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INTRODUCTION

Course Title: General Anatomy (Deals with the basic facts and knowledge)

Course Code: ANHP 125 & ANHP 126 Credit Hour: 2+1

Anatomy ("Ana"-apart "tomy"-cutting)

- Anatomy is a Greek word, literally means cutting apart or disassociating of the parts of the body.
- Anatomy is the branch of biological science which deals with the **form and structure** of an organism.

Importance of anatomy

- ⇨ Anatomy is the fundamental for veterinary medical science.
- ⇨ Anatomical knowledge is prerequisite for successful clinical practice.

Classification: Broadly anatomy classified into

1. Macroscopic anatomy/Gross Anatomy
2. Microscopic anatomy/Histology
3. Developmental anatomy/Embryology

- ***Gross Anatomy/Macroanatomy/Naked eye anatomy***: is the branch of anatomy which deals with the form and structure of an organism with unaided eye or naked eye.
- ***Microscopic anatomy/Histology***: deals with the form and structure of an organism with the help of microscope.
- ***Developmental anatomy/Embryology:*** deals with formation and development of an organism.

Veterinary Anatomy

Veterinary anatomy deals mainly with the form and structure of the ***principal domesticated animals and birds.***

Branches of Veterinary Anatomy:

- Canine anatomy- Anatomy of the dog (*Canis familaris*)
- Feline anatomy- cat (*Felis catus*)
- Swine anatomy- pig (*Sus domestica*)
- Equine Anatomy- Anatomy of horse (*Equus caballus*)
- Bovine Anatomy- Anatomy of ox (*Bos indicus/taurus*)
- Ovine Anatomy-Antomy of sheep *(Ovis aries).*
- Caprine anatomy- Anatomy of goat (*Capra hircus*) and
- Avian anatomy- Anatomy of birds (*Gallus domesticus*)

Methods of study: Dissection of dead animals (cadaver) is the most important and efficient method to study and comprehend anatomy.

Two approach: Systematic (Systematic means serially/chronologically/sequentially) and Regional approach

1. Systematic anatomy: is the method of study ***following different systems*** of the body present.
2. Regional anatomy/Topographic anatomy: the methods by which relative positions of various parts of the body are accurately determined. Related with form and relationship of all the organs present in a particular parts or regions of the body. Anatomy of a particular region. e.g., Anatomy of head, forelimb

Other approaches: Comparative, special, applied/surgical, sectional etc.

Comparative Anatomy: comparative anatomy is the description and comparison of the structure of animals and forms the basis for their classification.

Special Anatomy: is the description of the structure of a single type or species.

Applied Anatomy: It deals with the anatomical facts or knowledge in their relation to surgery, physical diagnosis and other practical branches.

Sectional Anatomy: deals with various sections of image such as such as X-ray, ultrasound, computer tomography (CT) or magnetic resonance imaging (MRI)

Table: Nomenclature of Systematic anatomy

System	*Name of Study*	*Chief Structures*
Skeletal system	Osteology	Bones
Articular system	Arthrology	Joints
Muscular system	Myology	Muscles
Digestive system	Splanchnology	Stomach and intestines
Respiratory system	Splanchnology	Lungs and airways
Urinary system	Splanchnology	Kidneys and urinary bladder
Reproductive system	Splanchnology	Ovaries and testes
Endocrine system	Endocrinology	Ductless glands
Nervous system	Neurology	Brain, spinal cord, and nerve
Circulatory system	Cardiology	Heart and vessels
Sensory system	Esthesiology	Eye and ear

Branches of systematic anatomy:

1. **Osteology:** is the branch of systematic anatomy which *deals with description of bones*
2. **Arthrology/Syndesmology**: is the branch of systematic anatomy which deals with description of joints and associated structure.
3. **Myology**: is the branch of systematic anatomy which deals with *muscles* and associated structure
4. **Splanchnology** (*Splanch means Viscera*): is the branch of systematic anatomy which deals with viscera. It is again subdivided into-
   digestive system, respiratory system and urogenital system-includes urinary system and genital system
5. **Angiology-** is the branch of systematic anatomy which deals with description of the *organs of circulation*.
6. **Neurology**- is the branch of systematic anatomy which deals with the nervous system
7. **Aesthesiology**- is the branch of systematic anatomy which deals with the sense organs and common integuments.

