

FAKULTAS PETERNAKAN
UNIVERSITAS HALU OLEO

Panduan Praktikum Anatomi dan Fisiologi Ternak

Anatomi dan Fisiologi Unggas Identifikasi Sel Darah

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2018



**PANDUAN PRAKTIKUM
ANATOMI DAN FISILOGI TERNAK**



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**JURUSAN PETERNAKAN
FAKULTAS PETERNAKAN
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KENDARI
2018**

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KATA PENGANTAR

Puji syukur ke hadirat Tuhan Yang Maha Kuasa, yang telah memberikan rahmat-Nya sehingga Panduan Praktikum Anatomi dan Fisiologi Ternak untuk mahasiswa Jurusan Peternakan Fakultas Peternakan Universitas Halu Oleo ini dapat diselesaikan dengan sebaik-baiknya.

Panduan praktikum ini dibuat sebagai pedoman dalam melakukan kegiatan praktikum Anatomi dan Fisiologi Ternak yang merupakan kegiatan penunjang mata kuliah Anatomi dan Fisiologi Ternak pada Jurusan Peternakan Universitas Halu Oleo. Penuntun praktikum ini diharapkan dapat membantu mahasiswa dalam mempersiapkan dan melaksanakan praktikum dengan lebih baik, terarah, dan terencana. Pada setiap topik telah ditetapkan tujuan pelaksanaan praktikum dan semua kegiatan yang harus dilakukan oleh mahasiswa serta teori singkat untuk memperdalam pemahaman mahasiswa mengenai materi yang dibahas.

Penyusun menyakini bahwa dalam pembuatan Panduan Praktikum Anatomi dan Fisiologi Ternak ini masih jauh dari sempurna. Oleh karena itu penyusun mengharapkan kritik dan saran yang membangun guna penyempurnaan panduan praktikum ini di masa yang akan datang.

Akhir kata, penyusun mengucapkan banyak terima kasih kepada semua pihak yang telah membantu baik secara langsung maupun tidak langsung.

Kendari, Mei 2018

Tim Penyusun

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PRAKTIKUM I ANATOMI DAN FISILOGI UNGGAS

A. Latar Belakang

Praktikum Anatomi dan Fisiologi Unggas di maksudkan untuk mengetahui struktur anatomi otot unggas dan berbagai sistem organ serta fungsinya masing-masing. Praktikum ini dilakukan dengan inspeksi, palpasi, dan identifikasi letak, bentuk, tekstur serta memahami fungsi dari masing-masing organ pada berbagai sistem tubuh dari unggas.

Inspeksi dilakukan dengan membandingkan gambar pada atlas anatomi atau penuntun praktikum dengan preparat yang tersedia kemudian diidentifikasi letak, bentuk, tekstur dan fungsinya.

B. Tujuan

Mahasiswa dapat mengidentifikasi letak, bentuk, tekstur dari otot dan organ serta fungsinya dalam sistem organ unggas.

C. Luaran

Mahasiswa mampu mengidentifikasi letak, bentuk, tekstur dari otot dan organ pada berbagai sistem organ serta memahami fungsinya masing-masing.

D. Materi Praktikum

Alat:

1. *Latex Examination Gloves* (sarung tangan)
2. Atlas Anatomi atau gambar sebagai panduan
3. Pinset
4. Alat tulis

Bahan:

1. Preparat ayam

E. Langkah Kerja

1. Lakukan pengamatan pada sistem otot, sistem respirasi, sistem digesti, sistem sirkulasi, sistem reproduksi, serta organ-organ imunitas. Lalu catat dan dokumentasi hasilnya.
2. Lakukan identifikasi letak, bentuk, dan tekstur dari otot dan berbagai organ pada sistem organ tersebut. Lalu catat hasilnya.

PRAKTIKUM II

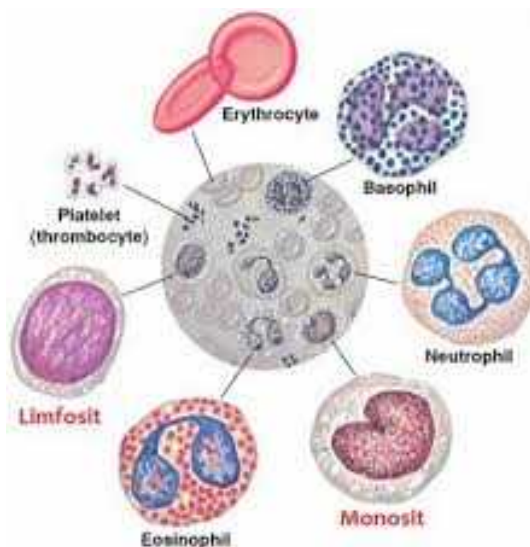
FISIOLOGI DARAH (IDENTIFIKASI SEL DARAH)

A. Latar Belakang

Pemeriksaan sediaan darah umumnya digunakan untuk membantu pemeriksaan kelainan darah dan juga infeksi parasit. Salah satu cara yang dapat dilakukan untuk pemeriksaan darah adalah dengan pembuatan preparat darah apus tepi kemudian dilakukan pengamatan di bawah mikroskop. Pereparat darah apus tepi meliputi 2 bagian pemeriksaan yaitu pemeriksaan hitung jenis sel darah putih (termasuk pemeriksaan rutin) dan gambaran sel darah serta unsur-unsur lain antara lain parasit, sel ganas dan lain-lain.

Praktikum ini dimaksudkan untuk mengidentifikasi gambaran sel darah merah dan putih serta memahami fungsinya masing-masing.

