity); intestine (lined with columnar epithelium); muscle arms; testis; vas deferens; semen vesicle.

Byskrifte: kutikula; epidermis (sinsitium); dorsaalsenuwee; ventraalsenuwee; laterale veld; ekskresiekanale; lengtespiere; pseudoseel (liggaamsholte); intestinum (uitgevoer met silinderepiteel); spierarms; testis; vas deferens; semenvesikel.

NOTES/NOTAS

CHAPTER 4 KINGDOM ANIMALIA (Coelomata: Protostomia)
HOOFSTUK 4 RYK ANIMALIA (Coelomata: Protostomia)

4.1 **Phylum/Filum:** Annelida

Diagnostic characteristics/Diagnostiese kenmerke:
1 Body segmented/Liggaam gesegmenteer
2 Well-developed coelom/Goed ontwikkelde seloom
3 Closed circulatory system/Geslote bloedsom–loopstelsel
4 Both circular and longitudinal muscle layers/ Beide kring- en lengtespierlae

Class/Klas: Oligochaeta

Diagnostic characteristics/Diagnostiese kenmerke:
1 Prominent segmentation/Opvallende segmentasie
2 With only a few chetae/Min setas teenwoordig
3 Head and parapodiums absent/Kop en para–podiums afwesig

Genus: *Pheretima*, *Lumbricus*

4.2 **Phylum/Filum:** Arthropoda

Diagnostic characteristics/Diagnostiese kenmerke:
1 With jointed appendage Met gelede aanhangsels
2 Segmented body divided into tagmas/ Gesegmenteerde liggaam in tagmas verdeel
3 Exoskeleton a chitinous cuticle/Eksoskelet is 'n chitienkutikula

Subphylum/Subfilum: Uniramia

Diagnostic characteristics/Diagnostiese kenmerke:
1 Uniramous appendages/Eenassige aanhang-sels
2 Appendages on head: 1 pr of antennae, 1 pr of mandibles, 1/2 prs of maxillae/Aanhangsels op kop: 1 pr antennas, 1 pr mandibels, 1/2 pr maksillas

Class/Klas: Insecta

Diagnostic characteristics/Diagnostiese kenmerke:
1 Three tagmas: head, thorax and abdomen/ Drie tagmas: kop, toraks en abdomen
2 One pair of antennae/Een paar antennas
3 Thorax with three pairs of legs and no/1/2 pairs of wings/Toraks met drie paar pote en geen/1/2 paar vlerke