Anatomical terms and Language

In order to indicate precisely the position and direction of the parts of the body, some terms are used. These are called descriptive terms of anatomy or anatomical language. These terms are used for quadruped (animal) in standing position. These terms differs from human anatomical position.

In veterinary medicine, anatomical terminology varies significantly from that of human medicine because ***animals are quadruped (animals with four legs) humans are biped.***

In human anatomy, ANTERIOR, means toward the front of the body (where the mammary glands are in males and females) and POSTERIOR means toward the back of the body (where you can feel your backbone). In quadrupedal animals, the area where the mammary glands are located is on the ventral part of the body, and the backbone is on the dorsal aspect of the body.

So anterior and posterior terms are not applicable to veterinary medicine except few cases. *Instead we use cranial for anterior and caudal for posterior.*

- **NAV**: Nomina Anatomica Veterinaria (1968), terms of the NAV are generally Latin.

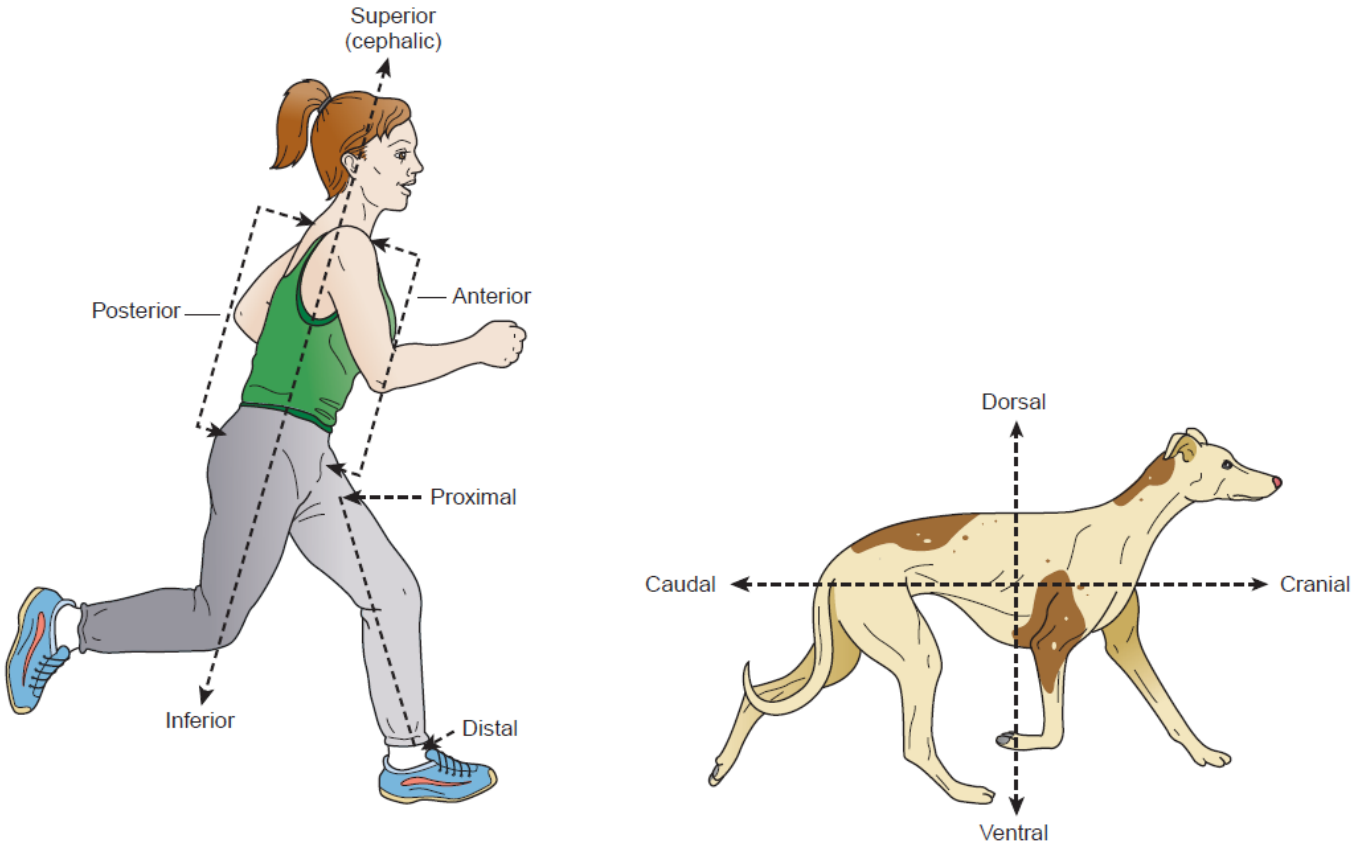


FIGURE 1.1: Anatomical terminology describing body direction: human vs. animal.

Anatomical Terms

Term	Meaning	Term	Meaning
Cranial	Towards the head (cranium)	Axial	Close to the axis of central digit
Rostral	Towards the tip of the nose	Abaxial (ab, away from)	Away from the axis
Caudal	Towards the tail (cauda)	External	Located outside
Dorsal	Towards the back (dorsum)	Internal	Located inside
Ventral	Towards the belly (venter)	Superficialis	Located near the surface
Medial	Towards the centre/middle	Profundus	Located in the depth
Lateral	Towards the side (latus, flank)	Temporal	Towards the temporal bone