Sel darah merah (eritrosit) tidak mempunyai inti sel (kecuali *Aves*). Eritrosit mengandung hemoglobin dan mengedarkan oksigen. Kekurangan eritrosit merupakan indikasi klinis kejadian anemia. Sel darah putih (leukosit) bertanggung jawab terhadap sistem imun tubuh dan bertugas untuk memusnahkan benda-benda yang dianggap asing dan berbahaya oleh tubuh, misal virus atau bakteri. Leukosit bersifat amuboid atau tidak memiliki bentuk yang tetap.



Histology Sel Darah

B. Tujuan

Mahasiswa dapat mengidentifikasi gambaran eritrosit dan leukosit pada preparat darah apus tepi serta memahami fungsinya masing-masing.

C. Luaran

Mahasiswa mampu mengidentifikasi gambaran eritrosit dan leukosit pada preparat darah apus tepi serta memahami fungsinya masing-masing.

D. Materi Praktikum

Alat

1. Mikroskop

Bahan

1. Preparat darah apus tepi
2. Minyak emersi

E. Langkah Kerja

1. Lakukan pengamatan preparat pada mikroskop dengan perbesaran lensa objektif 100x
2. Lakukan identifikasi sel darah merah dan putih
3. Catat dan gambarkan hasilnya.

DAFTAR PUSTAKA

Alfinus; 2012; Laporan Apresiasi Keterampilan Laboratorium Medik dan Paramedic Veteriner Se Wilayah Kerja Balai besar Veteriner Maros.

Bacha JW dan Bacha LM. 2000. *Colour Atlas of Veterinary Hematology*. Ed : 2nd Lippincott Williams & Wilkins.

Dyce DM, ack WO, Wensing CGJ. 2010. *Textbook Of Veterinary Anatomy*. Ed : 4th. Saunders Elsevier.

LAMPIRAN 1

ANATOMI AYAM (*TEXTBOOK OF VETERINARY ANATOMY*)

1. OTOT-OTOT DAN TENSOR UTAMA



Gambar 7.12. Otot-otot dan *tensor* utama ternak ayam. (1) *Pectoralis superficialis*; (2) *Biceps brachii*; (3) *Extensor* dan *Flexor carpi radialis*; (4) *Biceps femoris*; (5) *Gastrocnemius*; (6) *Tibialis cranialis*; (7) tendo-tendo *extensor*, dan (8) tendo-tendo *flexor*; (9) otot-otot *Cervical*; (10) *Obliquus abdominis externus*, dan (11) *Gluteus superficialis* (Abbott Laboratories, International Veterinary Division, 1968).

2. SISTEM DIGESTI

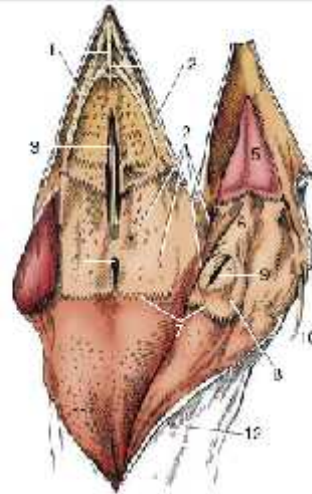


Figure 37-14 Oropharynx opened by the reflection of the lower jaw. 1, Median and lateral palatine ridges; 2, openings of salivary glands; 3, choana; 4, infundibular cleft; 5, body of tongue; 6, root of tongue; 7, "mechanical" papillae; 8, laryngeal mound; 9, glottis; 10, branchial cornu of hyobranchial apparatus; 11, esophagus; 12, position of trachea.

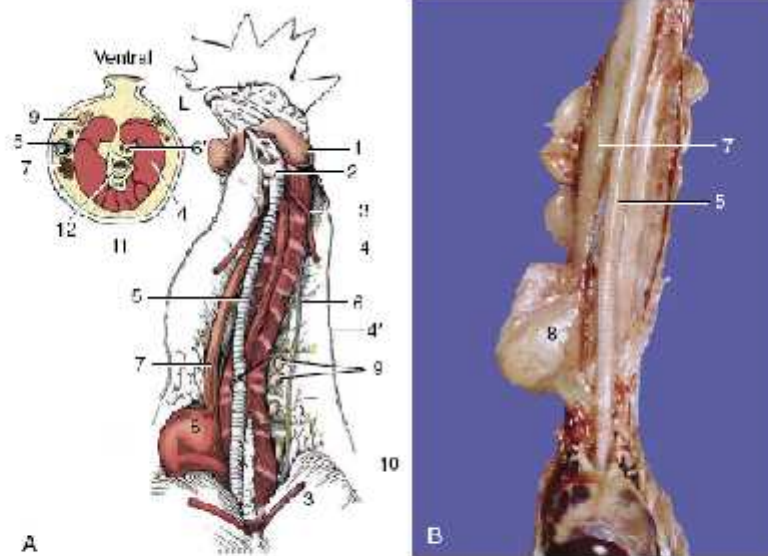


Figure 37-15 Ventral view of the dissected neck. A, Schematic. The inset shows a transverse section through the middle of the neck. B, Detail of neck with crop. 1, Wattle; 2, larynx; 3, sternothyroidus, cut; 4, cervical muscles; 4', cervical nerve; 5, trachea; 6, jugular vein and vagus; 6', internal carotid arteries; 7, esophagus; 8, crop; 9, thymus; 10, pectoralis; 11, vertebra; 12, spinal cord.