Order/Orde: Orthoptera
Genus: *Locusta*

Order/Orde: Hemiptera
Genus: *Cimex*

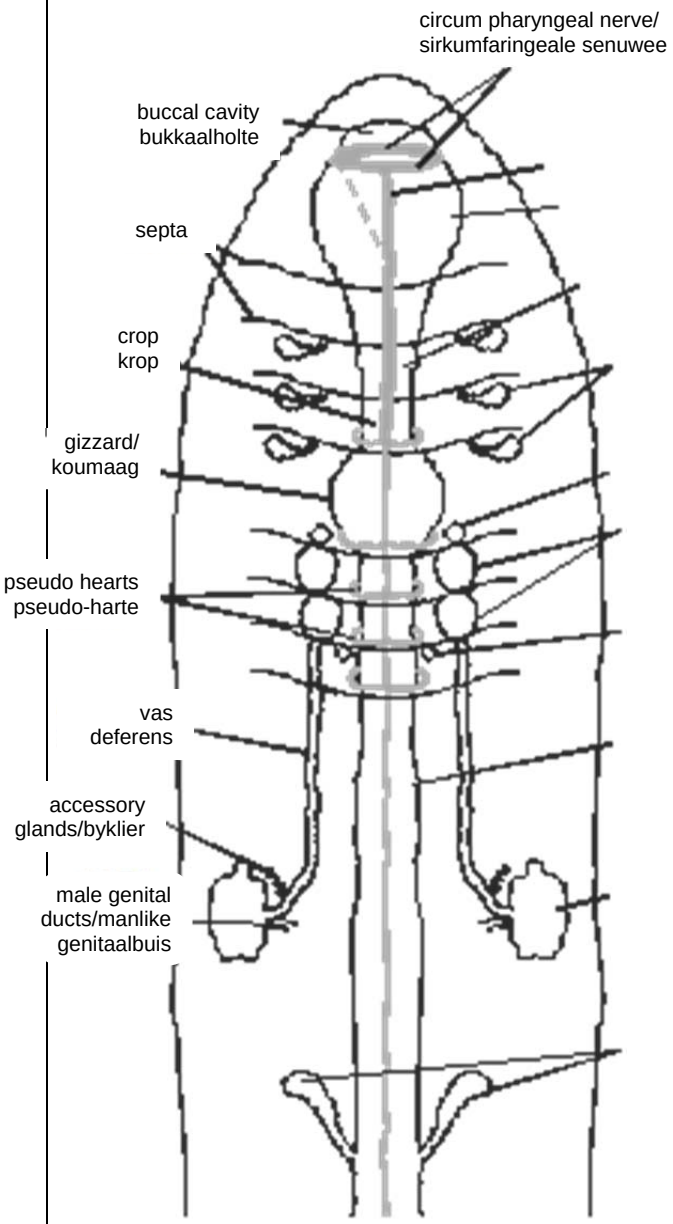
Order/Orde: Hymenoptera
Genus: *Apis*

Order/Orde: Blattodea
Genus: *Leucophaea*

4.1 **PHYLUM/FILUM: ANNELIDA**

4.1.1 External characteristics of *Pheretima*/ Uitwendige kenmerke van *Pheretima*

4.1.2 Inwendige morfologie van *Pheretima* (dis–seksie)/Internal morphology of *Pheretima* (dissection)



4.1 **PHYLUM/FILUM: ANNELIDA**

4.1.1 External characteristics of *Pheretima*/Uitwendige kenmerke van *Pheretima*

Labels: prostomium; peristomium; segments; chetae; clitellum; mouth; anus; position of dorsal blood vessel.

Byskrifte: prostomium; peristomium; segmente; setas; klitellum; mond; anus; posisie van die dorsaalbloedvat.

4.1.2 Internal morphology of preserved *Pheretima*/Inwendige morfologie van gepreserveerde *Pheretima*

Dissection: Follow the instructions as explained by the lecturer

1 Use a small, sharp pointed scissors and make a snip half way between the clitellum and anus on the dorsal side. Be very careful and just snip through the dorsal body wall.
2 By keeping the scissors horizontal and by taking care not to poke into the intestine, open the dorsal body wall all the way to the prostomium.
3 Fill the wax dissection dish with water (enough to completely cover the organism) and start pinning the earthworm to the wax floor of the dissection dish. The septa between consecutive segments must be teased loose before pinning down the body wall because they tend to cut through the intestine when the body wall is folded open. This part of the dissection should be done with the aid of the dissection microscope.
4 Identify all the internal structures and make a labelled drawing of them. (See opposite page)
Labels: dorsal blood vessel; cerebral ganglia; buccal mass; pharynx; oesophagus; crop; gizzard; intestine; pseudo hearts; intestinal ceacums; spermathecae; semen vesicles; prostate glands; accessory glands; testes; ovaries; septa; ventral nerve cord; segmental ganglia.

Disseksie: Volg die instruksies soos wat dit deur die dosent verduidelik word.