Median	In the middle	Nasal	Towards the nose
Proximal	Towards the trunk	Superior	Above eyelid
Distal	Away from the trunk	Inferior	Below eyelid
Palmer	Towards the palm of the hand	Apical	Towards the tip
Planter	Towards the sole of the foot	Oral	Towards the mouth
Recumbent	Lying down	Oblique	At an angle

Virtual planes of the animal body

Median plane	Dividing the body in two equal parts
Paramedian plane	Any plane parallel and close to the median plane
Sagittal plane	Any plane parallel to the median plane but located further lateral
Dorsal plane	Any plane parallel to the dorsal surface
Transverse plane	Any plane perpendicular to the long axis

Terms commonly used in Veterinary Medicine

- A prefix is found at the beginning of a word, e.g. peri in pericardium. The prefix itself has a general meaning, e.g. peri means ‘around’, but when combined with another word it gives a specific meaning: pericardium meaning literally ‘around the heart’. Prefixes are given in Table A.1.

- A suffix is found at the end of a word, e.g. cyte in osteocyte. Suffixes also have a general meaning, e.g. cyte means ‘cell’, but when added to a word it becomes specific: osteocyte meaning ‘bone cell’. Suffixes are given in Table A.2.

- The root of a word is the essence of its meaning, e.g. pericardium. The root often refers to the organ, structure or disease in question; the root cardium relates to the heart. It can be considered as the 'word element', which is often derived from a Latin or Greek word. Roots are given in Table A.3. Other words simply have a meaning that can be used within a word, e.g. genesis means 'creation' or 'origination'. Thus, carcinogenic means that something 'creates' cancer; similarly pathogenic means 'causing disease'.