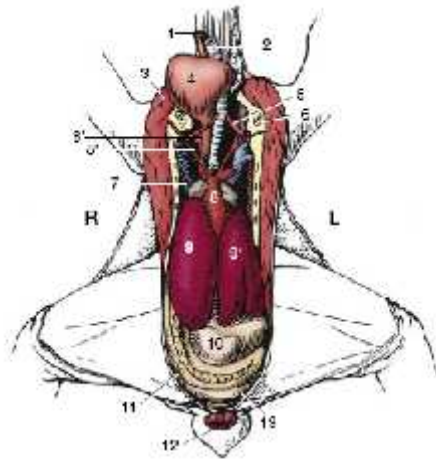


Figure 37-16 Viscera after removal of ventral body wall, ventral view. 1, Isopterygus; 2, trachea; 3, pectoralis, cut; 4, crop; 5, sternotrachealis; 6, coracoid bone, cut; 7, right cranial vena cava; 8, heart; 8', common carotid artery; 8'', subclavian artery; 9, 9', right and left lobes of liver; 10, gizzard (its caudal blind sac); 11, duodenal loop, enclosing pancreas; 12, vent; 13, one of the ceca.

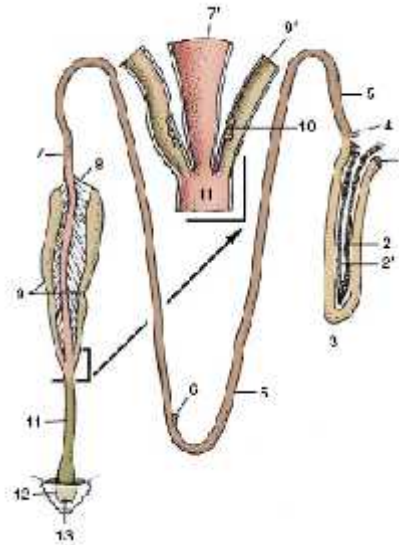


Figure 37-20 Kevited intestinal tract with detail of ileocecal junction. 1, Pylorus; 2, 2', dorsal and ventral lobes of pancreas; 3, duodenal loop; 4, bile and pancreatic ducts entering duodenum; 5, jejunum; 6, vitelline diverticulum; 7, ileum; 7', ileum opened; 8, ileocolic fold; 9, ceca; 9', caecum opened; 10, cecal tonsil; 11, colon; 11', colon opened; 12, cloaca; 13, vent.

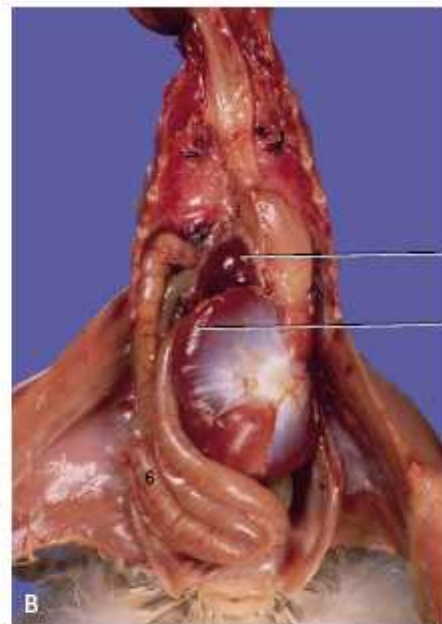
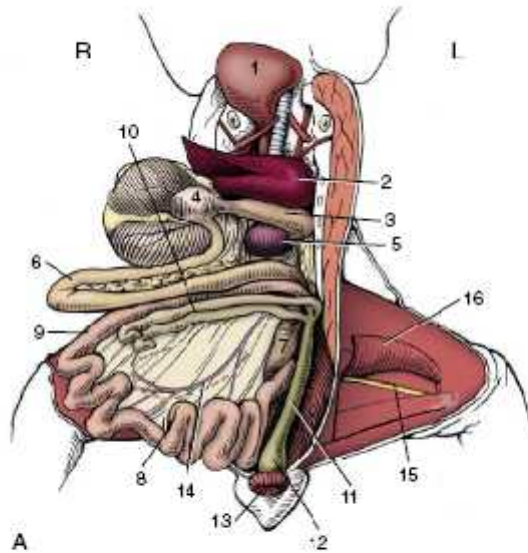


Figure 37-21 A, Gastrointestinal tract after reflection of liver, stomach, and small intestine craniodextrally, ventral view. B, Detail of stomach and duodenum loop with pancreas within the loop. 1, Crop; 2, left lobe of liver; 3, proventriculus with vagus on dorsal surface; 4, cranial blind sac on right side of reflected gizzard; 5, spleen; 6, duodenal loop enclosing pancreas; 7, jejunum; 8, vitelline diverticulum; 9, ileum; 10, ceca; 11, colon; 12, cloaca; 13, vent; 14, cranial mesenteric vessels and intestinal nerve in mesentery; 15, sciatic nerve and ischial artery; 16, gracilis and adductor.

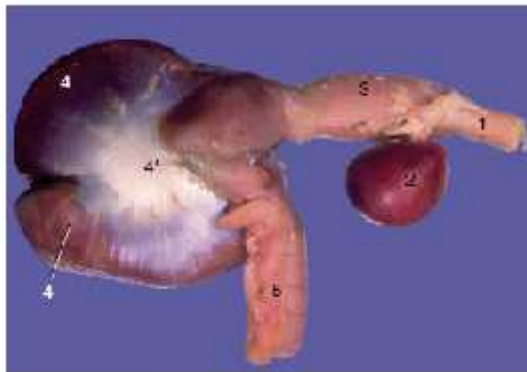


Figure 37-18 Stomach of chicken. 1, Esophagus; 2, spleen; 3, proventriculus; 4, gizzard with aponeurosis (4'), 5, duodenum.

