

BASIC SCIENCES • ANATOMY

— STUDY NOTES

Veterinary Gross Anatomy Notes: Regions, Cavities and Organ Systems (PDF)

Gross anatomy is whatever the unaided eye can resolve, and it comes in two arrangements that are both called by that name. **Systematic** anatomy orders the body by organ system; **regional** (topographic) anatomy orders it by part of the body and describes everything found there together. These notes are the regional map: the five divisions, the named regions of the trunk with their boundaries, the three cavities they enclose, and what lies behind each wall.

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- Four aspects, and where the map stops

LEVEL

Vets & veterinary students

EDITION

2026-09-04

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- 2 Five divisions, and what a region is
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- 8 Four aspects, and where the map stops

LEARNING OBJECTIVES

After working through these notes you will be able to:

- ✓ **Define** gross anatomy, and **distinguish** the systematic from the regional arrangement of the same material.
- ✓ **Name** the five major divisions of the body and the principal regions of the trunk.
- ✓ **State** a region's boundaries in structures that can be palpated on a standing animal.
- ✓ **Locate** the three parts of the flank and **justify** why large-animal work needs them.
- ✓ **Predict**, for a named region, which organs a regional account will describe there.

TL;DR

Gross anatomy is whatever the unaided eye can resolve, and it comes in two arrangements that are both called by that name. **Systematic** anatomy orders the body by organ system; **regional** (topographic) anatomy orders it by part of the body and describes everything found there together. These notes are the regional map: the five divisions, the named regions of the trunk with their boundaries, the three cavities they enclose, and what lies behind each wall.

AT A GLANCE

TWO ARRANGEMENTS	Systematic, by organ system · regional (topographic), by part of the body
FIVE DIVISIONS	Head (<i>caput</i>) · neck (<i>collum</i>) · trunk (<i>truncus</i>) · tail (<i>cauda</i>) · limbs (<i>membra</i>)
CHEST REGIONS	Presternal · sternal · cardiac · costal
THE FLANK, TOP DOWN	Paralumbal fossa · cord of the flank · slope of the flank
ABDOMINAL CAVITY	Diaphragm cranially → terminal line caudally
FOUR ASPECTS	Surface · applied · surgical · radiographic

01 Two arrangements, both called gross

- **Gross** = resolvable with the unaided eye. Not a map — a depth.
- **Systematic** — organs grouped because their functions are related. Compares well between species; easier to learn first.
- **Regional (topographic)** — everything present in one part of the body, whatever system it belongs to. Less attention to function, immediate clinical application, and it must be given **species by species**.
- A textbook titled *gross anatomy* is usually the **regional** one.

ONE SUBJECT, TWO ARRANGEMENTS

Two ways to organise the same body

SYSTEMATIC	REGIONAL
By organ system	By part of the body
Digestive, respiratory	Neck, thorax, flank
The stomach, once	The flank, all at once
Easier to learn first	How the clinic sees it

Both are **gross** anatomy. This page is the regional map.

Fig 1 — The same body, arranged two ways. Diagram — Vet-eBooks.com, drawn for this guide.

02 Five divisions, and what a region is

- Head (*caput*) · neck (*collum*) · trunk (*truncus*) · tail (*cauda*) · limbs (*membra*) — distinguishable from the outside.
- Each is subdivided into **regions**, the descriptive units of topographic anatomy.
- **A region has a stated boundary**, and everything inside it is described together. The NAV lists them under *Regiones corporis*, each with its boundary.