Table A.1 Common prefixes

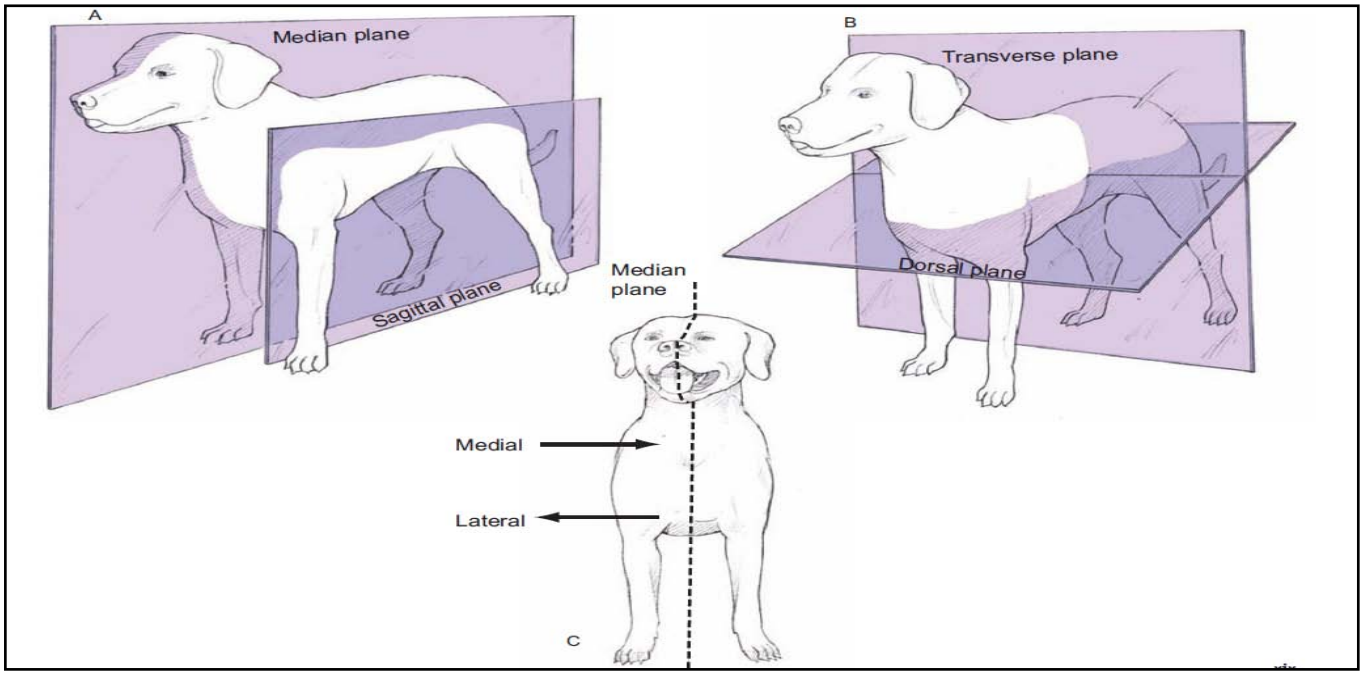
Prefix	Meaning	Examples
A-	Without; not	*Avascular* – without a blood supply
Anti-	Working against; counteracting	*Antibody* – neutralises antigens; *antiseptic* – inhibits growth of bacteria; *antihistamine* – inhibits the effects of histamine
Ante- (also **Pre-**)	Before	*Anterior* – structures at the front of the body; *antenatal* – before parturition; *prepubic* – in front of the pubis
Brady-	Slow	*Bradycardia* – slow heart rate; *bradypnoea* – slower than normal breathing
Cyto-	A cell	*Cytotoxic* – something that has a damaging effect on cells (e.g. cytotoxic drugs)
Dys-	Difficult; impaired	*Dyspnoea* – difficulty in breathing; *dysplasia* – an abnormality of development
Endo-	Within	*Endometrium* – the inner lining of the uterus; *endothelium* – the layer of epithelial cells that lines the inside of the heart and blood vessels
Epi-	Upon; outside of	*Epidermis* – the outermost layer of the skin; *epiglottis* – cartilaginous structure that guards the entrance to the larynx
Eryth(ro)-	Red	*Erythrocyte* – red blood cell; *erythema* – redness of the skin
Hyper-	Excessive; increased	*Hypertensive* – high blood pressure; *hypertrophy* – increase in the size of a tissue or organ
Hypo-	Decreased; deficient; beneath	*Hypothermia* – low body temperature; *hypodermis* – the subcutis that lies beneath the skin
Peri-	Around; in the region of	*Periosteum* – the connective tissue that surrounds a bone; *perianal* – around the anus
Poly-	Many; much	*Polyoestrous* – having more than one oestrous cycle a year; *polyarthritis* – inflammation of several joints; *polypeptide* – a compound containing three or more linked amino acids
Post-	After; behind	*Postmortem* – after death; *postoperative* – after a surgical operation; *posterior* – towards the rear
Pyo-	Pus	*Pyometra* – presence of pus in the uterus; *pyoderma* – bacterial infection of the skin
Tachy-	Rapid	*Tachycardia* – elevated heart rate