3. SISTEM RESPIRASI

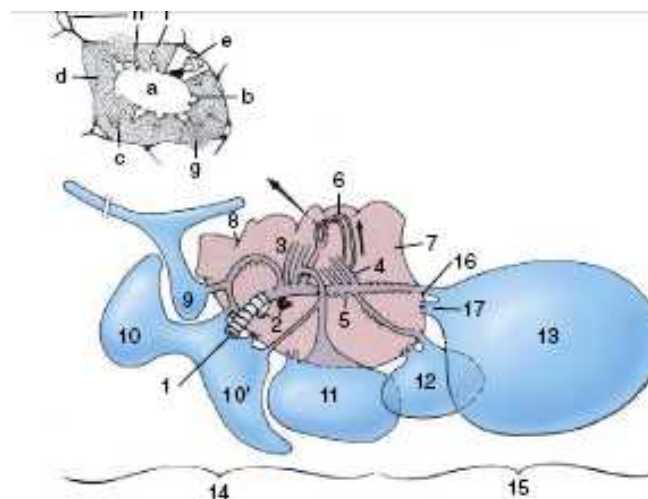


Figure 37-28 Right lung (medioventral view) and related air sacs, schematic. The intrapulmonic structures have been simplified. The inset shows a transverse section of a parabronchus. 1, Primary bronchus; 2, pulmonary vessels at hilus; 3, medioventral bronchi; 4, mediodorsal bronchi; 5, lateroventral bronchi; 6, loops of parabronchi; 7, lung; 8, indentations caused by ribs; 9, cervical air sac; 10, 10', extrathoracic and intrathoracic parts of clavicular air sac; 11, cranial thoracic air sac; 12, caudal thoracic air sac; 13, abdominal air sac; 14, cranial air sacs, functionally related to paleopulmonic parabronchi; 15, caudal air sacs, functionally related to neopulmonic parabronchi; 16, direct (saccobronchial) connection; 17, indirect (recurrent bronchial) connection of air sac to lung. a, Lumen; b, atria; c, infundibula; d, network of air and blood capillaries; e, solidly drawn atrium and schematic air capillaries to show their continuity; f, interparabronchial septum; g, gas exchange tissue anastomosing through gap in interparabronchial septum; h, blood vessels.

4. SISTEM EKSKRESI (GINJAL)

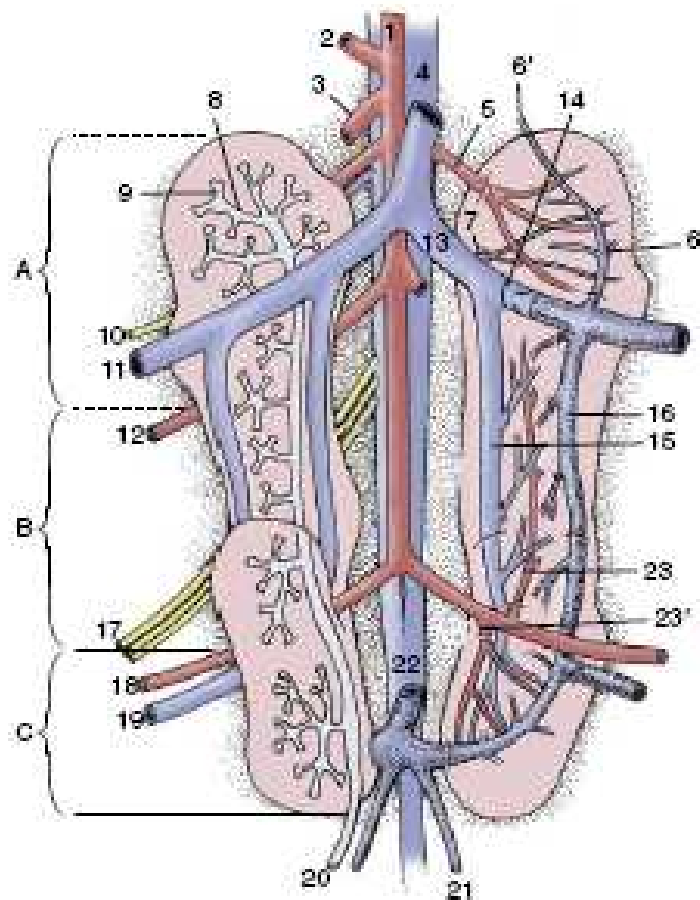


Figure 37–29 Ventral view of the kidneys and vessels and nerves in their vicinity, schematic. The right kidney shows the branches of the ureter; the left, the renal vessels. Cranial (A), middle (B), and caudal (C) divisions of kidney. 1, Aorta; 2, celiac a.; 3, cranial mesenteric a.; 4, caudal vena cava; 5, cranial renal a.; 6, cranial renal portal v.; 6', anastomosis with vertebral venous sinus; 7, cranial renal v.; 8, primary branch of ureter; 9, secondary branch of ureter; 10, femoral n.; 11, external iliac v.; 12, external iliac a.; 13, common iliac v.; 14, portal valve; 15, caudal renal v.; 16, caudal renal portal v.; 17, sciatic n.; 18, ischial a.; 19, ischial v.; 20, ureter; 21, internal iliac v.; 22, caudal mesenteric v.; 23, 23', middle and caudal renal aa.

5. SITEM REPRODUKSI

A. JANTAN

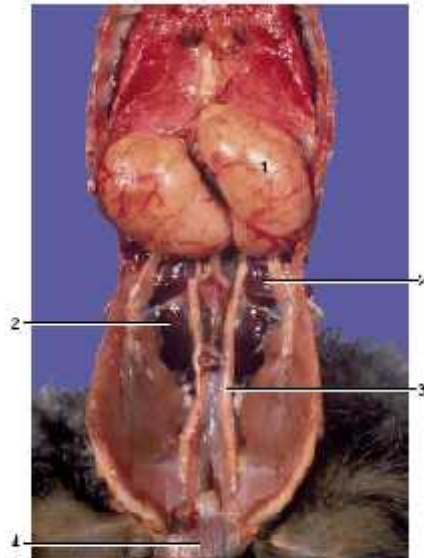


Figure 37-30 Ventral view of the male reproductive organs. 1, Testis; 2, kidney; 3, deferent duct; 4, cloaca.