03 The trunk, region by region

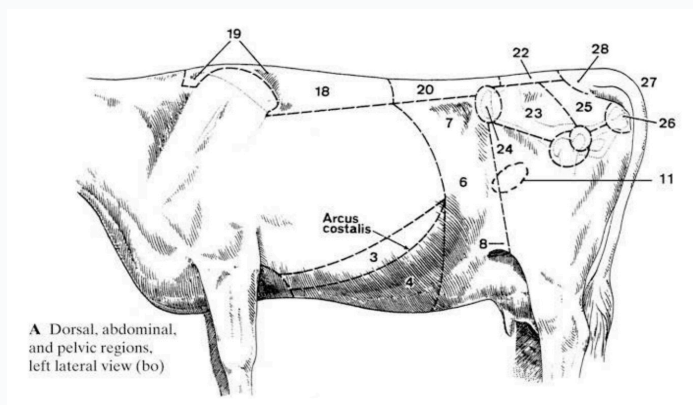


Fig 2 — The NAV's surface regions on an ox; numbers keyed below. Image — Constantinescu (ed), *Illustrated Veterinary Anatomical Nomenclature*, 4th ed. Reproduced for educational reference.

NO.	REGION	WHERE IT RUNS
3	Hypochondriac	Over the costal cartilages
4	Xiphoid	Between the costal arches, to the last rib's ventral end
6	Lateral abdominal — the flank	The side of the belly, to the level of the tuber coxae
7	Paralumbur fossa	Lumbar transverse processes above, cord below, last rib in front
8	Fold of the flank	Formed by the dorsal border of the abdominal cutaneous muscle
18	Thoracic vertebrae	Dorsal neck back to the lumbar region
19	Interscapular	Between the scapular borders — the withers
20	Lumbar	Over the lumbar vertebrae
22–26	Sacral, gluteal, tuber coxae, clunis, tuber ischiadicum	The pelvis, named off its bony points
27–28	Tail and root of the tail	Caudal end

- Chest regions (*Regiones pectoris*): **presternal, sternal, cardiac, costal**. Advancing the thoracic limb **enlarges the cardiac region** — which is why it makes auscultation easier.
- Across species the map is stable and the **proportions** change.

04 Finding a boundary by hand

- **Neck:** atlanto-occipital transverse plane to the prescapular groove. The **wings of the atlas** and the **transverse processes of C3–C6** are palpable.
- **Jugular groove:** ventral part of the lateral neck; the external jugular vein lies in it and is the vessel of choice for IV injection.
- △ In large animals the **omohyoid** separates that vein from the common carotid **only in the cranial and middle thirds**. Inject there — not in the caudal third, where the artery is unprotected and the cutaneous muscle also covers the vein.

05 The flank, in three parts

LARGE MAMMALS — DORSAL TO VENTRAL

The flank, in three parts

1 • Paralumbar fossa Behind the last rib, under the lumbar processes

2 • Cord of the flank Internal oblique, tuber coxae to last rib

3 • Slope of the flank The wall below the cord

WHY THE LEFT ONE MATTERS

Where the rumen is heard and the bloat trocar goes.

Fig 3 — Fossa, cord, slope — top to bottom. Diagram — Vet-eBooks.com, drawn for this guide.

- **Paralumbar fossa** — lumbar transverse processes dorsally, the cord ventrally, the last rib cranially.
- **Cord of the flank** — the internal abdominal oblique, tuber coxae to last rib, attaching at the **last costochondral joint**. A muscle, not a surface mark.
- **Slope of the flank** — the wall below the cord. Conventional usage: the 5th ed. of the N.A.V. names nothing specific distal to the cord.
- **Left paralumbar fossa** = rumen auscultation and palpation (7–12 contractions in five minutes) and the bloat trocar site.

06 The three cavities

CAVITY	LIMITS	WORTH REMEMBERING
Thoracic	Inside the rib cage, cranial to the diaphragm	The diaphragm domes forward, so the chest is shorter than the ribs suggest

CAVITY	LIMITS	WORTH REMEMBERING
Abdominal	Diaphragm cranially → terminal line caudally	Its rib-covered part is the intrathoracic part of the abdominal cavity
Pelvic	From the terminal line caudally	Continuous with the abdominal cavity, not sealed off from it

- **Roof of the abdomen:** vertebral column and its muscles. Kidneys, adrenal glands, aorta, caudal vena cava, lumbar lymphatic trunks and lumbar nerves lie against it **retroperitoneally**.
- **Contents:** digestive organs, urogenital system and endocrine glands, with their supply vessels, nerve tracts, mesenteries and ligaments.