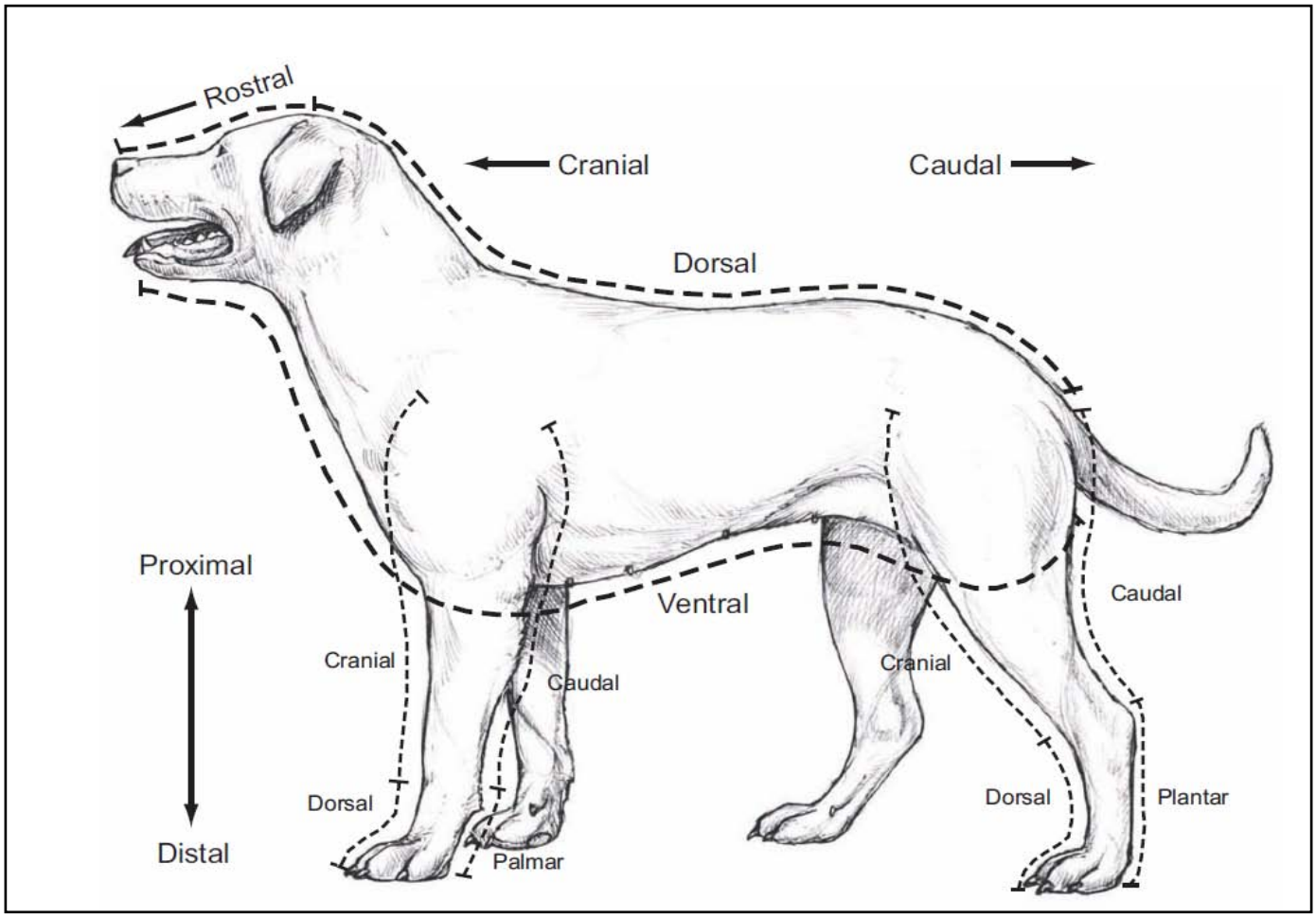
Table A.2 Common suffixes

Suffix	Meaning	Examples
-aemia	Relates to the blood	*Ischaemia* – reduced or deficient blood supply; *viraemia* – the presence of virus particles in the bloodstream
-cyte (**cyto-** is the prefix used)	A cell	*Erythrocyte* – red blood cell; *chondrocyte* – cartilage cell; *hepatocyte* – liver cell
-ectomy	Surgical removal of	*Thyroidectomy* – removal of the thyroid gland
-genic	Giving rise to; causing	*Pathogenic* – causing disease; *carcinogenic* – causing neoplasia or cancer
-ia/-iasis	Condition or state	*Hypoplasia* – incomplete development of an organ or tissue; *distichiasis* – presence of a double row of eyelashes
-itis	Inflammation	*Arthritis* – inflammation of a joint; *hepatitis* – inflammation of the liver; *conjunctivitis* – inflammation of the conjunctiva of the eye
-oma	Tumour, neoplasm	*Sarcoma* – malignant tumour; *lipoma* – benign tumour of adipose tissue
-osis	Disease order or state	*Osteochondrosis* – a developmental disease of articular cartilage
-ostomy	Surgical opening	*Tracheostomy* – opening into the trachea; *colostomy* – opening into the colon

Table A.3 Common roots of words

Root word	Meaning	Examples
Arthr(o)	Joint; articulation	*Arthrodesis* – surgical fusion of a joint; *arthritis* – inflammation of a joint
Cardi(o)	Heart	*Cardiology* – the study of the heart and its function; *myocardium* – muscle layer of the heart
Chondr(o)	Cartilage	*Chondrocyte* – cartilage cell; *perichondrium* – membrane that covers cartilage
Cyst(o)	Bladder	*Cystotomy* – incision into the bladder; *cystitis* – inflammation of the urinary bladder
Derm(ato)	Skin	*Dermatitis* – inflammation of the skin
Gloss(o) (also **lingual**)	Tongue	*Hypoglossal* – situated below the tongue (also *sublingual*)
Haem(ato/o)	Blood	*Haematemesis* – vomiting blood; *haemorrhage* – the escape of blood from a ruptured vessel
Hepat(o)	Liver	*Hepatocyte* – liver cell; *hepatic artery* – artery that supplies blood to the liver
Hist(io/o)	Tissue	*Histology* – the study of tissues