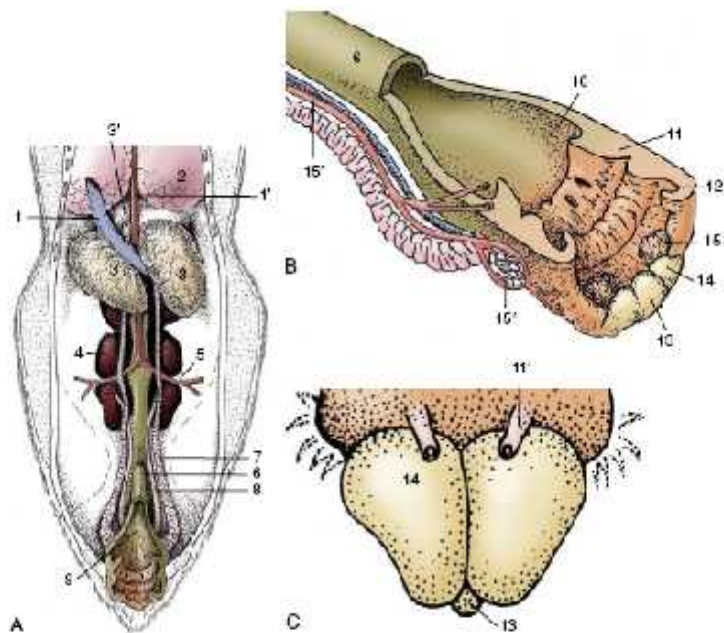


Figure 37-31 A, Ventral view of the male reproductive organs. B, The floor of the cloaca has been removed and is shown turned over. C, Caudal view of the tumescent phallus. 1, Caudal vena cava; 1', aorta; 2, lung; 3, testes; 3', right adrenal gland; 4, kidney; 5, ischial a.; 6, colon; 7, deferent duct; 8, ureter; 9, cloaca; 10, coelodeum; 11, urodeum; 11', papilla of right deferent duct; 12, procoelodeum; 13, median phallic tubercle; 14, lateral phallic body; 15, lymphatic folds; 15', paracloacal vascular body; 15'', pudenda artery.

B. BETINA

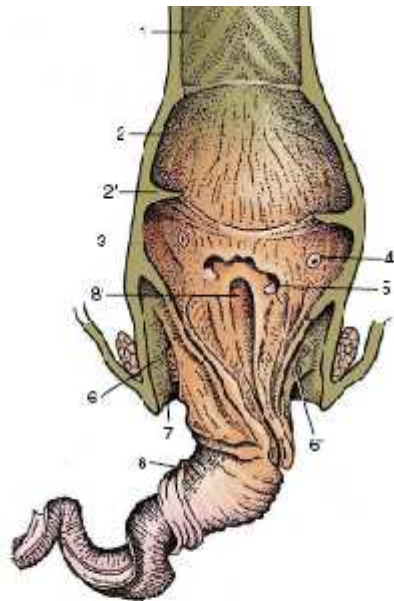


Figure 37-32 Cloaca of a drake with protruded phallus whose tip has been cut off, dorsal view. 1, Clobn; 2, coprodeum; 2', coprouroceal fold; 3, urodeum; 4, urateric orifice; 5, papilla of deferent duct; 6, proctodeum; 6', proctodeal glands; 7, lip of vent; 8, spiral groove of phallus; 8', beginning of spiral groove.



Figure 37-33 Ventral view of reproductive organs of a hen. 1, Ovary with follicles in different stages of development; 2, oviduct; 3, uterus; 4, colon; 5, cloaca.



Figure 37-34 Isolated female reproductive organs. 1, Ovary with follicles in different stages of development; 2, oviduct; 3, uterus; 4, colon; 5, cloaca.

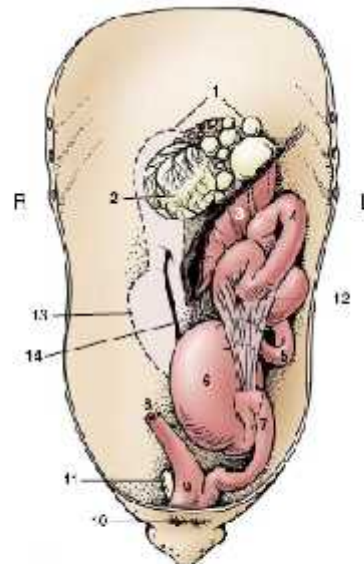


Figure 37-35 Ventral view of the reproductive organs of a laying hen, semischematic. 1, Ovary; 2, stigma on mature follicle; 3, infundibulum; 4, magnum; 5, isthmus; 6, uterus containing egg; 7, vagina; 8, colon; 9, cloaca; 10, vent; 11, vestigial right oviduct; 12, free border of ventral ligament of oviduct; 13, outline of right kidney; 14, right ureter.