07 Organ topography

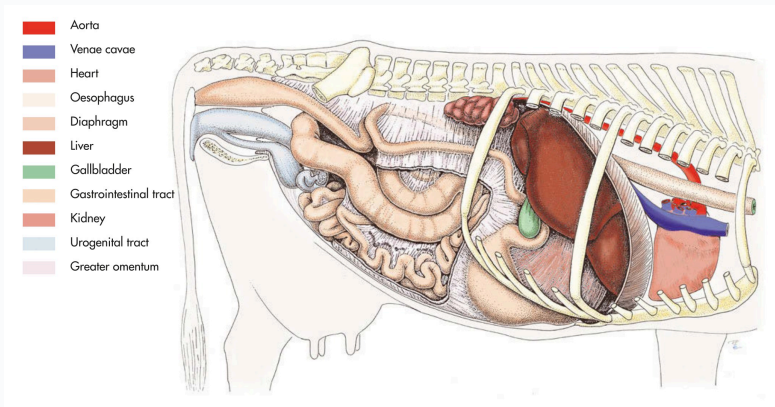


Fig 4 — Cow, right lateral, wall removed. Head to the right. Image — König & Liebich, *Veterinary Anatomy of Domestic Animals*, 7th ed. Reproduced for educational reference.

- The question: **stand here, what is under my hand and what is behind that?**
- In ruminants the **rumen occupies the left half** of the abdomen and pushes the intestines **right**. Left fossa → rumen; right fossa → intestine, with the liver further forward under the ribs.
- The regions are symmetrical. The topography is not — which is why regional anatomy has to be taught species by species.

08 Four aspects, and where the map stops

ASPECT	THE QUESTION IT IS ORGANISED AROUND
Surface	What can I see and feel, and what does it say is underneath?
Applied	Which anatomical facts change what I do to this animal?

ASPECT	THE QUESTION IT IS ORGANISED AROUND
Surgical	What will I meet, in order, if I open here?
Radiographic	What does normal look like in this projection?

- All four are **regional anatomy with an aim attached**, not separate branches. Dyce calls them terms “whose connotations overlap but hardly require definition”.
- **Fascia** is what separates one layer of a region from the next, which is why regional accounts are written outside-in. A fascial plane is a route and a barrier at once.
- **Birds are outside this map.** No diaphragm, air sacs, and a body wall the mammalian region names were not written for.

USE IT LIKE THIS

Take one region and answer three questions in order: where does its boundary run, which of those edges can I feel on a standing animal, and what lies immediately behind each one. Two regions done properly teach the method.

KEY TERMS — QUICK GLOSSARY

Gross (macroscopic) anatomy

Structure resolvable with the unaided eye.

Systematic anatomy

Organs grouped because their functions are related, i.e. by body system.

Regional (topographic) anatomy

Everything present in one part of the body, whatever system it belongs to.

Region

A named part of the body with a defined boundary, described as a whole. The NAV lists them under *Regiones corporis*.

Organ topography

Which organ lies where, and against what — the question a regional account exists to answer.

Terminal line

The caudal limit of the abdominal cavity and the start of the pelvic cavity.

Intrathoracic part of the abdominal cavity

The part of the abdominal cavity that still lies inside the rib cage, because the diaphragm domes forward.

Retroperitoneal space

Against the roof of the abdominal cavity: kidneys, adrenal glands, aorta, caudal vena cava, lumbar trunks and nerves.

Paralumbar fossa

The hollow of the flank — lumbar transverse processes dorsally, the cord ventrally, the last rib cranially.

Cord of the flank

The part of the internal abdominal oblique running from the tuber coxae to the last rib, attaching at the last costochondral joint.