Mamm(o) (also **mast(o)**)	Breast; mammary gland	*Mammogram* – radiograph of a mammary gland; *mastectomy* – surgical removal of mammary gland
Metr(a/o)	Uterus	*Endometrium* – lining of the uterus; *metritis* – inflammation of the uterus
My(o)	Muscle	*Myositis* – inflammation of a voluntary muscle
Neur(o)	Nerve	*Neuralgia* – pain in a nerve; *neuron* – nerve cell
Ophthalm(o)	Eye	*Ophthalmoscope* – instrument used to examine the interior of the eye
Orchi(d)	Testis (testicle)	*Orchitis* – inflammation of a testis; *cryptorchid* – having an undescended testicle
Oste(o)	Bone	*Osteomyelitis* – inflammation of bone
Pneum(o)	Air or gas; lung	*Pneumonia* – inflammation of the lung tissue; *pneumothorax* – the presence of free air in the thorax
-pnoea	Respiration; breathing	*Apnoea* – temporary cessation in breathing
Ren-	Kidney	*Renal artery* – the artery that supplies the kidney with blood
Rhin(o)	Nose	*Rhinitis* – inflammation of the mucous membrane of the nose
Trich(o)	Hair	*Trichosis* – any disease of, or abnormal growth of hair
Vas(o)	Vessel; duct	*Vascular* – pertaining to blood vessels; *vasoconstriction* – decrease in the diameter of a blood vessel; *vasectomy* – excision of the vas deferens (deferent duct)





Textbooks

1. Anatomy and Physiology of Farm Animals by Frandson and Spurgeon 7th edition
2. Veterinary Anatomy of Domestic Mammals: Textbook and Colour Atlas by Horst Erich Konig and Hans-Georg Liebich 1st edition
3. Textbook of Veterinary Anatomy by Dyce, Sack and Wensing 4th edition
4. Sisson and Grossman's The Anatomy of Domestic Animals by Robert Getty 5th edition
5. A Textbook of Veterinary Anatomy by Septimus Sission 2nd edition
6. Introduction to Veterinary Anatomy and Physiology Textbook by Aspinall and Cappello 2nd ed
7. Bovine anatomy by Budras and Habel
8. Anatomy of the dog by Budras, Fricke, McCarthy and Richter
9. Spurgeon's Color Atlas of Large Animal Anatomy: The Essentials by McCracken and Kainer
10. Color Atlas of Small Animal Anatomy by McCracken Kainer and Carlson