LAMPIRAN 2

PROSEDUR PENGAMBILAN DAN PEMBUATAN PREPARAT DARAH

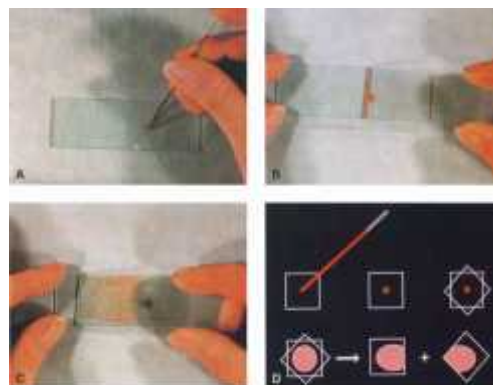
Prosedur Pengambilan dan Pembuatan Preparat Darah Apus Tepi :

1. Cari titik pada tubuh ternak yang banyak mempunyai pembuluh darah sehingga akan mempermudah dalam pengambilan darah. Bagian tersebut sebelumnya perlu dibersihkan/sterilisasi dengan alkohol. Selain untuk sterilisasi, pembersihan dengan alkohol dapat meminimalisir terjadinya infeksi pada ternak setelah dilakukan pengambilan sampel darah.
2. Darah diambil langsung dari pembuluh darah ayam (*vena pectoralis*) dan sapi/kambing (*vena jugularis*) dengan menggunakan *syringe* 3 ml
3. Sebanyak satu tetes sampel darah diteteskan pada salah satu ujung objek glass, selanjutnya dengan menggunakan salah satu sisi dari glass objek yang lain dilakukan ulas darah (kemiringan $\pm 60^\circ$) dan dibiarkan hingga kering.
4. Preparat ulas dimasukkan kedalam larutan methanol selama ± 5 menit lalu dimasukkan ke dalam larutan pewarna giemsa 10 % selama ± 25 menit
5. Setelah itu bilas dengan aquadest dan ditunggu sampai kering. Lanjut identifikasi sel darah (praktikum)
6. Pemeriksaan dengan mikroskop dilakukan dengan pembesaran 100X

Catatan : fungsi metanol untuk fiksasi, yaitu untuk membunuh sel-sel pada sediaan tanpa mengubah posisi (struktur) organel yang ada di dalamnya sedangkan pewarna giemsa 10% sebagai pewarna yang umum digunakan agar sediaan terlihat lebih jelas.



Pengambilan darah melalui *vena pectoralis* pada ayam (A) dan *vena jugularis* pada kambing (B) dan sapi (C). Sumber : Balai Besar Veteriner Maros, 2012

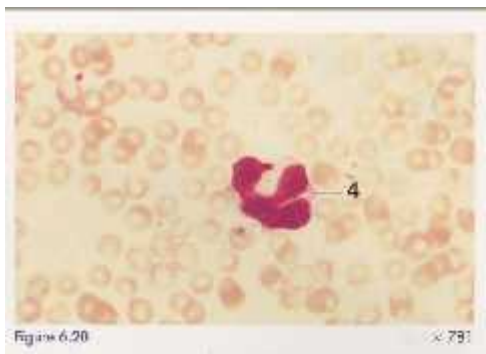
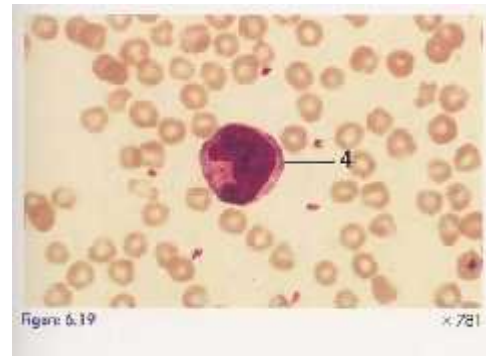
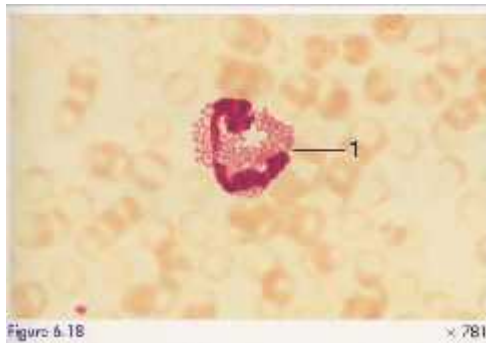
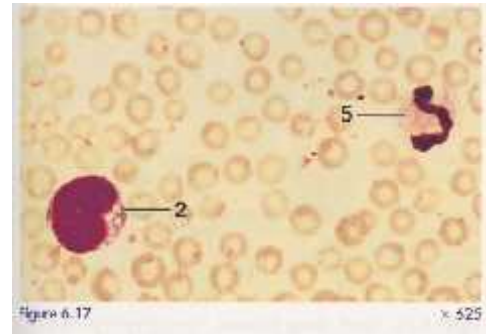
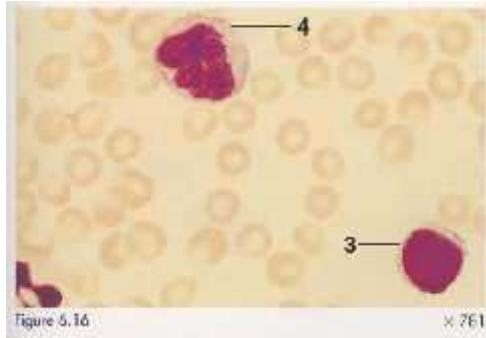


Pembuatan preparat ulas darah. Sumber : *Colour Atlas of Veterinary Hematology* 2001.

LAMPIRAN 3

IDENTIFIKASI SEL DARAH

Atlas of Veterinary Hematology



KEY	
1. Eosinophil	4. Monocyte
2. Lymphocyte, large	5. Neutrophil
3. Lymphocyte, medium	

Figure 6.16. Blood, Cow (Giemsa). Medium lymphocyte and monocyte. The cytoplasm of the monocyte is darker and more granular than that of the lymphocyte.

Figure 6.17. Blood, Cow (Giemsa). Large lymphocyte and neutrophil. Large lymphocytes of the cow often show a deeply indented nucleus. Their cytoplasm is granular and vacuolated.