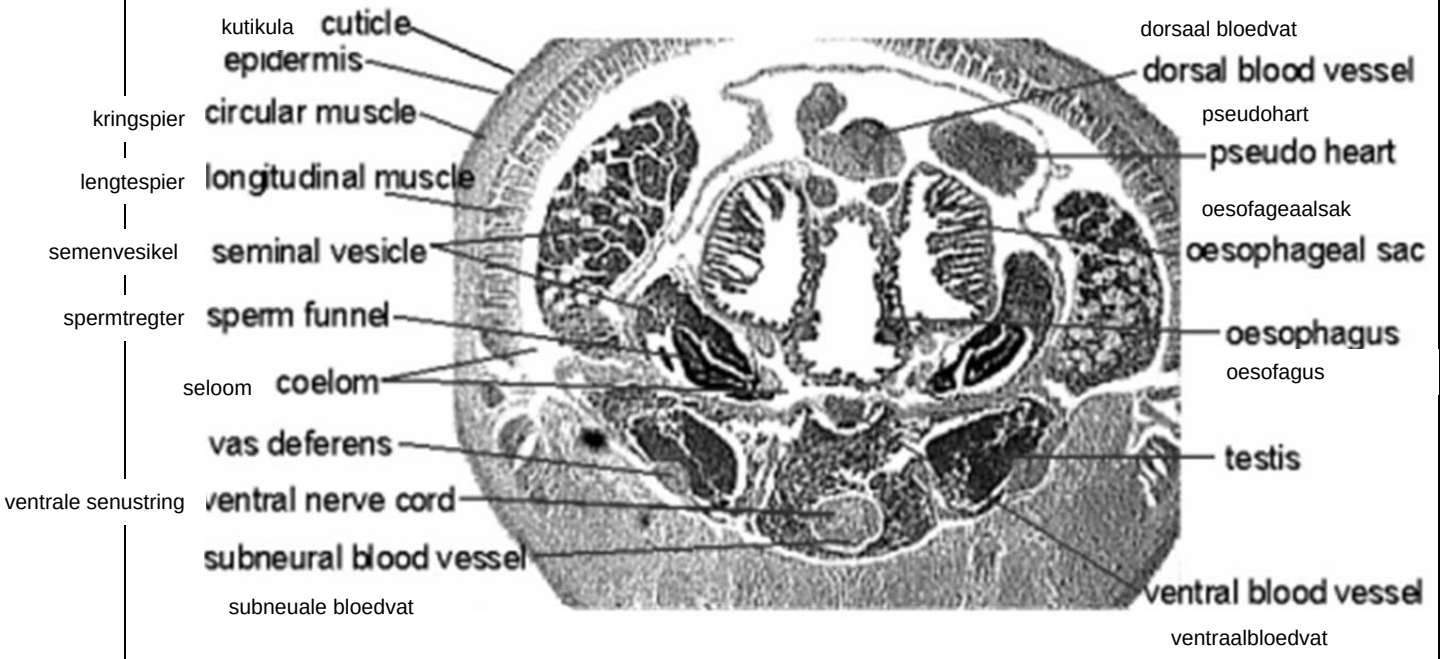
1 Gebruik ’n klein skerppuntskêrtjie en maak ’n klein snit in die dorsaalliggaamswand halfpad tussen die klitellum en die anus. Wees versigtig om net deur die liggaamswand te knip.
2 Deur die skêrtjie horisontaal te hou en nie in die intestinum in te steek nie, knip die dorsaalliggaamswand oop tot by die prostomium.
3 Vul die wasgevulde dissekteerbakkie met water (genoeg om die organisme heeltemal te bedek) en speld die erdwurm aan die wasbodem vas. Die septums tussen opeenvolgende segmente moet los getorring word voordat die liggaamswand vasgespeld word omdat hulle deur die intestinum sny as die liggaamswand oopgevou word. Hierdie gedeelte van die disseksie behoort met die hulp van ’n disseksiemikroskoop gedoen te word.
4 Identifiseer al die inwendige strukture en maak ’n benaamde tekening daarvan. (Sien langsaan)
Byskrifte: dorsaalbloedvat; serebraalganglia; bukkaalmassa; farinks; oesofagus; krop; koumaag; intestinum; pseudoharte; intestinale sekums; spermatekas; semenvesikels; prostaatkliere; bykliere; testis; ovariums; septa; ventraalsenuweestring; segmentale ganglia.

Do cross-fertilising earthworms have internal or external fertilisation? Explain your answer.
Het kruisbevrugtende erdwurms interne of eksterne bevrugting? Verduidelik u antwoord.

4.1 **PHYLUM/FILUM: ANNELIDA**

4.1.3 Cross section through the pharynx of *Lumbricus*/Dwarssnit deur die farinks van *Lumbricus*

4.1.4 Cross section through *Lumbricus* oesophageal region/Dwarssnit deur *Lumbricus*-oesofagusstreek



4.1 **PHYLUM/FILUM: ANNELIDA**

4.1.3 Cross section through the pharynx of *Lumbricus*/Dwarssnit deur die farinks van *Lumbricus*

Labels: cuticle; epidermis; circular muscle layer; longitudinal muscle layer; coelom; dorsal blood vessel; ventral blood vessel; ventral nerve cord; subneural blood vessel; pharynx; pharyngeal muscle.

Byskrifte: kutikula; epidermis; kringspiere; lengtespiere; seloom; dorsaalbloedvat; ventraalbloedvat; ventraalsenustring; subneurale bloedvat; farinks; faringeaalspier.