QUICK REVISION — REMEMBER THESE

- 1 **Gross = resolvable by eye.** Defined against microscopic anatomy (the structures invisible to the eye) and developmental anatomy (conception to old age).
- 2 **Both maps are gross anatomy.** Systematic groups organs by function; regional takes one place and describes everything in it.
- 3 **A region has a stated boundary,** and the useful boundaries are palpable: wings of the atlas, transverse processes of C3–C6, the last rib, the tuber coxae.
- 4 **Large-animal IV goes in the cranial or middle third of the jugular groove,** because only there does the omohyoid separate the vein from the carotid.
- 5 **Flank, dorsal to ventral: fossa, cord, slope.** The cord is the internal abdominal oblique running from the tuber coxae to the last rib.
- 6 **Left paralumbar fossa = the rumen** — auscultation and palpation, 7–12 contractions in five minutes, and the bloat trocar site.
- 7 **Abdominal cavity: diaphragm → terminal line,** with the rib-covered part named the intrathoracic part of the abdominal cavity.
- 8 **The rumen fills the left half of the ruminant abdomen** and pushes the intestines right, so the two flanks answer different questions.
- 9 **Surface, applied, surgical and radiographic anatomy are aspects of regional anatomy,** not separate branches.

MEMORY AIDS

Fossa, Cord, Slope — always downhill — the three parts of the flank in dorsoventral order. The middle one is a **muscle**, not a surface mark, and fixing it fixes the other two.

D to T — the abdominal cavity runs **D**iaphragm to **T**erminal line. Everything cranial to the D is chest; everything caudal to the T is pelvis.

A system travels, a region stays put — a systematic chapter follows one system all over the animal; a regional chapter stays in one place and takes whatever it finds there.

TEST YOURSELF — ACTIVE RECALL

Cover the answers and try to retrieve each one from memory first — self-testing beats re-reading.

1. What does **gross** mean, and what two things is the term defined against?
2. Name the five major divisions of the body, with their Latin names.
3. What makes a region a region rather than an area?
4. Name the four most important regions on the surface of the chest.
5. Name the three parts of the flank, top down, and give the three boundaries of the first.
6. Where is the rumen auscultated, and how many contractions are normal in five minutes?

7. Where does the abdominal cavity begin and end — and what is the part of it inside the rib cage called?
8. Why are large-animal intravenous injections given in the cranial or middle third of the jugular groove?

ANSWERS

1. Resolvable with the unaided eye — against **microscopic** anatomy, which studies the structures invisible to the eye, and **developmental** anatomy, which follows the animal from conception to old age.
2. Head (*caput*), neck (*collum*), trunk (*truncus*), tail (*cauda*), limbs (*membra*).
3. A stated boundary, and the rule that everything inside it is described together — whatever system each structure belongs to.
4. Presternal, sternal, cardiac and costal.
5. Paralumbar fossa, cord of the flank, slope of the flank. The fossa is bounded dorsally by the lumbar transverse processes, ventrally by the cord (internal abdominal oblique, tuber coxae to last rib) and cranially by the last rib.
6. At the **left paralumbar fossa**; seven to twelve. The same site takes the trocar in bloat.
7. Diaphragm cranially to the terminal line caudally. The rib-covered part is the **intrathoracic part of the abdominal cavity**.
8. The omohyoid muscle separates the external jugular vein from the common carotid artery only there. In the caudal third the artery is unprotected and the cutaneous muscle also covers the vein.

WHEN TO REFER OR ESCALATE

- You are about to put a needle into a region whose boundary you cannot state — find the boundary first; the safe window is defined by it, not by the region's name.
- A textbook seems to leave out material you need — check which map it is on before assuming the material is missing.
- You are working on a bird with a mammalian region list — it does not transfer. No diaphragm, air sacs, and a differently built body wall.
- A structure's position surprises you in one species — ask what is filling the space. In ruminants the answer is usually the rumen.

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