Figure 6.18. Blood, Cow (Giemsa). The red granules of the eosinophil are small, round, and intensely stained in the cow. The nucleus may be foreshortened, but is usually C-shaped.

Figure 6.19. Blood, Sheep (Giemsa). The nucleus of the monocytes of ruminants may be oval, indented, or trilobed. The cytoplasm is gray-blue and vacuolated and may contain granules.

Figure 6.20. Blood, Sheep (Giemsa). Monocyte with trilobed nucleus. Compare with figure 6.19. Our observations have revealed that some monocytes with trilobed nuclei occur in cows and goats also.

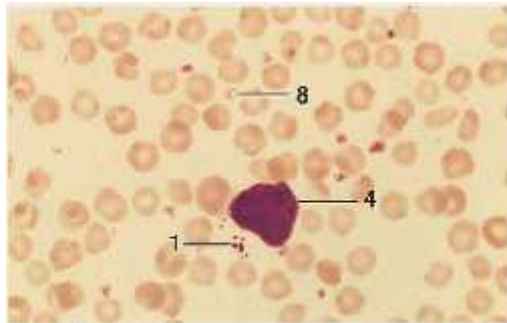


Figure 6.21 Blood, Sheep (Giemsa) Lymphocyte with azurophilic granules. $\times 781$

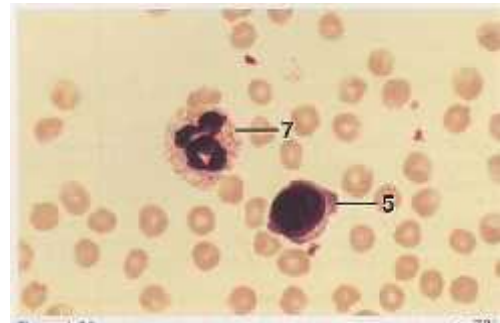


Figure 6.22 Blood, Sheep (Giemsa), lymphocyte and neutrophil. $\times 781$

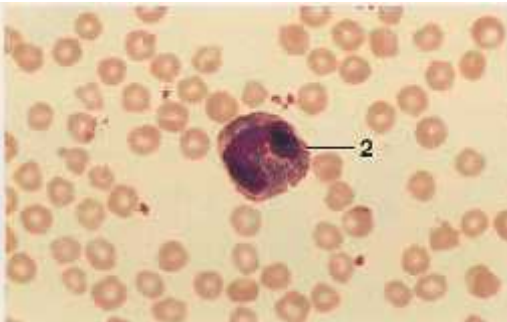


Figure 6.23 Blood, Sheep (Giemsa), The eosinophil of the sheep. $\times 781$

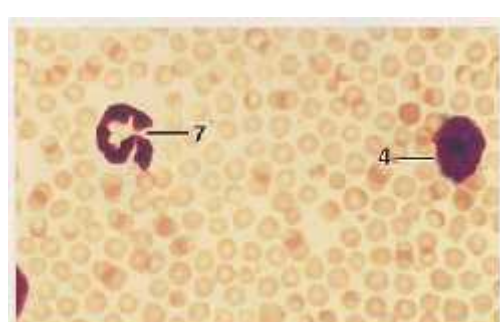


Figure 6.24 Blood, Goat (Giemsa), A lymphocyte and a neutrophil. $\times 781$

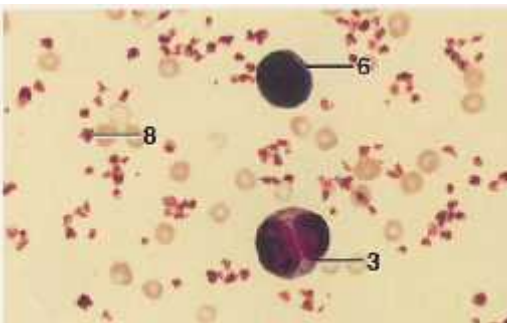


Figure 6.25 Buffy Coat, Goat (Giemsa). $\times 781$

KEY	
1. Azurophilic granules	5. Lymphocyte, medium
2. Eosinophil	6. Lymphocyte, small
3. Lymphocyte, birucleate	7. Neutrophil
4. Lymphocyte, large	8. Platelet

Figure 6.21. Blood, Sheep (Giemsa). Lymphocyte with azurophilic granules.

Figure 6.22. Blood, Sheep (Giemsa), lymphocyte and neutrophil. The cytoplasm of the neutrophil of sheep and goats contains numerous small and a few large, pink granules. A perinuclear halo is commonly seen around the periphery of the nucleus of lymphocytes.

Figure 6.23. Blood, Sheep (Giemsa). The eosinophil of the sheep contains pink, densely packed, oval granules that are uniform in size.

Figure 6.24. Blood, Goat (Giemsa). A lymphocyte and a neutrophil. The chromatin of the lymphocyte is in the form of closely apposed clumps. Granules are evident in the cytoplasm of the neutrophil.

Figure 6.25. Buffy Coat, Goat (Giemsa). Some lymphocytes of the cow, sheep, and goat are birucleate.