4.1.4 Cross section through *Lumbricus* oesophageal region/Dwarssnit deur *Lumbricus*-oesofagusstreeK

Labels: cuticle; epidermis; circular muscle layer; longitudinal muscle layer; coelom; dorsal blood vessel; ventral blood vessel; ventral nerve cord; subneural blood vessel; oesophagus; oesophageal sacs; testes; semen vesicles; sperm funnels (semen funnels); vas deferens; pseudo hearts (if present on slide).

Byskrifte: kutikula; epidermis; kringspiere; lengtespiere; seloom; dorsaalbloedvat; ventraalbloedvat; ventraalsenustring; subneurale bloedvat; oesofagus; oesofageaalsak; testis; semenvesikels; spermtregters (sementregters); vas deferens; pseudoharte (indien teenwoordig op plaatjie).

4.1 **PHYLUM/FILUM: ANNELIDA**

4.1.5 Cross section through *Lumbricus* crop region/Dwarssnit deur *Lumbricus*-kropstreek

4.1.6 Cross section through *Lumbricus* gizzard region/Dwarssnit deur *Lumbricus*-koumaagstreek

4.1.7 Cross section through *Lumbricus* intestinal region/Dwarssnit deur *Lumbricus*-intestinumstreek

4.1 **PHYLUM/FILUM: ANNELIDA**

4.1.5 Cross section through *Lumbricus* crop region/Dwarssnit deur *Lumbricus*-kropstreek

Labels: cuticle; epidermis; circular muscle layer; longitudinal muscle layer; coelom; dorsal blood vessel; crop (thin walled); ventral blood vessel; ventral nerve cord; subneural blood vessel.

Byskrifte: kutikula; epidermis; kringspiere; lengtespiere; seloom; dorsaalbloedvat; krop (dun wand); ventraalbloedvat; ventraalsenustring; subneurale bloedvat.

4.1.6 Cross section through *Lumbricus* gizzard region/Dwarssnit deur *Lumbricus*-koumaagstreek

Labels: cuticle; epidermis; circular muscle layer; longitudinal muscle layer; coelom; dorsal blood vessel; ventral blood vessel; ventral nerve cord; subneural blood vessel; gizzard (thick walled).

Byskrifte: kutikula; epidermis; kringspiere; lengtespiere; seloom; dorsaalbloedvat; koumaag (dik wand); ventraalbloedvat; ventraalsenustring; subneurale bloedvat.

4.1.7 Cross section through *Lumbricus* intestinal region/Dwarssnit deur *Lumbricus*-intestinumstreek

Labels: cuticle; epidermis; circular muscle layer; longitudinal muscle layer; coelom; dorsal blood vessel; ventral blood vessel; ventral nerve cord; subneural blood vessel; intestine; typhlosole.

Byskrifte: kutikula; epidermis; kringspiere; lengtespiere; seloom; dorsaalbloedvat; ventraalbloedvat; ventraalsenustring; subneurale bloedvat; intestinum; tiflosool.

4.1.8 Model of *Lumbricus*/Model van *Lumbricus*

Study the model of *Lumbricus* carefully. You do not need to make a labelled drawing of it but it will help you to interpret the cross sections on the slides.
Bestudeer die model van *Lumbricus* deeglik. U hoef nie ’n benaamde tekening hiervan te maak nie, maar die model sal u help om die dwarssnitte op die plaatjies te interpreteer.

What is the function of the typhlosole in the intestine of *Lumbricus*?
Wat is die funksie van die tiflosool in die intestinum van *Lumbricus*?

4.2 **PHYLUM/FILUM: ARTHROPODA**

4.2.1 Dorsal view of the cockroach *Leucophaea*/Dorsale aansig van die kakkerlak *Leucophaea*

4.2.2 Difference between male and female *Leucophaea*/Verskil tussen mannetjie en wyfie *Leucophaea*

Male abdomen/Manlike abdomen	Female abdomen/Vroulike abdomen

4.2 **PHYLUM/FILUM: ARTHROPODA**

4.2.1 Dorsal view of the cockroach *Leucophaea*/Dorsale aansig van die kakkerlak *Leucophaea*

Study the external characteristics of the cockroach *Leucophaea* (use the dissection microscope if necessary) and make a labelled drawing of the dorsal view of the animal:
Bestudeer die uitwendige kenmerke van die kakkerlak *Leucophaea* (gebruik die disseksiemikroskoop indien nodig) maak 'n benaamde tekening van die dorsaalaansig van die insek:

Labels: head; thorax; abdomen; antennae; compound eyes; biting chewing mouth parts; pronotum; prothorax; mesothorax; metathorax; leathery upper wings; membranous under wings; three pairs of walking legs; tergum; sternum; pleuron; cerci; stylets.

Byskrifte: kop; toraks; abdomen; antennas; saamgestelde oë; bytend-kouende monddele; pronotum; protoraks; mesotoraks; metatoraks; leeragtige bo-vlerke; membraanagtige ondervlerke; drie paar looppote; tergum; sternum; pleuron; serki; stilette.

4.2.2 Difference between male and female *Leucophaea*/Verskil tussen mannetjie en wyfie *Leucophaea*

Make a labelled drawing of the ventral view of the last segment of both male and female cockroach. Select the appropriate labels from the list above.

Maak 'n benaamde tekening van die ventrale aansig van die laaste segment van beide die mannetjie- en wyfiekakkerlak. Kies die toepaslike byskrifte uit bogenoemde lys.

4.2 **PHYLUM/FILUM: ARTHROPODA**

4.2.3 Biting-chewing mouthparts of *Locusta*/Bytend-kouende monddele van *Locusta*

4.2 **PHYLUM/FILUM: ARTHROPODA**

4.2.3 Biting-chewing mouthparts of *Locusta*/Bytend-kouende monddele van *Locusta*

Labels: labrum (upper lip); mandibles (upper jaws with sharp cutting edges); maxillae (lower jaws); maxillary palps; labium (lower lip); labial palps; glossa of labium; paraglossa of labium; hypopharynx.

Byskrifte: labrum (bo-lip); mandibels (bo-kake met skerp snykante); maksillas (onderkake); maksillaarpalpe; labium (onderlip); labiaalpalpe; glossa van die labium; paraglossa van die labium; hipofarinks.

What is the function of the mandibles?/Wat is die funksie van die mandibels?

What is the function of the maxillae?/Wat is die funksie van die maksillas?

What is the function of the labial palps?/Wat is die funksie van die labiaalpalpe?

4.2 **PHYLUM/FILUM: ARTHROPODA**

4.2.4 Piercing and sucking mouthparts of *Cimex*/Stekend-suigende monddele van *Cimex*

4.2.5 Chewing and sucking mouthparts of *Apis*/Kouend-suigende monddele van *Apis*

4.2.4 Piercing and sucking mouthparts of *Cimex*/Stekend-suigende monddele van *Cimex*

Labels: labrum; labium (proboscis); labial groove; maxillae with toothed ends; mandibles.

Byskrifte: labrum; labium (proboscis); labiaalgroef; maksillas met getande uiteindes; mandibels.

4.2.5 Chewing and sucking mouthparts of *Apis*/Kouend-suigende monddele van *Apis*

Labels: labrum; mandibles; maxillae; maxillary palps; labium; labial palps; glossa of labium; paraglossa of labium; flabellum.

Byskrifte: labrum; mandibels; maksillas; maksillaarpalpe; labium; labiaalpalpe; glossa van labium; paraglossa van labium; flabellum.

NOTES/NOTAS

CHAPTER 5 KINGDOM ANIMALIA (Coelomata: Deuterostomia)
HOOFSTUK 5 RYK ANIMALIA (Coelomata: Deuterostomia)

5.1 **Phylum/Filum:** Chordata

Diagnostic characteristics/Diagnostiese kenmerke:

1 Hollow dorsal nerve chord/Hol, dorsaal senuweestring
2 With notochord/Met notochorda
3 With pharyngeal gill slits/Met faringeale kieusplete
4 With post anal tail/Met postanaalstert

Subphylum/Subfilum: Vertebrata

Super class/Superklas: Tetrapoda

Class/Klas: Mammalia

Diagnostic characteristics/Diagnostiese kenmerke:

1 With mammary glands/Met soogkliere
2 With hair/Met hare
3 With a four chambered heart/Met 'n vierkamerhart
4 With a diaphragm/Met 'n diafragma

Genus: *Rattus*

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.1 External morphology of the white rat (lateral view)/Eksterne morfologie van die witrot (laterale aansig)

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.1 External morphology of the white rat (lateral view)/Eksterne morfologie van die witrot (laterale aansig)

Labels: head; external nares; nasal septum; mouth opening; split upper lip; incisors; vibrissae; eyes; eye lids; nictitating membrane; pinnae; external auditory meatus; neck; thorax; abdomen; tail; anus; forefoot with four digits; hind foot with five digits.
Male: penis; scrotal sacs; urogenital opening.
Female: vulva; mammary glands; urinary opening; clitoris.