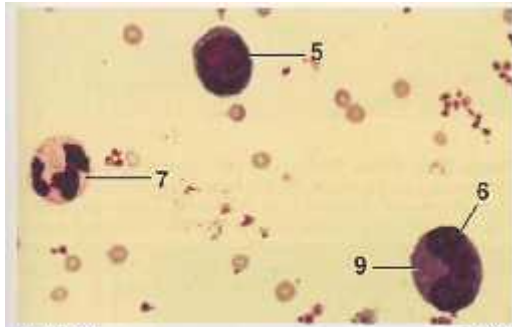


Figure 6.26 × 625

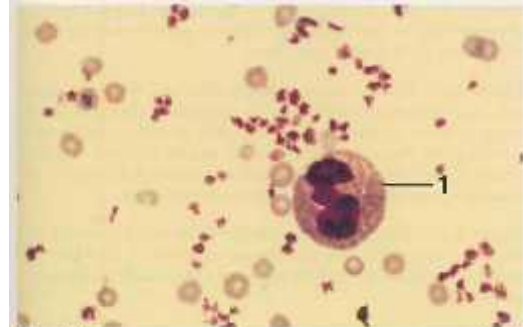


Figure 6.27 × 781



Figure 6.28 × 250

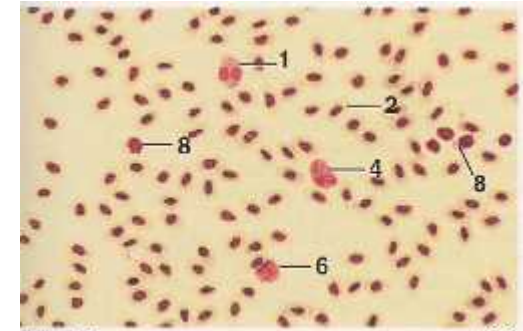


Figure 6.29 × 312

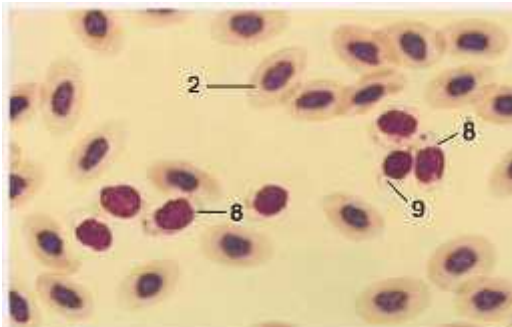


Figure 6.30 × 781

KEY	
1. Eosinophil	6. Monocyte
2. Erythrocyte	7. Neutrophil
3. Granulocyte	8. Thrombocyte
4. Heterophil	9. Vacuole
5. Lymphocyte, large	

Figure 6.26. Buffy Coat, Goat (Giemsa). Lymphocyte, monocyte, and neutrophil. The cytoplasm of the monocyte is blue and contains vacuoles that are often seen in clusters.

Figure 6.27. Buffy Coat, Goat (Giemsa). The small, round, acidophilic granules of the eosinophil of the goat almost fill the cytoplasm.

Figure 6.28. Blood Cells in Section, Chicken. Elongated, nucleated red blood cells and a few granulocytes are shown in the lumen of a blood vessel.

Figure 6.29. Blood, Chicken (Wright-Giemsa). Erythrocytes, leukocytes, and thrombocytes.

Figure 6.30. Blood, Chicken (Wright-Giemsa). An oval, coarsely granular nucleus and a vacuolated cytoplasm with one or more magenta granules characterize the thrombocyte.

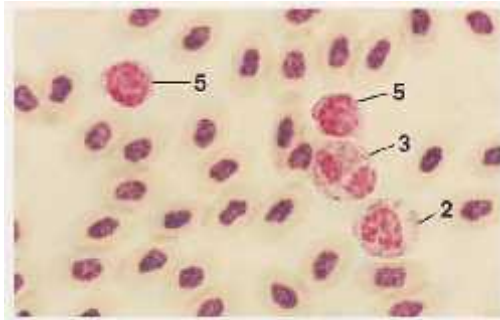


Figure 6.31 × 781



Figure 6.32 × 781



Figure 6.33 × 781

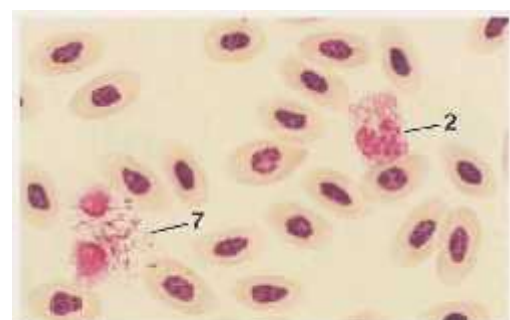


Figure 6.34 × 781

KEY

- | | |
|-------------------------|-----------------------|
| 1. Basophil | 5. Lymphocyte |
| 2. Eosinophil | 6. Monocyte |
| 3. Heterophil | 7. Smudged heterophil |
| 4. Immature erythrocyte | |

Figure 6.31. Blood, Chicken (Wright-Giemsa). Eosinophil, two lymphocytes, and a heterophil. The heterophil has numerous rod-shaped granules. Some of these may show a ruby-red, spheric granule at the center. The nuclear chromatin is coarse and densely packed. In contrast, the eosinophil has fewer, round, pink granules in a pale blue cytoplasm. The nuclear chromatin is blocklike, the blocks being distinctly separated from each other.

Figure 6.32. Blood, Chicken (Wright-Giemsa). Monocyte and heterophil. Many of the rod-shaped granules of the heterophil have a ruby red, spheric granule at their center. This is a common characteristic of the heterophil. The monocyte has a pale, basophilic, and vacuolated cytoplasm.

Figure 6.33. Blood, Chicken (Wright-Giemsa). Basophil, monocyte, and immature erythrocyte. The basophil is characterized by large numbers of medium-size basophilic granules. Unlike other granulocytes, the nucleus of this cell is usually unlobed. The cytoplasm of the immature erythrocyte is more basophilic and the nucleus is less condensed than in a mature erythrocyte.

Figure 6.34. Blood, Chicken (Wright-Giemsa). Eosinophil and smudged heterophil. The rod-shaped granules of the heterophil and the round granules of the eosinophil are clearly visible in this preparation.