Byskrifte: kop; uitwendige neusopeninge; nasale septum; mondopening; gesplete bo-lip; insisivi; vibrissae; oë; ooglede; knipvlies; pinnae; eksterne gehoorkanaal; nek; toraks; abdomen; stert; anus; voorpoot met vier tone; agterpoot met vyf tone.
Mannetjie: penis; skrotumsakke; urogenitaalopening.
Wyfie: vulva; soogkliere; urinêre opening; klitoris.

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.1 External morphology of the white rat (lateral view)/Eksterne morfologie van die witrot (laterale aansig)

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.1 External morphology of the white rat (lateral view)/Eksterne morfologie van die witrot (laterale aansig)

Labels: head; external nares; nasal septum; mouth opening; split upper lip; incisors; vibrissae; eyes; eye lids; nictitating membrane; pinnae; external auditory meatus; neck; thorax; abdomen; tail; anus; forefoot with four digits; hind foot with five digits.

Male: penis; scrotal sacs; urogenital opening.
Female: vulva; mammary glands; urinary opening; clitoris

Byskrifte: kop; uitwendige neusopeninge; nasale septum; mondopening; gesplete bo-lip; insisivi; vibrissae; oë; ooglede; knipvlies; pinnae; eksterne gehoorkanaal; nek; toraks; abdomen; stert; anus; voorpoot met vier tone; agterpoot met vyf tone.

Mannetjie: penis; skrotumsakke; urogenitaalopening.
Wyfie: vulva; soogkliere; urinêre opening; klitoris.

5.1 **PHYLUM/FILUM: CHORDATA**

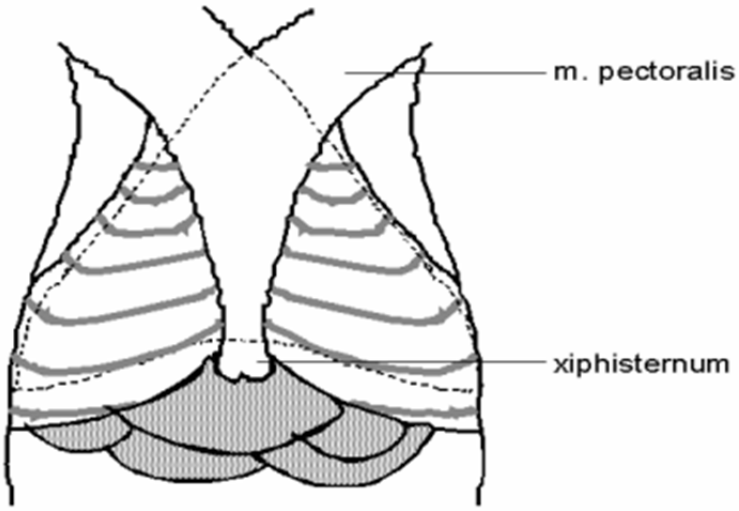
5.1.2 **Dissection:** (The dissection of the white rat will be demonstrated step-by-step)

Place a dead white rat on a wooden dissection board with its ventral side facing upwards and nail it to the board through each foot. The nails should point outwards at an angle of about 45°.

Lift the skin on the mid ventral side and make a small incision with your scissors. Cut the skin further, up to the lower jaw and down to the anus. Cut around the vulva/penis. You have to hold the scissors horizontally so that their sharp points do not damage the underlying body wall.

Pull the skin away from the body, while cutting through the connective tissue between the skin and body wall with a scalpel. Nail the skin to the dissection board on both sides.

Lift the wall of the abdominal cavity with a tweezer and cut through the body wall from the bottom to the ribs, and along the rib cage to the sides. Take care not to damage the underlying organs with the scissors. Nail the loose flaps of the abdominal wall to the dissection board. The organs of the abdominal cavity can now be studied.



To open the thoracic cavity you should make an incision approximately 7 mm from the end of the rib cage and extend that cut to both sides of the rib cage. The result of such a cut is an intact diaphragm overlaying the liver. Before continuing, the position of the subclavian veins and the anterior vena cava entering the rib cage from both the left and the right sides must be determined. To do that the pectoral muscles must be removed. The rib cage can now be removed by cutting a triangular shape from it, missing the subclavian veins and the anterior vena cava. The dotted line in the figure shows the cutting line. Remember to keep the scissors horizontal! The rib cage can now be severed from the body. The thymus gland covering the blood vessels entering and exiting the anterior end of the heart must be removed by pulling at the soft tissue with a tweezer. Be very careful not to damage the underlying blood vessels. The thoracic cavity can now be studied.

The urogenital system of the female is already exposed when the abdominal cavity is opened, but for the full male urogenital system, the scrotal sacs must be opened first. To expose the Cowper's glands, the fat in the corner between the base of the tail and the hind legs must be removed, also by teasing it away with a tweezer.

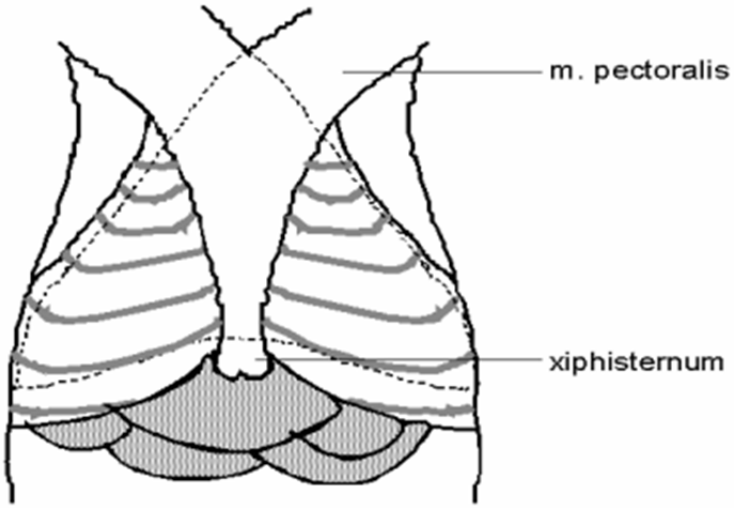
5.1.2 **Disseksie:** (Die disseksie van die wit rot sal stap-vir-stap verduidelik word)

Plaas 'n dooie witrot op 'n disseksieplank met die ventraalkant na bo en spyker elke poot aan die plank vas. Die spykers moet weg van die disseksie af projekteer sodat die hoek tussen die plank en die spykers 45° is.

Knyp die vel in die midventraalstreek vas en maak 'n klein insnydinkie met die skêrtjie. Verleng die insnyding tot by die onderkaak aan die bo-kant en die anus aan die onderkant. Sny rondom die vulva/penis. Hou die skêr horisontaal sodat die skerp punte nie die onderliggende liggaamswand beskadig nie.

Trek die vel van die liggaamswand af en sny met 'n skalpel die bindweefsel tussen die vel en die liggaamswand los. Spyker ook die vel weerskante aan die plank vas.

Lig die liggaamswand met die hulp van 'n pinset op en sny deur die liggaamswand van onderaf tot by die basis van die ribbes en al langs die ribbekas tot by die sye. Wees versigtig om nie die onderliggende organe met die skêrtjie te beskadig nie. Spyker die los flappe liggaamswand aan die plank vas. Die organe van die abdominaalholte kan nou bestudeer word.



Om die borsholte oop te maak, moet 'n insnyding ongeveer 7 mm van die einde van die ribbekas af gemaak word en verleng word na beide kante van die ribbekas. Die resultaat is 'n onbeskadigte diafragma wat bo-oor die lewer lê. Voordat verdere snitte gemaak word, moet die posisie waar die subklaviese vene en die vena cava anterior die ribbekas binnedring, vasgestel word. Om dit te kan doen, moet die pektoraalspiere eers verwyder word. Die ribbekas kan nou verwyder word deur 'n driehoekige stuk uit te sny, sonder om die twee subklaviese venes of the twee venae cavae anteriores te beskadig. Die stippellyn in die figuur dui die kniplyn aan. Onthou om die skêr horisontaal te hou! Die ribbekas kan nou afgesny word. Die timusklier wat die bloedvate anterior van die hart bedek, moet verwyder word deur die sagte weefsel met 'n pinset af te trek. Wees versigtig om nie die onderliggende bloedvate te beskadig nie. Die borsholte kan nou bestudeer word.

Die urogenitaalstelsel van die wyfie is reeds blootgestel wanneer die abdominaalholte oopgemaak is, maar vir die volledige manlike stelsel, moet die skrotumsakke eers oopgemaak word. Om Cowper se klier bloot te lê, moet die vet in die hoek tussen die basis van die stert en die agterpote, verwyder word deur dit met 'n pinset los te karring.

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.2 Digestive system and associated structures/Spysverteringstelsel en geassosieerde strukture

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.2 Digestive system and associated structures of the white rat./Spysverteringstelsel en geassosieerde strukture van die witrot.

Labels: submaxillary salivary glands; parotid salivary glands; oesophagus; cardiac portion of the stomach; pyloric portion of the stomach; pyloric sphincter; small intestines: duodenum & ileum; ileo-caecal sphincter; large intestines: caecum & appendix & colon & rectum & anus; liver: median liver lobe (partially divided by ligamentum falciformes) & undivided left liver lobe & divided right liver lobe & caudate liver lobe surrounding oesophagus; spleen; pancreas.

Byskrifte: submaksillêre speekselklier; parotisspeekselklier; esofagus; kardiale gedeelte van die maag; piloriese gedeelte van die maag; piloriese sfinkter; dunderm: duodenum & ileum; ileo-sekale sfinkter; dikderm: sekum & appendiks & kolon & rektum & anus; lewer: mediane lewerlob (gedeeltelik deur die ligamentum falciformes verdeel) & onverdeelde linker lewerlob & verdeelde regter lewerlob & koudale lewerlob wat die esofagus omring; milt; pankreas.

What is the difference between a valve and a sphincter?/Wat is die verskil tussen ’n klep en ’n sfinkter?

What is the function(s) of each of the following structures?/Wat is die funksie(s) van elkeen van die volgende strukture?

Salivary glands/Speekselkliere:

Pyloric sphincter/Piloriese sfinkter:

Duodenum:

Ileum:

Caecum/Sekum:

Spleen/Milt:

Pancreas/Pankreas:

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.3 Urogenital system of female white rat/Urogenitaalstelsel van die wyfie witrot

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.3 Urogenital system of female white rat/Urogenitaalstelsel van die wyfie witrot

Labels: kidneys; ureters; bladder; urethra; ovaries; Fallopian ducts; uterus duplex; vagina; vestibulum; vulva; external urinary opening.

Byskrifte: niere; ureters; blaas; uretra; ovariums; Fallopiese buise; uterus duplex; vagina; vestibulum; vulva; uitwendige urienopening.

What does the word “urogenital” refer to?/Waarna verwys die woord “urogenitaal”?

What is the function(s) of each of the following structures?/Wat is die funksie(s) van elkeen van die volgende strukture?

Ovaries / Ovariums:

Fallopian ducts / Buise van Fallopius:

Uterus duplex / Uterus duplex:

Urethra / Uretra:

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.3 Urogenital system of male white rat/Urogenitaalstelsel van die manlike witrot

5.1 **PHYLUM/FILUM: CHORDATA**

5.1.3 Urogenital system of male white rat/Urogenitaalstelsel van die manlike witrot

Labels: kidneys; ureters; bladder; urethra; scrotal sacs; testes; epididymis caput; epididymis corpus; epididymis cauda; vasa deferentia; gland of the vas deferens; seminal vesicles; coagulating glands; prostate gland; penis; preputial glands; Cowper's glands (bulbourethral glands).

Byskrifte: niere; ureters; blaas; uretra; skrotumsakke; testis; epididimiskaput; epididimiskorpus; epididimiskouda; vasa deferentia; klier van die vas deferens; semenvesikels; koaguleringskliere; prostaatkliere; penis; preputiumkliere; Cowper se kliere (bulbo-uretraalkliere).

What is the function(s) of each of the following structures?/Wat is die funksie(s) van elkeen van die volgende strukture?

Epididymis/Epididimis:

Seminal vesicles/Semenvesikels:

Coagulating glands/Koaguleringskliere:

Prostate gland/Prostaatklier:

Cowper's glands/Cowper se kliere:

Testes / Testis:

NOTES/NOTAS